Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as rangeland and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or a hardpan can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

General management needed for crops and pasture is suggested in this section. The estimated yields of some of the main crops and pasture plants are listed for each soil, and the system of land capability classification used by the Natural Resources Conservation Service and the Storie index used by the University of California Agricultural Experiment Station are explained.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the University of California Cooperative Extension Service.

Cropland Management

This section was prepared by Janine Hasey, Craig Weakley, John F. Williams, and Charles B. Wilson, University of California Cooperative Extension Service, and Ernst D. Paschke, Natural Resources Conservation Service.

The variety of different soils in Yuba County has led to diverse and intensive agricultural crop production in the valleys of the county. Orchards have been established on more than 25,000 acres of the more permeable soils near the river systems. Corn, alfalfa, and other row and field crops are grown on about 12,000 acres. Approximately 30,000 acres is used for rice. About 10,000 acres of irrigated pasture is in scattered areas throughout the valleys and on the lower foothills.

Although Yuba County has adequate water resources, these resources have yet to be fully developed. In the southern part of the county, some areas that currently are used for nonirrigated crops or for grazing could be developed for rice or other row or field crops.

The major goals of farm operators are achieving maximum production, maintaining product quality, and making a profit. To accomplish these goals, management practices are applied to maintain soil fertility, prevent excessive erosion, reduce maintenance requirements, and conserve energy and water.

The management practices needed in Yuba County include conservation cropping systems, applications of fertilizer, cover and green manure crops, chiseling and subsoiling, crop residue management, and pasture management. The conservation measures needed on irrigated land may include land leveling, irrigation pipelines, irrigation ditches, canal linings, drainage ditches, water-control structures, irrigation tailwater recovery systems, and irrigation water management. The irrigation systems commonly used in the county are level border, contour check, furrow, sprinkler, trickle, and microjet systems. Surface irrigation of pastures on foothills, commonly referred to as wild flooding, includes the use of contour head ditches and a series of spreader ditches to distribute water as evenly as possible across the hillside.

A *conservation cropping system* is a system in which the crop rotation and the cultural and management measures offset the undesirable effects of soil-depleting crops and erosion is controlled. Conservation cropping systems are applicable on all of the cropland in the survey area. Management considerations include the effect of weeds, disease, and insect pests resulting from a given crop rotation. Applications of fertilizer and other soil-improving practices generally are part of a conservation cropping system.

Applications of commercial fertilizer are essential for the successful production of all commercial crops in the survey area. Nitrogen and phosphorus are the primary nutrients needed for many crops. Potassium and zinc also are deficient for certain crops on some soils. The amount and kind of fertilizer and the time and method of application vary greatly, depending on the crop, the kind of soil, the crop rotation, and the amount of crop residue. Fertilizer requirements should be determined by periodic soil nutrient level tests and leaf analysis, especially for fruit and nut crops.

Cover and green manure crops are volunteer or planted annual grasses and legumes that provide seasonal protective cover. When the cover is disked in the spring, organic matter from these crops is added to the soil, improving infiltration, aeration, and tilth.

Chiseling and subsoiling increase the effective rooting depth in soils that have a plowpan or hardpan. Chiseling the plowpan and subsoiling the hardpan improve permeability and internal drainage, help to prevent the development of a perched water table, and allow deeper root penetration. Chiseling also temporarily improves soils that have a subsoil of clay, but these soils will eventually return to their original condition. The depth of subsoiling should be based on the depth of the hardpan. Such crops as rice grow well on these soils without modification of the hardpan.

Crop residue management is important in helping to maintain soil tilth, the content of organic matter, and fertility and in increasing the rate of water infiltration. Crop residue usually is incorporated into the soil. Rice stubble, however, is customarily burned. Burning the stubble helps to control diseases and is a practical way to dispose of the heavy amounts of organic matter. Some growers do not burn the stubble when they rotate rice with other crops. In orchards, large limbs are removed and burned, whereas small prunings generally are incorporated into the soil.

Pasture management is essential for achieving maximum forage production, maintaining desirable plant populations, and extending the productive life of the pasture. Rotation grazing and occasional mowing to maintain uniform growth are desirable. Deferred grazing when the soil is wet helps to prevent compaction. Commercial ranchers usually move livestock to annual rangeland during the winter rainy season, when pasture production is minimal and the soils are wet.

Irrigation water management can be achieved only if the land is properly leveled for the type of crops to be produced and the facilities necessary for the efficient distribution of water have been installed. Irrigation water should be applied according to crop requirements and at frequencies, rates, and amounts that will result in optimum production and minimum runoff and erosion.

The net irrigation water requirement for crops is the net amount of irrigation water that should be applied during the growing season. A crop with an 21-inch net irrigation requirement and a 70-percent irrigation efficiency requires 30 inches of gross water application during the growing season.

Although irrigated land in the valleys of the survey area has been leveled, much of the land is being releveled because of the need to improve efficiency. Pipelines or lined concrete ditches are replacing open-earth ditches because of the need to conserve water and reduce maintenance costs. Drainage ditches and erosion-control structures are needed in many areas to dispose of tailwater or winter surface runoff in a safe manner. On-farm irrigation tailwater return systems commonly are installed. Tailwater entering drainage ditches may supplement the irrigation water supply for downstream operators. Except when rice fields are drained in August or September prior to harvest, very little irrigation tailwater leaves the area during the irrigation season.

Technical assistance in planning and applying the practices needed to achieve optimum production and conservation benefits can be obtained from the local offices of the University of California Cooperative Extension Service and the Natural Resources Conservation Service.

Soils strongly influence the kinds of crops and pasture plants that can be grown in a given area. The following paragraphs describe the management practices needed in the areas used for some of the more important crops in the survey area.

Fruit crops include prunes, peaches, pears, kiwis, cherries, apples, and a variety of other tree and bush crops.

Prunes are grown on a variety of soils, including

Conejo, Shanghai, and Columbia soils. Since prunes are more tolerant of fine textures or a limited rooting depth than other orchard crops, plantings have been made on such soils as Kilaga and Kimball soils. Prunes are harvested with trunk shakers and catching frames. Irrigation water is most frequently applied in contour checks or level basins, but some furrow, border, sprinkler, and drip irrigation also is used. The net irrigation water requirement is about 22 inches annually. Nitrogen and potassium fertilizer is applied in some years according to soil and crop requirements. Foliar sprays containing zinc also are common. San Jose scale, peach twig borer, aphids, and mite eggs are controlled by a single spray during the dormant season. Russett scab and brown rot are typically controlled by a single spray during bloom.

Peaches are grown on Conejo, Columbia, and Shanghai soils. Most orchards are suitable for mechanical harvesting, though some are still handpicked. Nearly all of the peach orchards are surface irrigated. The net annual irrigation water requirement is about 26 inches. Peaches are labor intensive, requiring detailed pruning, hand thinning of the fruit, and an extensive pest-control program. Ground or aerial spraying programs for dormant insect and disease control and for control of blossom and preharvest brown rot are essential. Nitrogen is usually applied on a yearly basis. Foliar zinc sprays are commonly applied in the spring. The winter cover crop is disked into the soil in the spring, as soon as the orchards are dry enough for cultivation. Contour checks often serve for two periods of irrigation before being knocked down prior to disking for weed control. Periodic orchard planing is desirable to maintain a grade for efficient irrigation and winter surface drainage.

Pears are typically grown on Columbia, Shanghai, and Holillipah soils. Pears are labor intensive, requiring detailed pruning and extensive pest-control programs. Dormant sprays are applied for control of insects and mite eggs. During the spring, sprays are frequently applied for control of pear blight and codling moth. Nitrogen fertilizer is applied yearly. A foliar zinc spray is commonly applied in the spring. Pear orchards are surface irrigated. The net seasonal irrigation water requirement is about 25 inches.

Kiwi fruit has become a popular alternative crop for landowners with small parcels. Kiwis are best suited to soils that are naturally or artificially well drained or somewhat excessively drained, such as Columbia and Holillipah soils. One male vine for every eight female vines is generally planted. Construction of a trellis system is essential. The first commercial harvest is normally in the fourth year.

Site preparation before planting usually includes land leveling, ripping, and fumigation for pests, such as nematodes. Overhead sprinkler systems are installed primarily for protection from frost and for summer cooling, but they are also used for irrigation. A second irrigation system, frequently a drip or microsprinkler system, usually is installed. Vegetation is controlled by mowing between the rows and by applying herbicides within the rows. Windbreaks are frequently planted.

The nut crops in the survey area are primarily walnuts and almonds, but they include pistachio nuts on an increasing acreage.

Walnuts are grown on very deep, well drained or somewhat excessively drained soils, such as Holillipah, Horst, Columbia, and Conejo soils. Some orchards are interplanted with temporary trees, which are removed before the orchards become crowded. Applications of fertilizer are required and should be based on analysis of leaf tissue. Site preparation before planting includes land leveling, ripping to improve internal soil drainage, and fumigation to control soil-born pests. The net irrigation water requirement is about 35 inches per year if a cover crop is grown and 24 inches per year in clean-cultivated areas. Surface flood irrigation is common, but sprinklers and microsprinklers also are frequently used. Portable and solid set sprinklers are compatible with nontillage systems and with the harvesting procedures for this crop. Maintaining a smooth, firm surface permits sweeping and pickup of nuts from the ground after the trees are shook. Tree rows are strip-sprayed, and vegetation is mowed close to the ground. Pest control includes spraying for blight, codling moth, aphids, mites, and husk fly.

Almonds are generally planted in a square pattern. In Yuba County they grow best on the well drained Conejo and Horst soils, but they can be grown on the finer textured soils, such as Kilaga soils, when Marianna rootstock is used. Selection and spacing of appropriate pollinating varieties and adequate beehives are essential for good production. Pest control includes dormant spraying for mites, scales, and peach twig borer and blossom sprays for brown rot and shothole fungus. Applications of fertilizer are required and should be based on analysis of leaf tissue. The net irrigation water requirement is about 20 inches per year. Sprinkler and drip irrigation systems are used in almond orchards. Vegetation is controlled by mowing and strip-spraying the tree rows.

The field and row crops in Yuba County include rice, alfalfa, corn, winter-grown small grain, beans, and wildrice.

Rice makes up the largest acreage of any crop in the county. It grows well in the county because of the hot climate, adequate water, and the ability of soils to impound water. Rice is grown in leveled areas of fine textured soils and soils that have a hardpan or claypan, such as Capay, San Joaquin, and Kimball soils. To maintain a uniform water depth, contour check systems, straight check systems, or large level basins are used.

Water management is a critical production component. The seasonal water requirement ranges from 5 to 10 feet, depending on the soil type, the slope, and management. The fields are continuously flooded with water 3 to 8 inches deep throughout the growing season. They are usually flooded from April 20 to May 20. This period is followed by direct seeding of presoaked seed. Applications of fertilizer are required. Virtually all of the soils used for rice are deficient in nitrogen, many are deficient in phosphorus, and some are deficient in potassium. Zinc is rarely deficient for rice production. Most fertilizers are applied before the fields are flooded, but supplemental nitrogen is often needed in the middle of the growing season. Most seeding is by air. Pesticides generally are applied by air, whereas fertilizers frequently are applied by a combination of air and ground methods.

Rice fields are drained from mid-August to mid-September. Harvest begins late in September. Stubble and straw residue is usually burned for disposal and disease control. With rare exceptions, rice is usually grown without rotation in Yuba County because the soils on which it is grown have limitations for other crops, such as a shallow rooting depth or a clayey texture. Many rice fields are flooded during winter so that they can provide habitat for waterfowl and opportunities for recreation.

Wildrice is a relatively new and increasingly important crop in Yuba County. It is grown under conditions similar to those under which rice is grown and requires the same soil and water resources, equipment, and technology. The two kinds of rice require different planting and harvesting dates. Wildrice requires a shorter growing season. Also, yields are much lower, and fertilizer requirements are reduced.

Corn is planted in the county for grain and silage. As with other row crops, the management for corn is quite sophisticated, including intensive soil preparation, precision planting, banded placement of starter fertilizers, preplant application of herbicides, and great care in the timing and cutoff of irrigation and in the application of irrigation water. Corn is usually planted on raised beds in spring, when it can use soil moisture. Nitrogen is often applied in split applications. Occasionally, corn may be planted as a double-crop following small grain. The net irrigation water requirement for corn silage is about 18 inches.

Alfalfa is generally grown on very deep, well drained soils, such as Horst soils. It is planted in either fall or spring. Semidormant varieties grow best. Since vigorous growth of alfalfa depends on the presence of nitrogen-fixing Rhizobium bacteria, the seed should be inoculated if the bacteria is not present in the fields to be planted. The stand life is generally 4 to 5 years. Yields range from 5 to 8 tons per acre per season with five to six cuttings. Egyptian alfalfa weevil, pea aphid, blue alfalfa aphid, alfalfa caterpillar, and other insect pests are controlled with insecticides. Herbicides are used to control weeds. Alfalfa should not be planted on shallow or slowly permeable soils or on soils that are limited by wetness or drainage problems. The quality and life of the stand are restricted on these soils, and the risk of Phytophthora root rot is increased. Irrigation water management is extremely important. Border irrigation is the most frequently used method in Yuba County. The net irrigation water requirement is about 38 inches.

Irrigated pasture plants are grown on most of the soil types in the foothills and valleys of the county. Border irrigation is the main method of irrigation, but sprinklers are often used on small acreages. The net irrigation water requirement is about 32 inches annually. The best suited pasture plants in the survey area are ladino clover, strawberry clover, narrowleaf trefoil, broadleaf trefoil, perennial and annual ryegrass, orchardgrass, and tall fescue. Pasture management includes rotation grazing, occasional mowing to maintain stand uniformity and control annual weeds, irrigation water management, and applications of the proper kinds and amounts of fertilizer. Optimum production requires adequate nitrogen, phosphorus, and sulfur fertilization. Dallisgrass and bermudagrass frequently invade irrigated pastures and may provide a good portion of the forage in the older established pastures during the hot summer months.

Yields per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 7. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that ensures the smallest possible loss.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 7 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The Natural Resources Conservation Service or the University of California Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops (USDA, 1961). Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes. Appendix B shows the criteria used to determine land capability classes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c,* shows that the chief limitation is climate that is very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V soils do not occur in the survey area. Class VIII lands have not been assigned subclasses. They have limitations that preclude their use for commercial plant production and restrict their use to recreation, watershed, wildlife habitat, or esthetic purposes.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units are generally designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 and IIIe-6. The numbers used to designate units within the subclasses are as follows:

0. Indicates limitations caused by stony, cobbly, or gravelly material in the substratum.
1. Indicates limitations caused by slope or by an actual or potential erosion hazard.
2. Indicates a limitation of wetness caused by poor drainage or flooding.
3. Indicates a limitation of slow or very slow permeability in a clayey subsoil or a semiconsolidated substratum.
4. Indicates a low available water capacity in sandy or gravelly soils.
5. Indicates limitations caused by a fine textured or very fine textured surface layer.
6. Indicates limitations caused by salts or alkali.
7. Indicates limitations caused by stony, cobbly, or gravelly material in the surface layer.
8. Indicates that the soil has a very low or low available water capacity because the root zone generally is less than 40 inches deep over massive bedrock.
9. Indicates that limitations caused by very low or low fertility, acidity, or toxicity cannot be overcome by adding normal amounts of fertilizer, lime, or other amendments.
10. Indicates that the soil has a high content of organic material, such as peat and muck.

No unit designations are shown for class I soils because soil characteristics are similar for all of the soils in this class. No unit designations are shown for soils assigned to classes V, VI, and VII. These soils generally are not intensively managed for crops. No unit or subclass is shown for map unit components assigned to class VIII.

The capability classification of the major components of each map unit is given in table 8 and in section "Detailed Soil Map Units."

Major Land Resource Areas

The land capability classification system is further refined by designating the major land resource area (MLRA) of the soils. A major land resource area is a broad geographic area that has a distinct combination of climate, topography, vegetation, land use, and cropping systems (USDA, 1981). Parts of three of these nationally designated areas are in Yuba County. These areas and their numbers are Sacramento and San Joaquin Valleys, MLRA 17; Sierra Nevada Foothills, MLRA 18; and Sierra Nevada Range, MLRA 22. The major land resource area number is added in parentheses after the land capability class, subclass, or unit designation at the end of each map unit description in the section "Detailed Soil Map Units."

A soil in one resource area may have characteristics similar to those of a soil in another resource area and have the same capability symbol, but the climate, vegetation, suitable crops, and management practices may differ. For example, moderately deep soils in capability subclass VIe are in both MLRA 18 and MLRA 22. Unlike the moderately deep soils assigned to this subclass in MLRA 18 (Sierra Nevada Foothills), the moderately deep soils assigned to this subclass in MLRA 22 (Sierra Nevada Range) are suited to the coniferous trees used for commercial lumber.

MLRA 17, Sacramento and San Joaquin Valleys.—Part of this area is in the western portion of Yuba County. It is dominantly on flood plains and terraces in the Sacramento Valley. It includes general soil map units 1 through 5. The natural vegetation is mainly valley oaks, annual grasses, and forbs. Elevation ranges from 20 to 250 feet. The average annual precipitation ranges from 18 to 22 inches, the average air annual temperature ranges from 61 to 63 degrees F, and the average frost-free period ranges from 270 to 290 days.

Most of the land in this resource area in Yuba County is used for irrigated crops, mainly small grain and orchard crops. A few areas are used for urban development, livestock grazing, or gold mining.

MLRA 18, Sierra Nevada Foothills.—Part of this area is in the central portion of Yuba County. It is dominantly on foothills. It includes general soil map units 6 and 7. The natural vegetation is mainly annual grasses, forbs, shrubs, and oaks. Elevation ranges from 250 to 1,900 feet. The average annual precipitation ranges from 22 to 35 inches, the average annual air temperature ranges from 58 to 62 degrees F, and the average frost-free period ranges from 230 to 270 days.

Most of the land in this resource area in Yuba County is used for livestock grazing or homesite development.

MLRA 22, Sierra Nevada Range.—Part of this area is in the eastern portion of Yuba County. It is dominantly on mountains. It includes general soil map units 8 and 9. The natural vegetation is mainly coniferous trees. Elevation ranges from 1,900 to 4,825 feet. The average annual precipitation ranges from 35 to 85 inches, the average annual air temperature ranges from 47 to 59 degrees F, and average the frost-free period ranges from 130 to 230 days.

Most of the land in this resource area in Yuba County is used for timber production.

Storie Index Rating

The soils in the survey area are rated in table 9 according to the Storie index (Storie, 1933 and 1976). This index expresses numerically the relative degree of suitability of a soil for general intensive agricultural uses at the time of evaluation. The rating is based on soil characteristics only and is obtained by evaluation of such factors as soil depth, texture of the surface soil, subsoil characteristics, and surface relief. Availability of water for irrigation, local climate, size and accessibility of mapped areas, distance to markets, and other factors that might determine the desirability of growing certain plants in a given locality are not considered. Therefore, the index should not be used as the only indicator of land value. Where the local economic and geographic factors are known to the user, however, the Storie index provides additional objective information for land tract value comparisons.

Four general factors are used in determining the index rating—A, the permeability, available water capacity, and depth of the soil; B, the texture of the surface soil; C, the dominant slope of the soil body; and X, other conditions more readily subject to management or modification by the land user. In this survey area these conditions include drainage, flooding, fertility, erosion, and microrelief. For some soils more than one of these conditions are used in determining the rating. A rating of 100 percent expresses the most favorable, or ideal, condition for general crop production. Lower percentage ratings are assigned for less favorable conditions or characteristics. Factor ratings, in percentages, are selected from tables prepared from data and observations that relate soil properties to plant growth and crop yields (Storie, 1933). In the tables currently used (Storie, 1976), certain properties are assigned a range of values to indicate variations in the properties that affect the suitability of the soil for general agricultural purposes. Examples of these properties are soil depth, content of gravel in a gravelly surface layer, and microrelief. Where there is a range of values, the modal condition of a soil property, as it is described in a soil map unit, is used in the selection of a value for a factor.

The index for a soil is obtained by multiplying the percentage rating values given to its four factors, A, B, C, and X. If more than one condition is recognized for the X factor for a soil, the value for each condition acts as an additional multiplier. Thus, any of the general factors or X factor conditions may dominate or control the final rating.

Ratings of soil complexes in the survey area, such as Aiken-Horseshoe complex, 2 to 8 percent slopes, reflect the proportion of the dominant soils described in the map units. Each of the dominant soils in such complexes is rated separately in table 9. The Storie index rating for each unit is a weighted average of the separate ratings. Miscellaneous areas, such as Dumps, landfills, are not evaluated in terms of factors A, B, C, and X. They have features that preclude common agricultural uses; therefore, they have an index rating of 0.

Soils are assigned grades according to their suitability for general intensive agriculture as shown by their Storie index ratings. The six grades and their range in index values are:

Grade 1	80 to 100
Grade 2	60 to 79
Grade 3	40 to 59
Grade 4	20 to 39
Grade 5	10 to 19
Grade 6	less than 10

In the survey area *grade 1* soils are well suited to intensively grown irrigated crops that are climatically adapted to the region. *Grade 2* soils are good agricultural soils, although they are not so desirable as soils in grade 1 because of a less permeable subsoil, deep hardpan layers, a gravelly or moderately fine textured surface layer, moderate or strong slopes, restricted drainage, low available water capacity, lower soil fertility, or a slight or moderate hazard of flooding. *Grade 3* soils are only fairly well suited to agriculture because of moderate soil depth; moderate to steep slopes; restricted permeability in the subsoil; a clayey, sandy, or gravelly surface layer; somewhat restricted drainage; acidity; low fertility; or a hazard of flooding. *Grade 4* soils are poorly suited to agriculture. They are more limited in their agricultural potential than the soils in grade 3 because of such restrictions as a shallower depth; steeper slopes; poorer drainage; a less permeable subsoil; a gravelly, sandy, or clayey surface layer; channeled or hummocky relief; a hazard of flooding; low fertility; or acidity. *Grade 5* soils are very poorly suited to agriculture and are seldom cultivated. They are more commonly used as pasture, rangeland, or woodland. *Grade 6* soils and miscellaneous areas are not suited to agriculture because of very severe or extreme limitations. They are better suited to limited use as rangeland, woodland, or watershed or for continued use as urban land. Table 9 lists the grade for each soil in the survey area.

Ecosystem Relationships and Multiple-Use Land Management

By Warren Peden, State Range Conservationist, Sherman Finch, State Forester, and Ron Schultze, State Biologist, Natural Resources Conservation Service.

An ecosystem is a complete, interacting community of organisms considered together with their physical environment. Detailed information about ecosystem relationships and management is provided in ecological site descriptions, which can be obtained from the Natural Resources Conservation Service. Table 10 shows the ecological sites assigned to soils in the county and can be used to determine the ecological site for a particular area.

Management in Physiographic Areas

In this section ecosystem relationships and multiple-use land management are described for each of three physiographic areas in Yuba County. The physiographic areas are the same as the three groups of general soil map units—soils on flood plains and terraces, soils on foothills and mountains, and soils on mountains.

Soils on flood plains and terraces. Much of this area is cropland. Some areas are wetlands and riparian habitats or annual grasslands at elevations between 50 and 200 feet (fig. 7).

Management for cropland is described under the heading "Cropland Management." The other major land uses are livestock grazing, wildlife habitat, recreation, and urban development. Some of the cropland provides habitat for wildlife, such as pheasant, waterfowl, other birds, and small mammals, especially in areas along ditchbanks and in other areas that provide cover. Urbanization and intensive farming practices destroy this habitat. Some areas of cropland on such soils as San Joaquin soils, which are used for rice production in summer, are flooded in winter. These areas provide wildlife habitat and opportunities for hunting waterfowl. Small grain and a few other crops also are of value to wildlife.

Wetland and riparian habitats in some areas, such as in the area of gold fields and the areas of Holillipah and other soils on flood plains along the major streams and rivers, support unique plant communities and are especially important to waterfowl, shore birds,

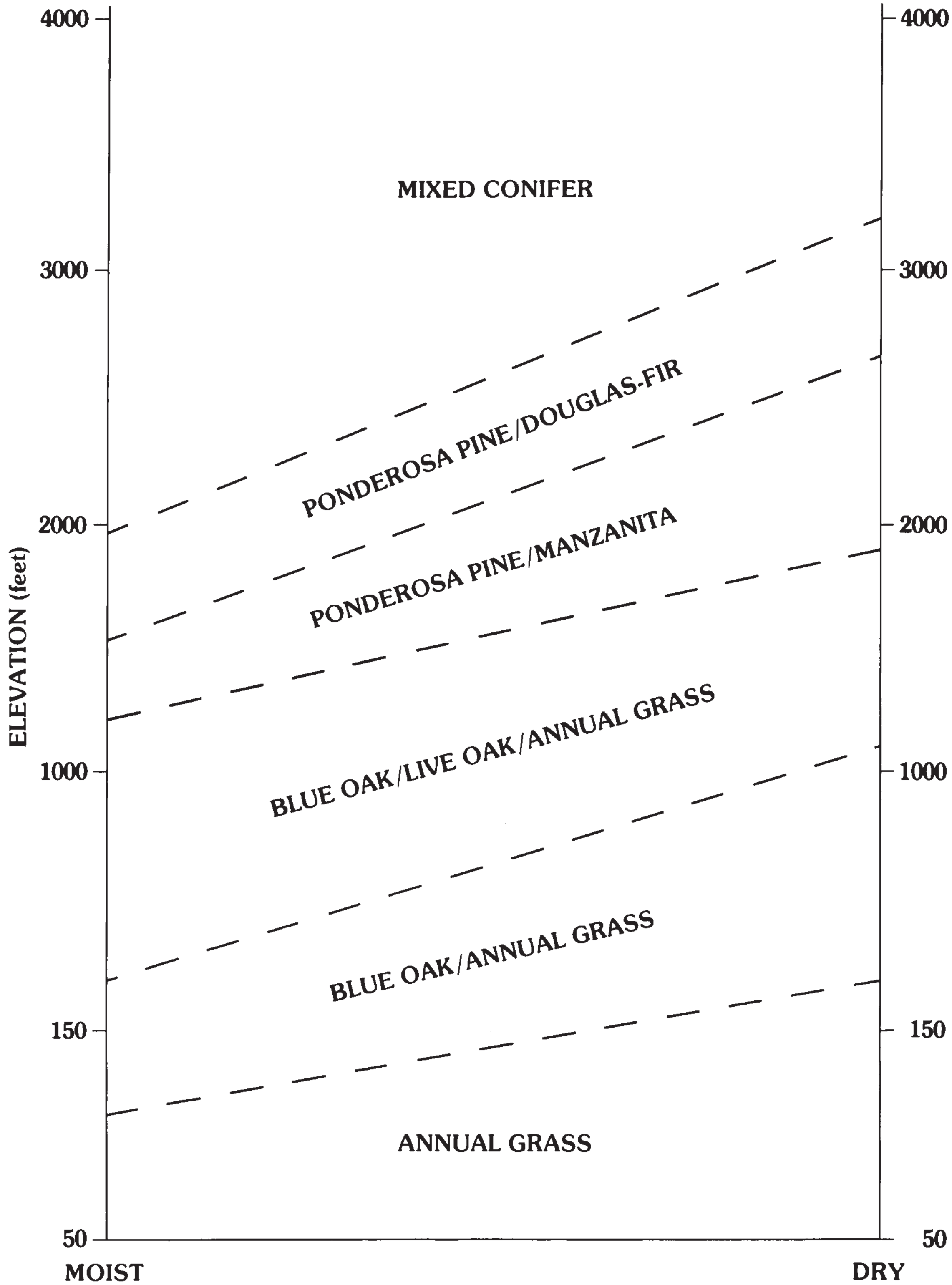

Figure 7.--Vegetation, elevation, and moisture in Yuba County, California.

amphibians, and other wildlife. Destruction of these habitats has a marked effect on wildlife diversity and population. California white oak and the associated vegetation for the most part have been removed from many areas where Columbia, Conejo, and other soils on flood plains and stream terraces have been converted to cropland. Remnant stands of trees along streams and rivers are of high value to wildlife.

Plantings of trees and shrubs for multiple uses, such as energy conservation around homesites, wildlife habitat, production of wood fiber, and esthetic purposes, generally are successful on Columbia, Shanghai, Conejo, Horst, and other soils on flood plains and stream terraces.

Annual grassland on San Joaquin, Redding, and other soils in areas that have not been converted to cropland is used for livestock grazing, wildlife habitat, recreation, and urban development. Annual grassland is an important resource for livestock grazing during fall, winter, and spring. In summer, when the annual grasses and forbs become desiccated, most of the livestock is shifted to irrigated pastures or forested sites at higher elevations. Table 10 lists the potential natural plant community for annual grassland, the ecological site, and forage production. Annual fluctuations in precipitation, precipitation distribution patterns, and temperature all influence the makeup of the potential plant community as well as forage production. Grassland management that favors one species over another is difficult and unpredictable. Efforts to increase the abundance of certain plant species may be successful, especially with seeding and applications of fertilizer, but the effect may be short lived because of changes in weather patterns or because of livestock grazing. Livestock grazing should be managed so that the desired species in the plant community listed in table 10 are maintained.

Proper grazing use is one of the most important practices of benefit to wildlife on annual grassland. If a diversity of annual grasses and forbs, such as those listed in table 10, is maintained through proper grazing use, the annual grassland supports a greater variety of wildlife species and is more valuable for livestock grazing. Since the diversity of annual grassland is limited, management that maintains the adjoining habitats, such as riparian areas, oak woodlands, and vernal pools, is important. Insect populations, which are commonly high, provide food for many vertebrates. There is usually a large forage base of plants and seeds for small birds and mammals, which in turn support larger predators. The water supply generally is limited in these areas. Water developments (ponds, guzzlers, and wetlands) are of benefit to both livestock and wildlife. Planting shrubs, trees, or other vegetation can increase plant diversity and improve the habitat for numerous wildlife species, but the success of planting is hampered by insects, rodents, and deer. With irrigation around homesites and in other areas, shrubs and some tree species, such as eucalyptus, cottonwood, poplar, and olive, can serve a multiple purpose for wildlife habitat, livestock protection, esthetics, and production of wood fiber.

Soils on foothills and mountains. Most of the vegetation in this area is blue oak-annual grass or blue oak-interior live oak-annual grass (fig. 7). At the lower elevations, pure stands of blue oak occur. Interior live oak and Digger pine increase in abundance as elevation and the moisture supply increase. This area has undergone a considerable amount of disturbance through fires and development. The present vegetative patterns reflect this disturbance.

Much of this area is used for livestock grazing, firewood production, wildlife habitat, recreation, and homesite development. Some areas are used for irrigated pasture.

The soils in this area are used extensively for livestock grazing. Annual grasses and forbs on such soils as Auburn and Sobrante soils are an important resource for livestock grazing during fall, winter, and spring. In summer, when the annual grasses and forbs become desiccated, most of the livestock is shifted to irrigated pasture or forested sites at higher elevations. Table 10 lists the potential natural plant community, the ecological site, and forage production. Annual fluctuations in precipitation, precipitation distribution patterns, and temperature all influence the makeup of the plant community as well as forage production. Management of annual grasses and forbs that favors one species over another is difficult and unpredictable. Efforts to increase the abundance of certain species may be successful, especially with seeding and applications of fertilizer, but the effect may be short lived because of changes in weather patterns or because of livestock grazing. Livestock grazing should be managed so that the desired species in the plant community listed in table 10 are maintained.

Clearing blue oak and interior live oak can increase forage production over the values shown in the table and can provide firewood. The increase in forage production induced by clearing, however, is not permanent. Production will return to near original levels after about 15 years (Kay, 1987). Blue oak is not regenerating, except through limited stump sprouting. Once lost, it may never be replaced. Interior live oak can reproduce well enough to maintain the species, but cutting often results in a large amount of multistemmed shrubs that may decrease livestock forage production. The shrubs may be of benefit to some wildlife species, such as mule deer. Excessive clearing of the oaks to increase livestock forage production, to harvest firewood, or to convert to other uses, such as cropland, urban development, and water projects, reduces the diversity of the habitat for wildlife.

Applying a system of proper grazing use, providing water developments, protecting streambanks and shorelines with vegetation, leaving dense stands of shrubs and oaks in areas at least 1 acre to 5 or more acres in size, and not excessively thinning oaks can maintain livestock forage, provide firewood, provide good habitat for many species of wildlife, and maintain esthetic values. In areas with a very dense canopy of shrubs that limit forage production and the diversity of wildlife habitat, prescribed burning can be an important means of managing vegetation and providing valuable new growth forage and browse for wildlife and livestock.

Riparian areas along streams should be protected because they are especially important for wildlife in the foothills. They are important as migratory routes for mule deer and as habitat for many other species of wildlife. The habitat in these areas is particularly valuable because it provides opportunities for hunting many game species, including mule deer, gray squirrel, quail, wild turkey, mourning dove, and band-tailed pigeon. Some species, such as mule deer, gray squirrel, ground squirrel, other rodents, and insects, cause damage to the crops closely associated with this habitat type. In turn, some species, such as hawks, owls, foxes, and coyotes, feed on the small rodents, while other species feed heavily on the insects and weed seeds and thereby reduce crop damage.

Soils on mountains. The broad area of conifers in the county includes several distinct vegetative types (fig. 7). As elevation and the moisture supply increase, there is a corresponding change in vegetation. Table 10 lists the potential natural plant community for each ecological site. At an elevation of approximately 1,500 feet, ponderosa pine becomes dominant and may occur in almost pure stands. At the lower elevations blue oak and interior live oak increase in the canopy. The typical soils in these areas are those of the Boomer, Pendola, and Woodleaf series. At an elevation of about 2,500 feet, ponderosa pine and Douglas-fir are the major species. The typical soils in these areas are those of the Chaix, Hotaw, and Mariposa series. The mixed conifer type is at an elevation of more than 3,800 feet. White fir, ponderosa pine, sugar pine, incense cedar, California black oak, and Douglas-fir occur in a mixture or in groups of pure species. The typical soils in these areas are those of the Jocal and Slacreek series.

Much of the area is used for timber production, and the soils in the area are very productive. These forests have been mined, logged, and burned since the late 1800's. Site indices range from 79 to 164 for ponderosa pine, 95 to 150 for Douglas-fir, and 66 to 98 for white fir.

Management of this area revolves around timber harvest and reforestation methods. Selective cutting methods, which favor variety-group selection, and small clearcuts (40 acres or less) benefit wildlife. After disturbance, this area can be dominated by brush and hardwoods. Competition from brush species reduces the reproduction and growth rates of timber. In some areas livestock grazing can suppress deerbrush and other species that compete with newly planted trees. Clearcuts, streambanks, and small, wet meadows provide most of the forage and browse. Clearcut openings provide forage and browse for livestock and wildlife until the tree overstory closes. It is important that water sources developed for livestock and wildlife be protected.

Timber harvesting methods can have a dramatic impact on fish and wildlife. If well planned and properly implemented, silvicultural practices can benefit fish and wildlife resources. Proper road construction and timber harvesting practices that reduce the hazard of erosion are essential. Practices that increase edge and habitat diversity generally benefit more species, although some species are adapted to old growth sites. The habitat for fish and wildlife can be improved by retaining and properly managing certain components, such as streambanks, wet meadows, oaks, patches of brush snags, and cavity-containing trees; leaving a few trees exceeding 24 inches in diameter with some submerchantable live trees; and not yarding out or disposing of all large slash material.

Ecological Site Productivity and Potential Natural Plant Communities

Table 10 shows for each soil, the site name; the total annual production of herbaceous vegetation by dry weight in favorable, normal, and unfavorable years; and the composition weight and composition canopy of the potential natural vegetation. Explanation of the column headings in table 10 follows.

The *site name* refers to a kind of land with a specific potential plant community and specific site characteristics. The site differs from other kinds of land in its ability to produce vegetation and to respond to management. The relationship between soils and vegetation was ascertained during this survey; thus, ecological sites generally can be determined directly from the soil map. Detailed descriptions of ecological sites can be obtained from the local office of the Natural Resources Conservation Service.

Herbaceous production is the amount of vegetation that can be expected to grow annually on well managed land that is supporting the potential plant community. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, climatic conditions for the growing season are about average. In an unfavorable year, climatic conditions for the growing season are well below average, generally because of low rainfall or because of poor rainfall distribution and low temperature.

Soil depth and properties that affect the supply of moisture and plant nutrients have the greatest influence on the production of plants. A seasonal water table, soil depth, and type of underlying bedrock also are important.

Dry weight is the total annual yield per acre of air-dry herbaceous vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Potential natural vegetation is the vegetation that makes up most of the potential plant community on each soil. It is listed by common name. Under *composition weight*, the expected percentage of the total annual production by dry weight is given for each species making up the potential plant community. Under *composition canopy*, the percentage of each species making up the potential natural plant community by percent canopy is given. The amount of the potential natural vegetation that can be used as forage depends on the kinds of grazing livestock and wildlife and the season of use.

Management of livestock grazing, wildlife habitat, and timber production requires knowledge of the kinds of soil and of the potential natural plant community. The objective in managing livestock grazing is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential plant community for that site. Such management generally results in optimum forage production, control of undesirable brush species and erosion, and conservation of water. Sometimes, however, management for plant communities other than the potential plant community meets livestock grazing needs, improves the habitat for wildlife, and protects soil and water resources, especially in the foothills and mountains of Yuba County. When decisions involving the management of vegetation for a site are made, consideration should be given to wildlife, livestock, timber, and other management objectives. Because of the need for management of the entire ecosystem, the consequences of management for a particular use should be weighed against other uses.

Detailed information about managing ecological sites can be obtained from the Natural Resources Conservation Service, the University of California Cooperative Extension Service, the California Department of Forestry, or the U.S. Forest Service.

Woodland Productivity and Management

By Sherman Finch, State Forester, Natural Resources Conservation Service.

Tables 11 and 12 can be used by woodland owners or forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. Table 11 shows woodland productivity, and table 12 shows management concerns. The criteria used in developing ratings are described in Appendix D.

The major species of the potential plant community that occur on each of the map units are listed in table 10. Users of this report can obtain a considerable amount of useful management information by utilizing information in tables 10, 11, and 12. The grouping of forest soils into the ecological sites in table 10 may prove useful on forest land with two or more map units.

Table 11 lists the *ordination symbol* for each soil. Soils assigned the same ordination symbol require the same general management and have about the same potential productivity. The ordination system is a uniform system of labeling individual soils or groups of soils according to their potential productivity and the principal soil properties that influence the use and management of the soils for forestry. The ordination system has two levels—class and subclass.

The first element in the ordination symbol is the class. It is a number that the denotes potential productivity, in cubic meters of wood per hectare per year, for an indicator tree species (1 cubic meter per hectare equals 14.3 cubic feet per acre). Potential productivity is based on the site index. The growth in cubic meters is calculated at the age of culmination of mean annual increment (CMAI) for fully stocked, unmanaged, natural stands as given in standard normal yield tables. The species that determines the ordination class is next to the ordination symbol in table 11. It is a species that is common in the area and is generally the most productive on the soil. Potential volume growth values are based on yield tables by McArdle, Meyer, and Bruce (1961) for Douglas-fir; Meyer (1938) for ponderosa pine; and Schumacker (1926) for white fir. Yield is the total wood produced in the boles of the trees to the smallest top diameter given in the tables.

The second element in the ordination symbol is the subclass. It is a capital letter that denotes certain soil or physiographic characteristics that contribute to important hazards or limitations in management. The letter A indicates that no limitations or only slight limitations affect forest land use or management; D indicates a restricted rooting depth, for example, in shallow soils underlain by bedrock; R indicates excessive slope; T indicates a root zone that has excessive toxic substances or nutrient deficiencies that limit or impede the development of desirable tree species, for example, in soils that formed in material weathered from serpentine; and X indicates stoniness or rockiness. If a soil has more than one limitation, the priority is as follows: R, X, T, and D. Plant competition and other special considerations are not used to determine the subclass.

The *potential productivity* of merchantable or common trees on a soil is expressed as a *site index*. The average (mean) values are from McArdle, Meyer, and Bruce (1961) for Douglas-fir; Meyer (1938) for ponderosa pine; and Schumacker (1926) for white fir. The site index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that woodland managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

Estimates of the potential production for each soil, in board feet per acre per year (Scribner scale) at the culmination of mean annual increment (CMAI), are given in the detailed map unit descriptions. Volumes are from Meyer (1938) for ponderosa pine; McArdle, Meyer, and Bruce (1961) for Douglas-fir; and Schumacker (1926) for white fir. Wind can reduce productivity well below the estimates for soils on exposed ridges and in open areas. Wetness also can reduce productivity of the soils.

Estimating the potential productivity of soils that commonly produce hardwoods is difficult (Lytle and Finch, 1987). The estimates of hardwood yields shown in the detailed map unit descriptions are based on local plot measurements and on volume tables by Pillsbury and Stephens (1978). The cordwood volumes shown reflect actual measurements in relatively undisturbed hardwood stands and thus reflect actual rather than potential productivity.

In table 12, *slight*, *moderate*, and *severe* indicate the degree of the major soil limitations to be considered in management.

Seedling mortality ratings in table 12 indicate the degree to which the soil affects the mortality of tree seedlings. Plant competition is not considered in the ratings. The ratings apply to seedlings from good stock that are properly planted during a period of sufficient rainfall. A rating of *slight* indicates that no problem is expected under normal conditions; *moderate* indicates that extra precautions are advisable; and *severe* indicates that precautions are important and replanting may be necessary.

The trees selected for planting should be those that are suited to the soils and to commercial wood production. Adapted species are named in the detailed map unit descriptions. Natural reseeding by conifers is sometimes adequate. Where mineral soil is exposed during years of favorable seed production, good regeneration can be expected on all soils, except for very gravelly, shallow, or serpentinitic soils. Most of the hardwood species resprout after cutting.

The soil properties that commonly influence seedling mortality include texture, content of rock fragments, temperature, and drainage. Soils with an available water capacity of less than 2.5 inches in the upper 20 inches have severe limitations for seedlings, especially on south- and west-facing slopes. A low available water capacity is less critical at the higher elevations, where the plants generally use less water.

At low elevations seedling survival can be significantly restricted on soils that have relatively warm mean annual temperatures. Soil temperatures at a depth of 20 inches are commonly several degrees F higher in summer and several degrees lower in winter in open areas than in areas under a tree canopy. Surface temperatures may be high enough during the summer to cause heat injury to Douglas-fir seedlings on south-facing slopes. Species selection, type and size of planting stock, availability of shade, type of harvest, and the available water capacity of the soils should be considered when the soils in these areas are reforested.

Ratings of *plant competition* indicate the degree to which undesirable plants are expected to invade where there are openings in the tree canopy. The invading plants compete with native plants or planted seedlings. A rating of *slight* indicates little or no competition from other plants; *moderate* indicates that plant competition is expected to hinder the development of a fully stocked stand of desirable trees; and *severe* indicates that plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants. The species of competing plants and severity of competition vary, depending on soil type and past treatment of the site.

Plant competition is related to the available water capacity of the soils. Because of a high available water capacity, many plant species grow well on productive soils. As a result, plant competition is severe on these soils. Perennial and annual grasses, forbs, various manzanitas, tanoak, and shrubs can dominate a site for several years after timber is harvested. Conifer seedlings often regenerate slowly and can be suppressed by other vegetation because of the competition for moisture and light. This competition may be more limiting on shallow and moderately deep soils, such as Chawanakee and Mariposa soils, than on deep and very deep soils, such Sites and Jocal soils, even though the deeper soils may have a more severe rating and produce more competing vegetation. A lower available water capacity in the shallow and moderately deep soils increases the difficulty of establishing conifers. Careful selection of silvicultural and harvesting systems, intensive site preparation, and followup treatments may be needed to ensure adequate reforestation.

Table 12 shows the *limitation for revegetating exposed subsoil*, or the degree to which revegetation is affected by exposure of subsoil layers. This exposure frequently occurs during forest management activities, mainly on road cuts and fills and on some skid roads. Land managers may want to revegetate these areas, or they may be required to do so by regulations of an agency. Revegetation may be for erosion control or for timber production. Separate ratings are given for revegetation with either grasses or trees. The characteristics of the subsoil that influence planting conditions, germination, and the subsequent growth rate are considered in the ratings. These are general ratings; they do not preclude the need for onsite investigation of individual project areas. A rating of *slight* indicates few problems with revegetation. If locally adapted grasses are properly seeded, a good stand can be expected to reduce the hazard of erosion. If trees are planted, good survival and growth rates can be expected unless compaction or other local unfavorable conditions prevail. Natural revegetation is better on soils with a slight rating than on soils with moderate or severe ratings. *Moderate* indicates that additional care is needed in the selection of methods or types of plants for erosion control. If trees are planted, some mortality and growth rates below those in undisturbed areas can be expected. *Severe* indicates that intensive measures are needed to establish erosion-control plants because exposed areas have large amounts of hard rock with only a small amount of erodible soil. Tree planting is very difficult, the survival rate is low, or growth rates are very slow or greatly reduced below those in undisturbed areas. Onsite evaluation is essential when consideration is given to revegetation in areas where the rating is severe.

Ratings of the *equipment limitation* reflect the characteristics and conditions of the soil that restrict use of the equipment generally needed in woodland management or harvesting. A rating of *slight* indicates that use of equipment is not limited to a particular kind of equipment or time of year; *moderate* indicates a short seasonal limitation or a need for some modification in management or in equipment; and *severe* indicates a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Soil wetness caused by seasonal rainfall influences the type of equipment and time of use. Soils are usually too wet for ground yarding systems from about November 15 to April 1. When they are wet, all soils are susceptible to soil compaction by wheeled or tracked equipment. Heavily compacted or puddled soils are generally less productive than other soils. The "State Forest Practice Rules" prohibit timber harvesting, except by skyline yarding, during excessively wet periods. Roads are frequently impassable during the rainy season, except where they are covered with rocks or are on very gravelly soils. Depth of snowpack limits access and equipment use at elevations of more than 3,000 feet from about December 15 to April 15. Watering, oiling, or other road-surface and dust-control treatments may be desirable during periods of heavy use.

Slope gradient is an important consideration when harvesting equipment or harvesting systems are selected. In areas where slopes are less than 30 percent, few limitations affect the use of wheeled and tracked equipment. In areas where slopes are 30 to 50 percent, more care is needed in the selection of equipment suited to the site. Skyline yarding systems generally cause the least soil disturbance where the terrain and road systems are conducive to their use. Where existing skid and haul roads can be used or where short, steep slopes are intermingled with flat areas, however, tractor yarding equipment can sometimes be used with minimal soil disturbance. On the steeper slopes low ground-pressure, torsion-suspension equipment causes less soil disturbance and compaction than conventional tractor equipment (Albright, 1980; Froehlich, 1978). In large areas where slopes are more than 50 percent, less soil disturbance will result from skyline yarding than from tractor yarding.

Ratings of the *hazard of soil damage from fire* are intended to be used as a general guideline when plans are made either for prescribed burns or revegetation after wildfires. The risk of damage increases with the intensity of heat. The damage is mainly related to the loss of organic matter (Wells and others, 1979). Some soils have characteristics that enable them to withstand this loss better than other soils. These characteristics are used to rate the soils for their susceptibility to damage from burning. A rating of *slight* indicates that most types of fire will not have an adverse effect on soil characteristics and future productivity; *moderate*, that some extra care in planning is needed to maintain favorable soil characteristics; and *severe*, that special management is needed to protect organic matter and thus maintain productivity.

Ratings of the *hazard of soil damage from compaction* indicate the tendency of a soil to be adversely affected by the weight of equipment or other traffic. Soil density is increased after compaction. This increased density can effect productivity by increasing the resistance to root penetration and reducing the availability of oxygen to plant roots. Compaction also reduces the water permeability and infiltration rates. The rating is based on the texture, content of organic matter, and content of rock fragments in the upper 10 inches of the soil. A rating of *slight* indicates that considerable effort would be required to compact the soil enough to restrict plant growth or water infiltration rates. *Moderate* indicates that less effort is required to cause compaction or that an easily compacted soil recovers rapidly because of the type and amount of clay. *Severe* indicates that the soil is easily affected by compaction. Compaction is most likely to occur when the soil is wet. The activities that can cause compaction include site preparation, log skidding, livestock grazing, and any other activity that applies weight on a wet soil (Alexander and Poff, 1985).

Ratings of the *hazard of sheet and rill erosion* reflect the erodibility of the soil in bare areas and when logs are yarded by tractor and skyline systems. The ratings do not account for gully, ditch, or streambank erosion, mass movement caused by geologic conditions, unusual local moisture conditions, ground disturbance, or manipulation of vegetation. Soils that have an obvious tendency to slump or be gullied or that are susceptible to mass movement are identified in the map unit descriptions. Existing slips are shown on the soil maps where they were recognized during mapping. The use of slope stability maps and onsite investigation of these hazards are strongly encouraged.

The rating for bare areas is included as a basis for comparison with all other soils nationwide. The rating is valid only for a soil without vegetation, mulch, or other ground cover. This condition is very uncommon in this survey area. An extremely hot fire, poor timber harvest procedures, or attempted conversions to other land uses could result in bare soil conditions. The rating provides a general guide to the erodibility of exposed surface soil on skid roads and landings. This rating is based on the slope of the land and the erodibility of the soil and reflects the severity of water erosion in the absence of a vegetative cover.

In areas where logs are yarded by tractor and skyline systems, the hazard of sheet and rill erosion is *slight* if the expected soil loss is small, *moderate* if measures are needed to control erosion during logging and road construction, and *severe* if intensive management or special equipment and methods are needed to prevent excessive soil loss. The remaining overstory and understory vegetation, logging slash, root systems, and water bars reduce the erosion hazard below that for bare soil. The hazard of sheet and rill erosion is generally slight in the harvested areas as a whole when skyline yarding is used. Tractor yarding usually results in a greater hazard of erosion on steep slopes.

Erosion rates on skid roads within harvested areas are frequently high. Coupled with the possibility of reduced growth rates caused by compaction and the removal of surface soil horizons on deeply disturbed skid roads, high skid road density can substantially reduce the total productivity (Wert and Thomas, 1981). When used together, the ratings of erosion hazard, susceptibility to compaction, and limitation for revegetating exposed subsoil can help the user to decide if a significant reduction in future growth rates is likely and if appropriate management practices are needed to prevent this reduction.

Conservation practices that can prevent excessive soil loss and degradation of water quality vary by site. The proper location, design, and installation of roads, culverts, water bars, and stream crossings are critical. Seeding or mulching cut and fill slopes can reduce the hazard of sheet and rill erosion on highly erodible soils. Buffer strips along streams help to prevent sedimentation of the streams, control streambank erosion, and maintain favorable water temperature.

Soil properties, particularly erodibility, should be considered when site preparation for tree planting is planned. Machinery, chemicals, and fire can have adverse effects on soil properties and erosion rates if their use is not properly planned and applied. Selection and proper use of equipment and practices are the keys to controlling erosion during forest management activities. Regulatory and technical guidelines for erosion control are available in the "State Forest Practice Rules" and in numerous State, Federal, and university publications.

A few soils in the survey area have chemical toxicities or imbalances that hinder tree growth. Soils that formed in serpentinitic parent material are known to have ratios of calcium to magnesium that are detrimental to tree growth. Woodleaf soils are an example. Windthrow can be a problem where soil conditions cause shallow rooting of trees. Deep root development is hindered in shallow, compacted, or poorly drained soils.

Recreation

The soils of the survey area are rated in table 13 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewer lines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreational uses by the duration and intensity of flooding and the season when flooding occurs. In planning recreational facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 13, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties are generally favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or a combination of these measures.

The information in table 13 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 15 and interpretations for dwellings without basements and for local roads and streets in table 14.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have mild slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section. Appendix C gives the criteria used to determine soil limitations.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 14 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and *small commercial buildings* are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, slope, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 15 shows the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 15 also shows the suitability of the soils for use as daily cover for landfill. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils.

Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 15 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. Ease of excavation and revegetation should be considered.

The ratings in table 15 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, rock fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as the final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 16 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet and have a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In table 16, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 17 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and for embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, and sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind erosion or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts and sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 18 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under the heading "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as about 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 1993) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 1986). Both systems are described in the "PCA Soil Primer" (Portland Cement Association, 1962).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 19 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, salinity, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for some soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate or high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K in this survey area range from 0.10 to 0.49. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In table 19, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 20 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of very deep or deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep to very deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a permanent high water table or a high water table during the rainy season, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary inundation of an area, is caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Table 20 gives the frequency and duration of flooding and the time of year when flooding is most likely.

Frequency, duration, and probable dates of occurrence are estimated. Frequency is expressed as none, rare, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of flooding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of flooding is more than 50 percent in any year). Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 days to 1 month, and *very long* if more than 1 month. Probable dates are expressed in months. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The estimates are based mainly on observations of the water table at selected sites and on the evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. Indicated in table 20 are depth to the seasonal high water table, the kind of water table, and the months of the year that the water table commonly is high. A water table that is seasonally high for less than 1 month is not indicated in table 20.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

A *cemented pan* is a cemented or indurated subsurface layer within a depth of 5 feet. Such a pan causes difficulty in excavation. Pans are classified as thin or thick. A thin pan is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A thick pan is more than 3 inches thick if continuously indurated or more than 18 inches thick if discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low, moderate,* or *high,* is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low, moderate,* or *high.* It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Physical and Chemical Analyses of Selected Soils

The results of physical analysis of several typical pedons in the survey area are given in table 21 and the results of chemical analysis in table 22. The data are for soils sampled at carefully selected sites. Unless otherwise indicated, the pedons are typical of the series. They are described in the section "Soil Series and Their Morphology." Soil samples were analyzed by the Natural Resources Conservation Service, National Soil Survey Laboratory, Lincoln, Nebraska. Measurements reported as percent or quantity of unit weight were calculated on an ovendry basis. The methods used in obtaining the data are indicated in the list that follows. The codes in parentheses refer to published methods (USDA, 1984).

Coarse materials—(2-250 mm fraction) volume estimates of the percentages of all material greater than 2 mm (3B2).
Sand—(0.05-2.0 mm fraction) weight percentages of material less than 2 mm (3A1).
Silt—(0.002-0.05 mm fraction) pipette extraction, weight percentages of all material less than 2 mm (3A1).
Clay—(fraction less than 0.002 mm) pipette extraction, weight percentages of material less than 2 mm (3A1).
Water retained—pressure extraction, percentage of ovendry weight of less than 2 mm material; $^1/_3$ or $^1/_{10}$ bar (4B1), 15 bars (4B2a).
Organic carbon—dichromate, ferric sulfate titration (6A1a).
Extractable acidity—barium chloride-triethanolamine IV (6H5a).
Cation-exchange capacity—sum of cations (5A3a).
Cation-exchange capacity—ammonium acetate, pH 7.0 (5A8a).
Base saturation—ammonium acetate, pH 7.0 (5C1).
Base saturation—sum of cations, TEA, pH 8.2 (5C3).
Reaction (pH)—1:1 water dilution (8C1f).
Reaction (pH)—calcium chloride (8C1f).

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (USDA, 1975). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 23 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Eleven soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Xeroll (*Xer*, meaning dry, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Haploxeroll (*Hapl*, meaning minimal horizonation, plus *xeroll*, the suborder of the Mollisols that has a xeric moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Pachic* identifies the subgroup that has a mollic epipedon more than 20 inches thick. An example is Pachic Haploxerolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle size, mineral content, soil temperature regime, soil depth, and reaction. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, thermic Pachic Haploxerolls.

SERIES. The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example is the Conejo series, which is a fine-loamy, mixed, thermic Pachic Haploxeroll.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (USDA, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (USDA, 1975). Unless otherwise indicated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Aiken Series

The Aiken series consists of very deep, well drained soils on mountains. These soils formed in material weathered from andesitic tuff breccia. Slope ranges from 2 to 50 percent.

Soils of the Aiken series are clayey, oxidic, mesic Xeric Haplohumults.

Typical pedon of Aiken loam, in an area of Aiken-Horseshoe complex, 2 to 8 percent slopes; 1,600 feet south and 300 feet east of the northwest corner of sec. 25, T. 20 N., R. 8 E., Strawberry Valley quadrangle:

Oi—3 inches to 0; partially decomposed needles, twigs, and bark.

A—0 to 7 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; strong medium granular structure; soft, very friable, nonsticky and nonplastic; many fine and medium and common very fine roots; many very fine and fine interstitial pores; common fine rounded concretions; slightly acid; clear smooth boundary.

BA1—7 to 12 inches; reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and medium and common very fine roots; common very fine and fine interstitial and few very fine and fine tubular pores; common fine rounded concretions; moderately acid; clear smooth boundary.

BA2—12 to 21 inches; reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and medium and common very fine roots; common very fine and fine tubular and few very fine interstitial pores; common fine rounded concretions; moderately acid; abrupt smooth boundary.

Bt1—21 to 29 inches; yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common fine and few very fine roots; many very fine and fine tubular pores; common thin clay films on faces of peds and lining pores; common fine rounded concretions; moderately acid; clear smooth boundary.

Bt2—29 to 40 inches; yellowish red (5YR 5/6) clay, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few very fine and fine roots; many very fine tubular pores; many thin clay films lining pores and common thin clay films on faces of peds; common fine rounded concretions; 5 percent soft fragments of andesitic tuff breccia 5 to 10 centimeters across; very strongly acid; gradual smooth boundary.

Bt3—40 to 65 inches; yellowish red (5YR 5/6) clay, yellowish red (5YR 5/6) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; common very fine tubular pores; many thin clay films lining pores and common thin clay films on faces of peds; 5 percent soft fragments of andesitic tuff breccia 5 to 10 centimeters across; very strongly acid.

The mean annual soil temperature is 47 to 54 degrees F. The soil temperature is above 47 degrees F from about May 1 to November 15. The soil moisture control section is dry in all parts from about July 15 to October 15 and moist in some or all parts from about October 16 to July 14.

The A horizon is moderately acid or slightly acid.

The BA horizon has dry color of 5YR 5/6 or 5/4 and moist color of 5YR 4/4 or 3/4 or 2.5YR 4/6.

The Bt horizon has moist color of 5YR 5/6 or 4/6 or 2.5YR 4/6. It is very strongly acid to moderately acid.

Argonaut Series

The Argonaut series consists of moderately deep, well drained soils on foothills. These soils formed in material weathered from basic metavolcanic rocks. Slope ranges from 3 to 30 percent.

Soils of the Argonaut series are fine, mixed, thermic Mollic Haploxeralfs.

Typical pedon of Argonaut loam, in an area of Argonaut-Auburn complex, 3 to 8 percent slopes; 500 feet north and 600 feet east of the southwest corner of sec. 23, T. 15 N., R. 6 E., Smartville quadrangle:

A1—0 to 2 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine interstitial pores; 10 percent pebbles; moderately acid; abrupt smooth boundary.

A2—2 to 7 inches; strong brown (7.5YR 5/6) loam, dark brown (7.5YR 3/4) moist; strong fine subangular blocky structure; hard, very friable, nonsticky and nonplastic; common fine and few very fine roots; many very fine and common fine tubular pores; 10 percent pebbles; moderately acid; clear smooth boundary.

Bt1—7 to 14 inches; yellowish red (5YR 5/6) loam, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; hard, very friable, slightly sticky and nonplastic; common very fine and few fine roots; many very fine and common fine tubular pores; common thin clay films on faces of peds and lining pores; 10 percent pebbles; slightly acid; clear wavy boundary.

Bt2—14 to 21 inches; yellowish red (5YR 5/6) clay loam, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and few fine roots; many very fine and common fine tubular pores; many thin clay films lining pores and common moderately thick clay films bridging sand grains; 10 percent pebbles; slightly acid; abrupt smooth boundary.

2Bt—21 to 32 inches; strong brown (7.5YR 5/6) clay, strong brown (7.5YR 4/6) moist; many fine distinct dark grayish brown (10YR 4/2) mottles in root channels; a discontinuous very pale brown (10YR 7/4) layer in the upper 1/2 to 1 centimeter; massive; very hard, firm, very sticky and very plastic; few very fine and fine roots; common very fine tubular pores; common pressure faces; 5 percent pebbles; neutral; clear smooth boundary.

2BC—32 to 35 inches; brown (7.5YR 5/4) clay, strong brown (7.5YR 5/6) moist; massive; hard, firm, slightly sticky and slightly plastic; few very fine and fine roots; few very fine tubular pores; 15 percent pebbles; neutral; abrupt smooth boundary.

2Cr—35 inches; yellowish brown (10YR 5/4), weathered greenstone; hardness increasing with increasing depth.

The depth to paralithic contact ranges from 20 to 40 inches. The mean annual soil temperature is 59 to 64 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about June 1 to October 31 and moist in some or all parts from about November 1 to May 31. The content of rock fragments ranges from 5 to 35 percent. By weighted average, the content of clay in the upper 20 inches of the argillic horizon is 35 to 50 percent.

The A horizon has dry color of 7.5YR 5/6, 5/4, or 4/4. It is loam or gravelly loam with 15 to 25 percent clay. Reaction is moderately acid or slightly acid.

The Bt horizon has dry color of 5YR 5/6, 4/6, or 4/4 and moist color of 5YR 4/6, 4/4, or 3/4 or 7.5YR 4/4. It is gravelly loam, gravelly clay loam, loam, or clay loam with 25 to 30 percent clay. Reaction is moderately acid to neutral.

The 2Bt horizon has moist color of 7.5YR 5/6, 4/6, or 4/4 or 5YR 5/6. It is gravelly clay, gravelly clay loam, clay loam, or clay with 35 to 60 percent clay. Reaction is slightly acid or neutral.

Argovar Series

The Argovar series consists of very deep, poorly drained soils in mountain meadows. These soils formed in material weathered from gabbrodiorite. Slope ranges from 0 to 5 percent.

Soils of the Argovar series are fine-loamy over clayey, mixed, thermic Typic Argiaquolls.

Typical pedon of Argovar silt loam, 0 to 5 percent slopes; 2,400 feet south of the northeast corner of sec. 16, T. 18 N., R. 6 E., Rackerby quadrangle:

A—0 to 8 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; many fine prominent yellowish red (5YR 5/8) mottles, red (2.5YR 4/6 and 4/8) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; common very fine and fine tubular and few very fine interstitial pores; 5 percent pebbles; slightly acid; abrupt smooth boundary.

2Ab—8 to 17 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; many fine prominent strong brown (7.5YR 4/6) mottles, brown (7.5YR 4/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine and few fine tubular pores; 2 percent pebbles; neutral; clear smooth boundary.

2Btb—17 to 26 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; common medium prominent yellowish brown (10YR 5/6) mottles, dark yellowish brown (10YR 4/6) moist; moderate medium subangular blocky structure; hard, very friable, sticky and plastic; common very fine and fine roots; common very fine and fine tubular pores; common thin clay films lining pores and on faces of peds; 2 percent pebbles; neutral; abrupt smooth boundary.

3Btb1—26 to 44 inches; olive (5Y 5/3) clay, olive (5Y 4/3) moist; many medium prominent yellowish brown (10YR 5/6) and dark greenish gray (5GY 4/1) mottles along root channels, surrounding pebbles, and in part of the matrix; massive; very hard, firm, very sticky and very plastic; common very fine roots; few very fine tubular pores; common slickensides; 5 percent gabbrodiorite pebbles, some concentrated at the upper boundary as a stone line; neutral; gradual smooth boundary.

3Btb2—44 to 55 inches; pale yellow (5Y 7/4) clay, pale olive (5Y 6/4) moist; common medium prominent brownish yellow (10YR 6/8) and few fine prominent light gray (5Y 6/1) mottles, yellowish brown (10YR 5/6) and gray (5Y 5/1) moist; massive; very hard, firm, very sticky and very plastic; common very fine roots; few very fine tubular pores; few slickensides; neutral; gradual smooth boundary.

3BCb—55 to 62 inches; reddish yellow (7.5YR 6/8) clay, strong brown (7.5YR 5/8) moist; common medium prominent light yellowish brown (2.5Y 6/4) mottles, olive (5Y 5/3) moist; massive; very hard, friable, very sticky and very plastic; few clean quartz sand grains; neutral.

The mean annual soil temperature is 59 or 60 degrees F. The soil temperature is above 47 degrees F from about February 15 to January 15. The soil moisture control section is dry in all parts from about July 15 to October 1 and moist or saturated in some or all parts from about October 1 to July 15. Mottles are throughout the profile.

The A and 2A horizons have dry color of 10YR 5/3, 5/2, or 4/1 or 5Y 4/1 and moist color of 7.5YR 3/2; 10YR 2/1, 3/1, 3/2, or 3/3; or 5Y 4/1.

The 2Bt and 3Bt horizons have dry color of 7.5YR 6/8, 10YR 5/3, 2.5Y 4/6, or 5Y 5/3 or 7/4 and moist color of 7.5YR 5/8, 4/4, or 3/4; 10YR 2/1, 3/1, 3/3, or 5/6; or 5Y 6/4, 5/4, 5/3, 5/2, 4/4, 4/3, or 4/2. The texture is clay loam or loam in the 2Bt horizon and clay in the 3Bt horizon.

Auburn Series

The Auburn series consists of shallow or moderately deep, well drained soils on foothills. These soils formed in material weathered from basic metavolcanic rocks. Slope ranges from 3 to 75 percent.

Soils of the Auburn series are loamy, oxidic, thermic Ruptic-Lithic Xerochrepts.

Typical pedon of Auburn loam, 3 to 8 percent slopes; 500 feet north and 500 feet east of the southwest corner of sec. 34, T. 15 N., R. 6 E., Camp Far West quadrangle:

A—0 to 2 inches; brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine and fine tubular pores; slightly acid; abrupt smooth boundary.

Bw1—2 to 10 inches; reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many fine and few very fine and medium tubular pores; slightly acid; clear wavy boundary.

Bw2—10 to 17 inches; yellowish red (5YR 5/6) loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; many fine and few very fine and medium tubular pores; slightly acid; abrupt irregular boundary.

R—17 inches; hard amphibolite schist.

The depth to lithic contact ranges from 10 to 28 inches and is less than 20 inches in 50 percent or more of each pedon. The mean annual soil temperature is 59 to 64 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about June 1 to October 31 and moist in some or all parts from about November 1 to May 31. The content of rock fragments ranges from 0 to 25 percent. The texture is loam or gravelly loam. Reaction is moderately acid to neutral.

The A horizon has dry color of 7.5YR 5/4 or 4/4 and moist color of 7.5YR 4/4 or 3/4 or 5YR 4/4 or 3/4.

The Bw horizon has dry color of 5YR 5/4 or 5/6 and moist color of 5YR 4/4 or 3/4.

Boomer Series

The Boomer series consists of deep or very deep, well drained soils on mountains. These soils formed in material weathered from basic metavolcanic rocks. Slope ranges from 2 to 75 percent.

Soils of the Boomer series are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Boomer sandy loam, in an area of Boomer-Pendola complex, 50 to 75 percent slopes; 200 feet north and 1,250 feet west of the southeast corner of sec. 13, T. 19 N., R. 7 E., Challenge quadrangle:

Oi—1 inch to 0; partially decomposed needles, leaves, and twigs.

A—0 to 3 inches; brown (7.5YR 4/4) sandy loam, dark reddish brown (5YR 3/4) moist; moderate very fine and fine granular structure; soft, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine and fine tubular and interstitial pores; moderately acid; abrupt wavy boundary.

Bt1—3 to 16 inches; light brown (7.5YR 6/4) sandy clay loam, reddish brown (5YR 4/4) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common very fine and fine and few medium and coarse roots; many fine tubular and interstitial pores; common moderately thick clay films lining pores; moderately acid; gradual wavy boundary.

Bt2—16 to 41 inches; reddish yellow (5YR 6/6) sandy clay loam, yellowish red (5YR 4/6) moist; weak coarse subangular blocky structure; slightly hard, firm, sticky and plastic; few fine, medium, and coarse roots; few fine tubular pores; continuous moderately thick clay films on faces of peds and lining pores; moderately acid; diffuse wavy boundary.

Bt3—41 to 57 inches; reddish yellow (5YR 6/6) sandy clay loam, yellowish red (5YR 4/6) moist; weak coarse subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few medium and coarse roots; common very fine tubular pores; common moderately thick clay films on faces of peds and lining pores; moderately acid; clear wavy boundary.

Cr—57 inches; weathered greenstone.

The depth to paralithic contact ranges from 40 to 80 inches. The soil temperature is below 47 degrees F from about December 15 to March 15. The soil moisture control section is dry in all parts from about July 15 to October 15 and moist in some or all parts from about

October 15 to July 15. Reaction is moderately acid or slightly acid.

The A horizon has dry color of 7.5YR 5/4 or 4/4 or 5YR 4/4 or 4/6 and moist color of 7.5YR 5/2, 4/2, 3/4, or 3/2 or 5YR 4/2 or 3/4. It is sandy loam or gravelly loam. The content of gravel ranges from 0 to 35 percent.

The Bt horizon has dry color of 7.5YR 6/8, 6/6, or 6/4; 5YR 6/8, 6/6, 5/6, or 5/4; or 2.5YR 5/8, 5/6, or 4/6. It has moist color of 5YR 4/4 or 4/6 or 2.5YR 4/8 or 4/6. It is sandy clay loam, silty clay loam, clay loam, or gravelly clay loam with 25 to 35 percent clay. The content of gravel ranges from 5 to 20 percent.

Bruella Series

The Bruella series consists of very deep, well drained soils on stream terraces. These soils formed in coarse textured alluvium derived from granitic rocks. Slope is 0 to 1 percent.

Soils of the Bruella series are fine-loamy, mixed, thermic Ultic Palexeralfs.

Typical pedon of Bruella loam, 0 to 1 percent slopes; 800 feet north of Hallwood Boulevard, 600 feet west of Highway 20, in the unsectionized Honcut Rancho land grant, T. 16 N., R. 4 E., Yuba City quadrangle:

Ap—0 to 6 inches; strong brown (7.5YR 5/6) loam, dark reddish brown (5YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine interstitial and common very fine and fine tubular pores; slightly acid; abrupt smooth boundary.

A—6 to 13 inches; strong brown (7.5YR 5/6) loam, reddish brown (5YR 4/4) moist; moderate coarse and weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine, common fine, and few medium tubular pores; few fine black (10YR 2/1) stains on faces of peds; slightly acid; clear smooth boundary.

Bt1—13 to 26 inches; yellowish red (5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; common fine and few very fine roots; many very fine and fine and common medium tubular pores; many thin clay films on faces of peds and common moderately thick clay films lining pores; common medium black (10YR 2/1) stains on faces of peds; neutral; gradual smooth boundary.

Bt2—26 to 40 inches; strong brown (7.5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and common fine roots; many very fine and common medium and fine tubular pores; many thin clay films on faces of peds and common moderately thick clay films lining pores; common medium black (10YR 2/1) stains on faces of peds; neutral; gradual smooth boundary.

Bt3—40 to 50 inches; mixed yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) and brown (7.5YR 5/4) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; many very fine, fine, and medium tubular pores; many thin clay films on faces of peds and common moderately thick clay films lining pores; common medium black (10YR 2/1) stains on faces of peds; neutral; gradual smooth boundary.

Bt4—50 to 60 inches; mixed yellowish red (5YR 5/6) and strong brown (7.5YR 5/6) sandy clay loam, yellowish red (5YR 4/6) and brown (7.5YR 5/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and fine tubular pores; common thin clay films on faces of peds and many moderately thick clay films lining pores; common medium black (10YR 2/1) stains on faces of peds; neutral; gradual smooth boundary.

Bt5—60 to 70 inches; mixed yellowish red (5YR 4/6) and strong brown (7.5YR 5/6) sandy clay loam, brown (7.5YR 4/4) and strong brown (7.5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine tubular pores; common thin clay films on faces of peds and lining pores; common medium black (10YR 2/1) stains on faces of peds; neutral.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, the soil moisture control section is dry in all parts from about May 15 to October 15 and moist in some or all parts from about November 1 to May 15.

The A horizon has dry color of 7.5YR 5/6, 5/4, or 6/4 or 10YR 5/4 or 5/3 and moist color of 10YR 3/4, 7.5YR 3/4, or 5YR 3/4 or 4/4.

The Bt horizon has dry color of 7.5YR 5/6 or 4/6 or 5YR 5/6 or 4/6 and moist color of 7.5YR 4/4, 4/6, or 5/4 or 5YR 4/4, 4/6, or 5/6. It is sandy clay loam or loam.

Capay Series

The Capay series consists of very deep, moderately well drained soils in basins. These soils formed in fine textured alluvium derived from basic igneous and metabasic rocks. Slope is 0 to 1 percent.

Soils of the Capay series are fine, montmorillonitic, thermic Typic Chromoxererts.

Typical pedon of Capay clay loam, 0 to 1 percent slopes; 2,400 feet north and 500 feet east of the southwest corner of sec. 30, T. 14 N., R. 4 E., Olivehurst quadrangle:

Ap—0 to 9 inches; brown (10YR 5/3) clay loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; hard, firm, sticky and plastic; many fine roots; few very fine interstitial and tubular pores; neutral; abrupt smooth boundary.

A—9 to 15 inches; yellowish brown (10YR 5/4) clay, dark brown (10YR 3/3) moist; massive; very hard, firm, sticky and plastic; common very fine roots; few very fine interstitial and tubular pores; neutral; clear smooth boundary.

Bw1—15 to 35 inches; brown (7.5YR 5/4) clay, brown (7.5YR 4/4) moist; massive; very hard, firm, sticky and plastic; few very fine roots; few very fine interstitial and tubular pores; common fine black (10YR 2/1) concretions; few weak pressure faces and common wedge-shaped aggregates; mildly alkaline; clear smooth boundary.

Bw2—35 to 60 inches; brown (7.5YR 5/4) clay loam, brown (7.5YR 4/4) moist; massive; very hard, firm, sticky and plastic; common fine black (10YR 2/1) concretions; many pressure faces; mildly alkaline.

Some pedons have bedrock below a depth of 60 inches. The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, cracks 1 centimeter or more wide extend to a depth of 25 inches or more. They are open from June to October and closed the rest of the year.

The A horizon has dry color of 10YR 4/3, 5/3, or 5/2 or 7.5YR 5/2 or 5/4 and moist color of 10YR 3/3 or 3/2 or 7.5YR 3/2 or 3/4. It is moderately acid to moderately alkaline.

The Bw horizon has dry color of 10YR 5/4 or 7.5YR 5/6, 6/6, 5/8, or 5/4 and moist color of 10YR 3/3, 4/4, or 4/6 or 7.5YR 3/2, 3/4, 4/4, or 4/6. It is clay, clay loam, or silty clay. Reaction is neutral to moderately alkaline.

Chaix Series

The Chaix series consists of moderately deep, somewhat excessively drained soils on mountains. These soils formed in material weathered from granodiorite. Slope ranges from 30 to 75 percent.

Soils of the Chaix series are coarse-loamy, mixed, mesic Dystric Xerochrepts.

Typical pedon of Chaix coarse sandy loam, in an area of Chaix-Chawanakee-Hotaw complex, 30 to 50 percent slopes; 150 feet south and 1,100 feet east of the northwest corner of sec. 28, T. 18 N., R. 8 E., Camptonville quadrangle:

A1—0 to 5 inches; grayish brown (10YR 5/2) coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine and medium roots; common fine and medium interstitial pores; slightly acid; abrupt smooth boundary.

A2—5 to 9 inches; pale brown (10YR 6/3) coarse sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, nonsticky and nonplastic; common fine roots; few medium and coarse interstitial pores; slightly acid; clear wavy boundary.

Bw—9 to 15 inches; very pale brown (10YR 7/3) coarse sandy loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few fine and medium roots; few fine and medium interstitial pores; slightly acid; clear wavy boundary.

BC—15 to 29 inches; very pale brown (10YR 7/4) coarse sandy loam, light yellowish brown (10YR 6/4) moist; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; few medium and coarse interstitial pores; strongly acid; abrupt wavy boundary.

Cr—29 inches; weathered granodiorite.

The depth to weathered bedrock ranges from 20 to 40 inches. The mean annual soil temperature is 50 to 54 degrees F. The soil temperature is above 47 degrees F from about March 15 to February 15. The soil moisture control section is dry in all parts from about July 1 to October 31 and moist in some or all parts from about November 1 to June 30.

The A horizon has dry color of 10YR 6/3, 5/3, 5/2, 4/3, or 3/3.

The Bw horizon has dry color of 10YR 7/3, 7/1, or 6/3. It is strongly acid to slightly acid.

The BC horizon has dry color of 10YR 7/4 or 7/2. It is strongly acid to slightly acid.

Chawanakee Series

The Chawanakee series consists of shallow, somewhat excessively drained soils on mountains. These soils formed in material weathered from granodiorite. Slope ranges from 8 to 75 percent.

Soils of the Chawanakee series are loamy, mixed, mesic, shallow Dystric Xerochrepts.

Typical pedon of Chawanakee coarse sandy loam, in an area of Chaix-Chawanakee-Hotaw complex, 30 to 50 percent slopes; 1,200 feet north and 1,900 feet west of the southeast corner of sec. 21, T. 18 N., R. 8 E., Camptonville quadrangle:

Oi—1 inch to 0; partially decomposed needles, leaves, and twigs.

A—0 to 5 inches; grayish brown (10YR 5/2) coarse sandy loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many fine pores; slightly acid; clear smooth boundary.

Bw—5 to 15 inches; very pale brown (10YR 7/4) coarse sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and nonplastic; common fine and medium roots; common fine pores; strongly acid; abrupt wavy boundary.

Cr—15 inches; weathered granodiorite.

The depth to weathered bedrock ranges from 10 to 20 inches. The mean annual soil temperature is 50 to 54 degrees F. The soil temperature is above 47 degrees F from about March 15 to February 15. The soil moisture control section is dry in all parts from about July 1 to October 31 and moist in some or all parts from about November 1 to June 30.

The A horizon has dry color of 10YR 6/3, 5/3, 5/2, or 4/3 or 2.5Y 5/2. It is moderately acid or slightly acid.

The Bw horizon has dry color of 10YR 7/4, 7/3, 5/4, 6/4, 6/3, 6/2, 5/3, or 5/2 or 2.5Y 6/4 or 6/2. It is strongly acid or moderately acid.

Columbia Series

The Columbia series consists of very deep, somewhat poorly drained soils on flood plains. These soils formed in alluvium derived from mixed sources. Slope is 0 to 1 percent.

Soils of the Columbia series are coarse-loamy, mixed, nonacid, thermic Aquic Xerofluvents.

Typical pedon of Columbia fine sandy loam, 0 to 1 percent slopes (fig. 8); 1,300 feet north and 650 feet east of the intersection of Hallwood Boulevard and Hooper Road, in the unsectionized Honcut Rancho land grant, T. 16 N., R. 4 E., Yuba City quadrangle:

Ap—0 to 9 inches; light yellowish brown (10YR 6/4) fine sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine roots; many very fine tubular pores; slightly acid; abrupt smooth boundary.

C1—9 to 18 inches; light yellowish brown (10YR 6/4) fine sandy loam, dark yellowish brown (10YR 4/4) moist; common fine distinct yellowish brown (10YR 5/6) mottles; thin bands of black (10YR 2/1) organic

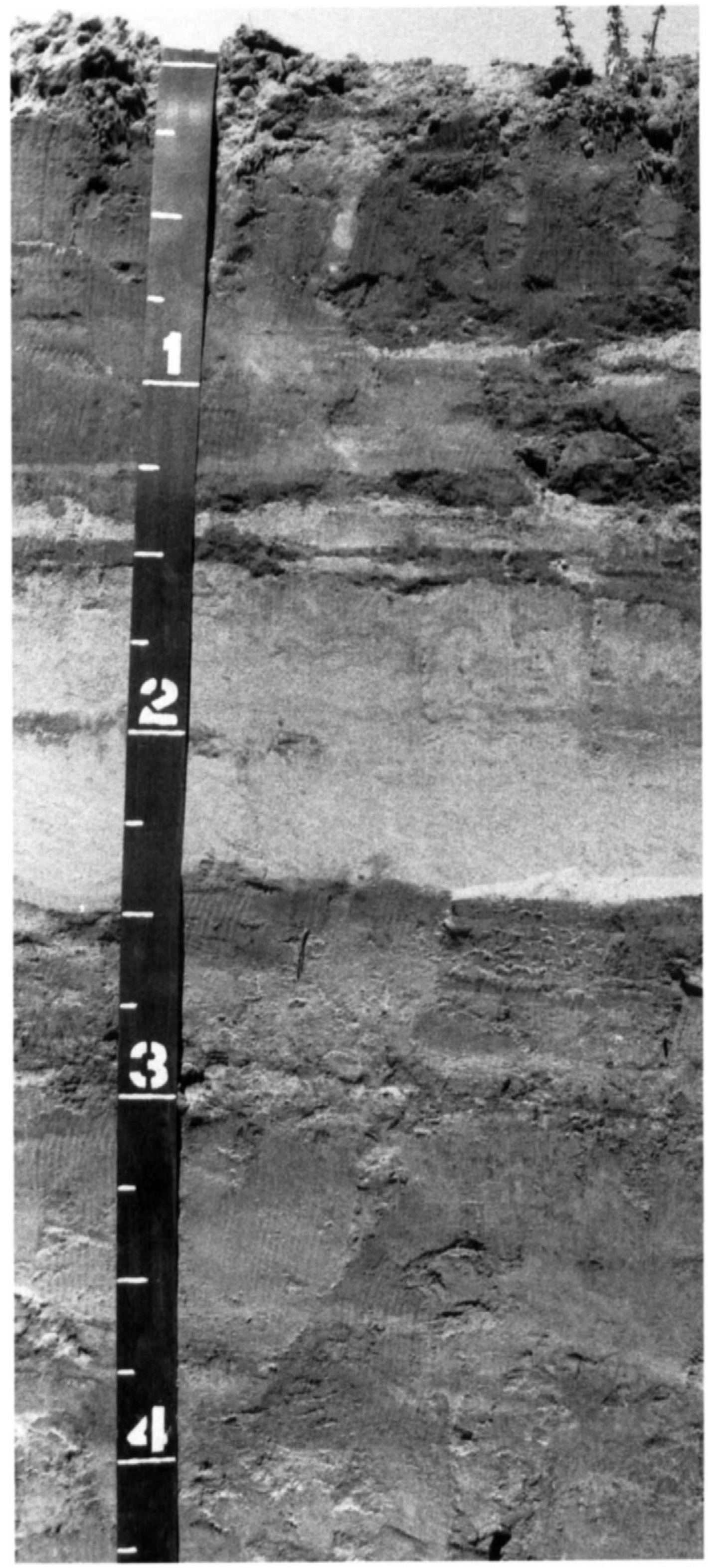

Figure 8.—Profile of Columbia fine sandy loam, which has a layer of fine sand between depths of 18 and 30 inches and strata of silt loam, very fine sandy loam, and fine sandy loam below a depth of 30 inches. Depth is marked in feet.

matter; massive; soft, very friable, slightly sticky and nonplastic; few very fine roots; many very fine tubular pores; slightly acid; abrupt smooth boundary.

C2—18 to 30 inches; light gray (10YR 7/2) fine sand, grayish brown (10YR 5/2) moist; common medium prominent dark red (2.5YR 3/6) mottles; 2-millimeter bands of dark yellowish brown (10YR 4/4) fine sandy loam with few fine distinct yellowish brown (10YR 5/6) mottles; single grain; loose, nonsticky and nonplastic; few very fine roots; neutral; abrupt smooth boundary.

C3—30 to 36 inches; very pale brown (10YR 8/4) silt loam, yellowish brown (10YR 5/4) moist; many medium prominent strong brown (7.5YR 4/6) and common medium distinct pale brown (10YR 6/3) mottles; common fine black (10YR 2/1) stains; massive; soft, very friable, slightly sticky and nonplastic; few very fine roots; neutral; abrupt smooth boundary.

C4—36 to 42 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; common medium distinct grayish brown (10YR 5/2) and yellowish brown (10YR 5/6) mottles; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; slightly acid; abrupt smooth boundary.

C5—42 to 62 inches; very pale brown (10YR 7/4) strata, 1 to 4 inches thick, of silt loam, very fine sandy loam, and fine sandy loam, mixed yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) moist; many medium prominent strong brown (7.5YR 4/6) and few medium prominent gray (10YR 5/1) mottles, mainly along interfaces between layers; massive; soft, very friable, nonsticky and nonplastic; few very fine and medium roots; many very fine tubular pores; few fine masses of black (10YR 2/1) organic matter; slightly acid; abrupt wavy boundary.

C6—62 to 68 inches; mixed light brownish gray (10YR 6/2) and light yellowish brown (10YR 6/4) loamy fine sand, mixed grayish brown (10YR 5/2) and yellowish brown (10YR 5/4) moist; many medium prominent strong brown (7.5YR 4/6) mottles; common pockets, 2 to 5 centimeters wide, of yellowish brown (10YR 5/6) silt loam with common fine distinct grayish brown (10YR 5/2) and strong brown (7.5YR 4/6) mottles; massive; soft, very friable, nonsticky and nonplastic; many very fine tubular pores; slightly acid.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, the soil moisture control section is dry in all parts from May through October and moist in some or all parts from November through April. The 10- to 40-inch control section is stratified fine sandy loam, very fine sandy loam, silt loam, loamy fine sand, or fine sand with an average of 10 to 18 percent clay.

The A horizon has dry color of 10YR 6/4, 6/3, or 5/3 and moist color of 10YR 4/4 or 4/3.

The C horizon has dry color of 10YR 8/4, 8/1, 7/4, 7/3, 7/2, 7/1, 6/4, or 6/2 and moist color of 10YR 7/4, 7/3, 7/2, 6/4, 5/4, 5/3, 5/2, 4/4, or 3/3. This horizon has common or many mottles with color of 10YR 5/6 or 7.5YR 4/6.

Conejo Series

The Conejo series consists of very deep, well drained soils on stream terraces. These soils formed in alluvium derived from mixed sources. Slope ranges from 0 to 2 percent.

Soils of the Conejo series are fine-loamy, mixed, thermic Pachic Haploxerolls.

Typical pedon of Conejo loam, 0 to 2 percent slopes (fig. 9); 500 feet south and 1,800 feet east of Lofton Cemetery, in the unsectionized Johnson Rancho land grant, T. 14 N., R. 5 E., Camp Far West quadrangle:

A—0 to 6 inches; brown (10YR 4/3) loam, very dark brown (10YR 2/2) moist; strong fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine interstitial and tubular pores; 2 percent pebbles; neutral; clear smooth boundary.

Bw1—6 to 12 inches; brown (10YR 4/3) clay loam, very dark brown (10YR 2/2) moist; moderate medium prismatic structure parting to moderate medium and coarse subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; continuous silt coatings on faces of peds; 2 percent pebbles; neutral; gradual smooth boundary.

Bw2—12 to 24 inches; brown (7.5YR 4/4) clay loam, dark brown (7.5YR 3/2) moist; moderate medium prismatic structure parting to moderate medium and coarse angular blocky; very hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; continuous silt coatings on faces of peds; 2 percent pebbles; neutral; gradual smooth boundary.

Bw3—24 to 48 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; weak medium prismatic structure parting to weak medium and coarse subangular blocky; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and common fine and medium tubular pores; continuous silt coatings on faces of peds; 2 percent pebbles; neutral; gradual smooth boundary.

Bw4—48 to 57 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; weak medium and coarse

Figure 9.—Profile of Conejo loam. Depth is marked in feet.

subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine and common fine and medium tubular pores; 2 percent pebbles; neutral; gradual smooth boundary.

BC—57 to 65 inches; brown (7.5YR 5/4) loam, brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine, fine, and medium pores; 2 percent pebbles; neutral.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, the soil moisture control section is dry in all parts from about May 15 to October 31 and moist in some or all parts from about November 1 to May 15.

The A horizon has dry color of 10YR 5/3 or 4/3 and moist color of 10YR 2/2 or 7.5YR 3/2. It is slightly acid or neutral.

The Bw horizon has dry color of 10YR 5/3 or 4/3 or 7.5YR 5/4 or 4/4 and moist color of 10YR 3/4, 3/3, or 2/2 or 7.5YR 4/4, 3/4, or 3/2. It is loam or clay loam with an absolute clay increase of 1 to 3 percent over the A horizon.

Corning Series

The Corning series consists of very deep, well drained soils on high fan terraces. These soils formed in alluvium derived from mixed sources. Slope ranges from 2 to 8 percent.

Soils of the Corning series are fine, mixed, thermic Typic Palexeralfs.

Typical pedon of Corning gravelly loam, in an area of Redding-Corning complex, 3 to 8 percent slopes; 600 feet south and 2,450 feet east of the northwest corner of sec. 16, T. 15 N., R. 5 E., Browns Valley quadrangle:

A—0 to 5 inches; yellowish red (5YR 5/6) gravelly loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine and fine interstitial and many very fine and fine tubular pores; 20 percent pebbles and 2 percent cobbles; strongly acid; clear smooth boundary.

AB—5 to 14 inches; yellowish red (5YR 5/6) gravelly loam, yellowish red (5YR 4/6) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine, fine, and medium interstitial and tubular pores; 20 percent pebbles and 2 percent cobbles; moderately acid; clear wavy boundary.

BAt—14 to 24 inches; yellowish red (5YR 5/6) gravelly loam, yellowish red (5YR 4/6) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine, fine, and medium interstitial and tubular pores; common thin clay films lining pores; 20 percent pebbles and 2 percent cobbles; slightly acid; abrupt smooth boundary.

2Bt1—24 to 31 inches; dark red (2.5YR 3/6) gravelly clay, dark red (2.5YR 3/6) moist; weak medium angular blocky structure; extremely hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; common pressure faces on peds and surrounding pebbles; 20 percent pebbles; neutral; clear smooth boundary.

2Bt2—31 to 36 inches brown (7.5YR 5/4) gravelly clay, brown (7.5YR 4/4) moist; weak medium angular blocky structure; extremely hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; common pressure faces on peds and surrounding pebbles; 20 percent pebbles; neutral; gradual wavy boundary.

2BCt—36 to 48 inches; mixed red (2.5YR 4/6) and reddish brown (5YR 4/4) gravelly sandy clay loam, mixed dark red (2.5YR 3/6) and reddish brown (5YR 4/4) moist; weak medium angular blocky structure; extremely hard, friable, sticky and plastic; common very fine tubular pores; many moderately thick clay films on faces of peds and lining pores; 25 percent pebbles and 5 percent cobbles; neutral; gradual irregular boundary.

2C—48 to 67 inches; mixed strong brown (7.5YR 5/6) and pale brown (10YR 6/3) very gravelly sandy loam, mixed strong brown (7.5YR 5/6) and pale brown (10YR 6/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; 30 percent pebbles and 15 percent cobbles (5 percent saprolitic pebbles); red (2.5YR 4/6) stains along fractures; neutral.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about May 15 to October 31 and moist in some or all parts from about November 1 to May 15.

The A horizon has dry color of 7.5YR 5/4 or 4/6 or 5YR 5/6 and moist color of 7.5YR 3/4 or 5YR 4/6 or 4/4. The content of rock fragments ranges from 15 to 30 percent. It includes 0 to 5 percent cobbles. Reaction is strongly acid to slightly acid.

The 2Bt horizon has dry color of 7.5YR 5/4; 5YR 5/6, 4/6, or 4/4; or 2.5YR 4/6 or 3/6. It has moist color of 7.5YR 4/6 or 4/4; 5YR 5/6, 4/6, 4/4, or 3/4; or 2.5YR 3/6. It is gravelly clay loam, gravelly clay, clay loam, or clay with 35 to 55 percent clay. It has an abrupt upper boundary with an absolute clay increase of at least 15 percent within 1 inch. The content of rock fragments is 5 to 35 percent. It includes 0 to 15 percent cobbles. Reaction is moderately acid to neutral. Base saturation is more than 75 percent in some part of the horizon.

The 2C horizon has dry color of 10YR 7/3, 6/6, or 6/3 or 7.5YR 5/6 and moist color of 10YR 6/3, 5/4, or 4/6; 7.5YR 5/6, 4/6, or 3/4; or 5YR 3/4. It is sandy loam, gravelly sandy loam, very gravelly sandy loam, or very gravelly sandy clay loam. The content of rock fragments ranges from 5 to 50 percent. It includes 0 to 15 percent cobbles.

Deadwood Series

The Deadwood series consists of shallow, somewhat excessively drained soils on mountains. These soils formed in material weathered from metasedimentary rocks. Slope ranges from 30 to 75 percent.

Soils of the Deadwood series are loamy-skeletal, mixed, mesic Dystric Lithic Xerochrepts.

Typical pedon of Deadwood very gravelly sandy loam, in an area of Hurlbut-Deadwood-Rock outcrop complex, 30 to 75 percent slopes; 1,500 feet south and 1,100 feet east of the northwest corner of sec. 8, T. 19 N., R. 8 E., Strawberry Valley quadrangle:

Oi—1 inch to 0; partially decomposed leaves, needles, and twigs.

A—0 to 6 inches; brown (10YR 5/3) very gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 30 percent pebbles and 10 percent cobbles; slightly acid; abrupt smooth boundary.

Bw—6 to 14 inches; brownish yellow (10YR 6/6) very gravelly sandy loam, yellowish brown (10YR 5/6) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine and fine tubular pores; 30 percent pebbles and 10 percent cobbles; slightly acid; abrupt smooth boundary.

R—14 inches; white (10YR 8/1), hard slate.

The depth to lithic contact ranges from 10 to 20 inches. The mean annual soil temperature is 50 to 54 degrees F. The soil temperature is above 47 degrees F from March 1 to December 30. The soil moisture control section is dry in all parts from about June 15 to October 31 and moist in some or all parts from about November 1 to June 15. The content of rock fragments ranges from 35 to 55 percent. Reaction is moderately acid or slightly acid.

The A horizon has dry color of 10YR 5/3, 5/4, 6/3, or 6/4 and moist color of 10YR 3/3, 3/4, 4/3, or 4/4.

The Bw horizon has dry color of 10YR 6/6, 6/4, or 6/3 and moist color of 10YR 5/4, 5/6, or 4/4. It is very gravelly sandy loam or very gravelly loam with an absolute clay increase of 1 to 3 percent over the A horizon.

Feather Series

The Feather series consists of very deep, well drained soils on stream terraces. These soils formed in alluvium derived from mixed sources. Slope ranges from 0 to 2 percent.

Soils of the Feather series are coarse-silty, mixed, thermic Cumulic Haploxerolls.

Typical pedon of Feather silt loam, 0 to 2 percent slopes, occasionally flooded; about 8.3 miles northwest of Marysville, 4,800 feet north of the intersection of Highway 70 and Ramirez Road and 4,400 feet northwest on a paved road to a levee, then 500 feet west of the levee, on a dirt road, and 600 feet north into a field; in the unsectionized Honcut Rancho land grant: Honcut Quadrangle.

Ap—0 to 7 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and few fine and medium roots; many very fine interstitial pores; neutral; clear smooth boundary.

A—7 to 26 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots; many very fine tubular pores; common wormcasts; mildly alkaline; abrupt smooth boundary.

Ab1—26 to 34 inches; mixed brown (10YR 5/3) and very pale brown (10YR 7/3) silt loam, mixed very dark grayish brown (10YR 3/2) and dark brown (10YR 4/3) moist; strong medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine, common fine, and few medium tubular pores; common gray (10YR 5/1) silt coatings on faces of peds and lining pores; common wormcasts; moderately alkaline; abrupt smooth boundary.

Ab2—34 to 46 inches; brown (10YR 5/3) silt loam, very dark brown (10YR 2/2) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine, common fine, and few medium tubular pores; common gray (10YR 5/1) silt coatings on faces of peds and lining pores; common wormcasts; moderately alkaline; gradual smooth boundary.

Ab3—46 to 60 inches; brown (10YR 5/3) silt loam, very dark brown (10YR 2/2) moist; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine, common fine, and few medium tubular pores; common gray (10YR 5/1) silt coatings lining pores; common wormcasts; moderately alkaline; gradual smooth boundary.

Ab4—60 to 75 inches; brown (10YR 5/3) silt loam, very dark brown (10YR 2/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine and common fine tubular pores; common gray (10YR 5/1) silt coatings lining pores; common wormcasts; moderately alkaline.

The solum is 60 or more inches thick. The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about May 15 to October 31 and moist in some part the rest of the year. The content of clay ranges from 10 to 18 percent. The content of fine sand or coarser sand ranges from 1 to 15 percent.

The Ap and A horizons have dry color of 10YR 5/3 or 4/3 and moist color of 10YR 3/3 or 3/2. They are neutral or mildly alkaline.

The Ab horizon has dry color of 10YR 7/3, 5/4, or 5/3 and moist color of 10YR 4/3, 3/3, 3/2, or 2/2. It is mildly alkaline or moderately alkaline.

Flanly Series

The Flanly series consists of moderately deep, well drained soils on foothills. These soils formed in material weathered from acid intrusive igneous rocks, mainly granodiorite. Slope ranges from 3 to 75 percent.

Soils of the Flanly series are fine-loamy, mixed, thermic Ultic Haploxeralfs.

Typical pedon of Flanly sandy loam, in an area of Flanly-Orose-Verjeles complex, 3 to 8 percent slopes; 2,450 feet south and 1,550 feet west of the northeast corner of sec. 30, T. 18 N., R. 7 E., Challenge quadrangle:

A—0 to 3 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; common very fine and fine interstitial and common very fine tubular pores; 5 percent pebbles and 5 percent cobbles; slightly acid; clear smooth boundary.

BAt—3 to 9 inches; strong brown (7.5YR 5/6) sandy loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure; many fine and common very fine roots; common very fine and fine tubular pores; few thin clay films lining pores and bridging sand grains; 2 percent stones; moderately acid; gradual smooth boundary.

Bt1—9 to 16 inches; strong brown (7.5YR 5/6) sandy loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and medium and many fine roots; common very fine and fine tubular pores; few thin clay films lining pores and bridging sand grains; 2 percent stones; moderately acid; gradual smooth boundary.

Bt2—16 to 24 inches; strong brown (7.5YR 5/6) loam, strong brown (7.5YR 4/6) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common fine and few very fine and medium roots; common very fine tubular pores; common moderately thick clay films lining pores and few thin clay films on faces of peds; 2 percent stones; moderately acid; gradual smooth boundary.

Bt3—24 to 34 inches; mixed strong brown (7.5YR 5/6 and 5/8) loam, strong brown (7.5YR 4/6) moist; moderate medium subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; common very fine tubular pores; common moderately thick clay films lining pores and few thin clay films on faces of peds; 2 percent stones; moderately acid; abrupt wavy boundary.

Cr—34 to 40 inches; reddish yellow (7.5YR 6/8), weathered granodiorite, strong brown (7.5YR 5/6) moist; common moderately thick strong brown (7.5YR 4/6) clay films on fracture faces; slightly acid.

The depth to paralithic contact ranges from 20 to 40 inches. The mean annual soil temperature is 59 to 64 degrees F. The soil temperature is below 47 degrees F from about January 15 to February 15. The soil moisture control section is dry in all parts from about June 1 to October 31 and moist in some or all parts from about November 1 to May 31. The content of rock fragments ranges from 0 to 15 percent. Reaction is moderately acid or slightly acid.

The A and BA horizons have dry color of 10YR 6/4, 5/4, 5/3, or 5/2 or 7.5YR 5/6 or 5/4 and moist color of 10YR 4/4, 3/4, 3/3, or 3/2 or 7.5YR 4/6, 3/4, 3/3, or 3/2. Moist chromas of 3 or less are in the upper 2 to 4 inches.

The Bt horizon has dry color of 7.5YR 7/6, 6/6, 6/4, 5/8, 5/6, or 5/4 or 5YR 5/6 and moist color of 7.5YR 5/6, 4/6, 4/4, or 3/4 or 5YR 4/6. It is sandy loam, loam, or clay loam with 18 to 35 percent clay.

Fluvaquents

Fluvaquents consist of very deep, very poorly drained soils on flood plains. These soils formed in alluvium generated by hydraulic mining operations. Slope ranges from 0 to 2 percent.

Reference pedon of Fluvaquents, 0 to 1 percent slopes; 1,050 feet south and 1,850 feet west of the northeast corner of sec. 22, T. 19 N., R. 6 E., Rackerby quadrangle:

A1—0 to 4 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine interstitial pores; 5 percent pebbles; slightly acid; clear smooth boundary.

A2—4 to 7 inches; gray (10YR 6/1) loam, dark gray (10YR 4/1) moist; common fine distinct reddish brown (5YR 5/4) mottles, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine interstitial pores; 5 percent pebbles; moderately acid; abrupt smooth boundary.

C1—7 to 15 inches; gray (5Y 5/1) sandy loam, dark gray (5Y 4/1) moist, massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine interstitial pores; 5 percent pebbles; slightly acid; clear smooth boundary.

C2—15 to 23 inches; gray (5Y 5/1) sandy loam, dark gray (5Y 4/1) moist; massive; soft, very friable, slightly sticky and slightly plastic; many very fine interstitial pores; 10 percent pebbles; neutral; abrupt smooth boundary.

2Ab—23 to 42 inches; brown (10YR 4/3) sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; many very fine interstitial pores; 10 percent pebbles; slightly acid; clear smooth boundary.

2C—42 to 60 inches; gray (5Y 5/1) sandy loam, dark gray (5Y 4/1) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine interstitial pores; 20 percent pebbles; neutral.

The mean annual soil temperature is 50 to 55 degrees F. The content of gravel ranges from 0 to 60 percent.

The A horizon has a dominant dry color of 10YR 6/1, 5/3, or 5/2 and moist color of 10YR 4/1, 3/3, or 3/2 or 7.5YR 4/4 or 3/4. It is loam or sandy loam with 10 to 25 percent clay. Reaction is moderately acid to neutral.

The C horizon has a dominant dry color of 5Y 5/1; 10YR 6/3, 6/1, or 5/2; 7.5YR 6/4 or 5/4; or 5YR 6/4. It has moist color of 5Y 4/1; 10YR 5/1, 4/3, or 3/2; or 7.5YR 4/4. Mottles are throughout the horizon. This horizon is loamy sand, sandy loam, loam, silt loam, sandy clay loam, clay loam, or the gravelly or very gravelly equivalents of those textures. The content of gravel ranges from 10 to 35 percent. Reaction is slightly acid or neutral.

The 2Ab horizon, if it occurs, is sandy loam, loam, or silt loam with 10 to 25 percent clay.

Hoda Series

The Hoda series consists of very deep, well drained soils on mountains. These soils formed material weathered from granodiorite. Slope ranges from 3 to 50 percent.

Soils of the Hoda series are fine, kaolinitic, mesic Ultic Haploxeralfs.

Typical pedon of Hoda loam, in an area of Holland-Hoda-Hotaw complex, 2 to 30 percent slopes; 100 feet south and 700 feet east of the northwest corner of sec. 6, T. 18 N., R. 8 E., Challenge quadrangle:

O—1 inch to 0; litter and duff.

A—0 to 7 inches; brown (7.5YR 5/4) loam, brown (7.5YR 4/4) moist; moderate very fine and fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; slightly acid; clear smooth boundary.

Bt1—7 to 14 inches; reddish yellow (5YR 6/6) clay loam, yellowish red (5YR 5/6) moist; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, and medium and few coarse roots; common very fine and fine interstitial pores; few thin clay films coating mineral grains; slightly acid; clear smooth boundary.

Bt2—14 to 21 inches; yellowish red (5YR 5/8) clay, yellowish red (5YR 4/8) moist; moderate medium angular blocky structure; hard, friable, sticky and plastic; common medium and coarse roots; common very fine and fine tubular pores; common thin clay films on faces of peds and common moderately thick clay films lining pores; slightly acid; gradual wavy boundary.

Bt3—21 to 48 inches; reddish yellowish (5YR 6/8) clay, yellowish red (5YR 5/8) moist; moderate medium angular blocky structure; hard, friable, sticky and plastic; common medium and coarse roots; common very fine and fine tubular and interstitial pores; common moderately thick clay films on faces of peds and lining pores; moderately acid; clear irregular boundary.

BCt—48 to 72 inches; reddish yellow (7.5YR 6/8) clay loam, strong brown (7.5YR 5/8) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common medium and coarse roots; few very fine interstitial pores; few thin clay films lining pores; moderately acid.

The thickness of the solum ranges from 40 to 80 inches, and the depth to paralithic contact is more than 80 inches. The mean annual soil temperature is 50 to 54 degrees F. The soil temperature is above 47 degrees F from about March 15 to December 15. The soil moisture control section is dry in all parts from about July 15 to October 15 and moist in some or all parts from about October 15 to July 15.

The A horizon has dry color of 10YR 5/2, 5/3, 4/3, or 3/3 or 7.5YR 5/4, 4/6, 4/2, or 4/4 and moist color of 10YR 3/3 or 3/4 or 7.5YR 3/4, 4/2, 4/4, 5/6, or 5/8. Moist chromas of 4 or more are below a depth of 5 inches. Reaction is moderately acid or slightly acid.

The Bt horizon has dry color of 7.5YR 8/6, 7/8, 7/6, 6/8, or 6/6 or 5YR 7/8, 7/6, 6/8, 6/6, 5/8, 5/6, 4/8, or 4/6. It is clay loam or clay averaging 35 to 50 percent clay throughout. Reaction is strongly acid to slightly acid.

Holillipah Series

The Holillipah series consists of very deep, somewhat excessively drained soils on flood plains. These soils formed in alluvium derived from mixed sources. Slope is 0 to 1 percent.

Soils of the Holillipah series are sandy, mixed, thermic Typic Xerofluvents.

Typical pedon of Holillipah loamy sand, 0 to 1 percent slopes (fig. 10); 850 feet north of Hooper Road and 300 feet east of Hallwood Boulevard, in the unsectionized Honcut Rancho land grant, T. 16 N., R. 4 E., Yuba City quadrangle:

Ap—0 to 6 inches; light yellowish brown (10YR 6/4) loamy sand, brown (10YR 4/3) moist; weak medium granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine interstitial pores; neutral; abrupt wavy boundary.

C1—6 to 9 inches; pale brown (10YR 6/3) sand, brown (10YR 5/3) moist; strata, 1 to 2 millimeters thick, and pockets, 1 to 2 centimeters across, of yellowish brown (10YR 5/6) silt loam; single grain; loose, nonsticky and nonplastic; many very fine interstitial pores; neutral; clear wavy boundary.

C2—9 to 20 inches; light gray (10YR 7/1), stratified sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; neutral; abrupt diffuse boundary.

C3—20 to 26 inches; very pale brown (10YR 7/4) fine sandy loam, yellowish brown (10YR 5/4) moist; common fine distinct brown (10YR 5/3) mottles; massive; soft, very friable, slightly sticky and nonplastic; neutral; abrupt wavy boundary.

C4—26 to 38 inches; light gray (10YR 7/1), stratified sand, grayish brown (10YR 5/2) moist; continuous yellow (10YR 7/8) mottles in 1/2- to 1-millimeter strata; single grain; loose, nonsticky and nonplastic; neutral; abrupt smooth boundary.

C5—38 to 46 inches; mixed very pale brown (10YR 7/3)

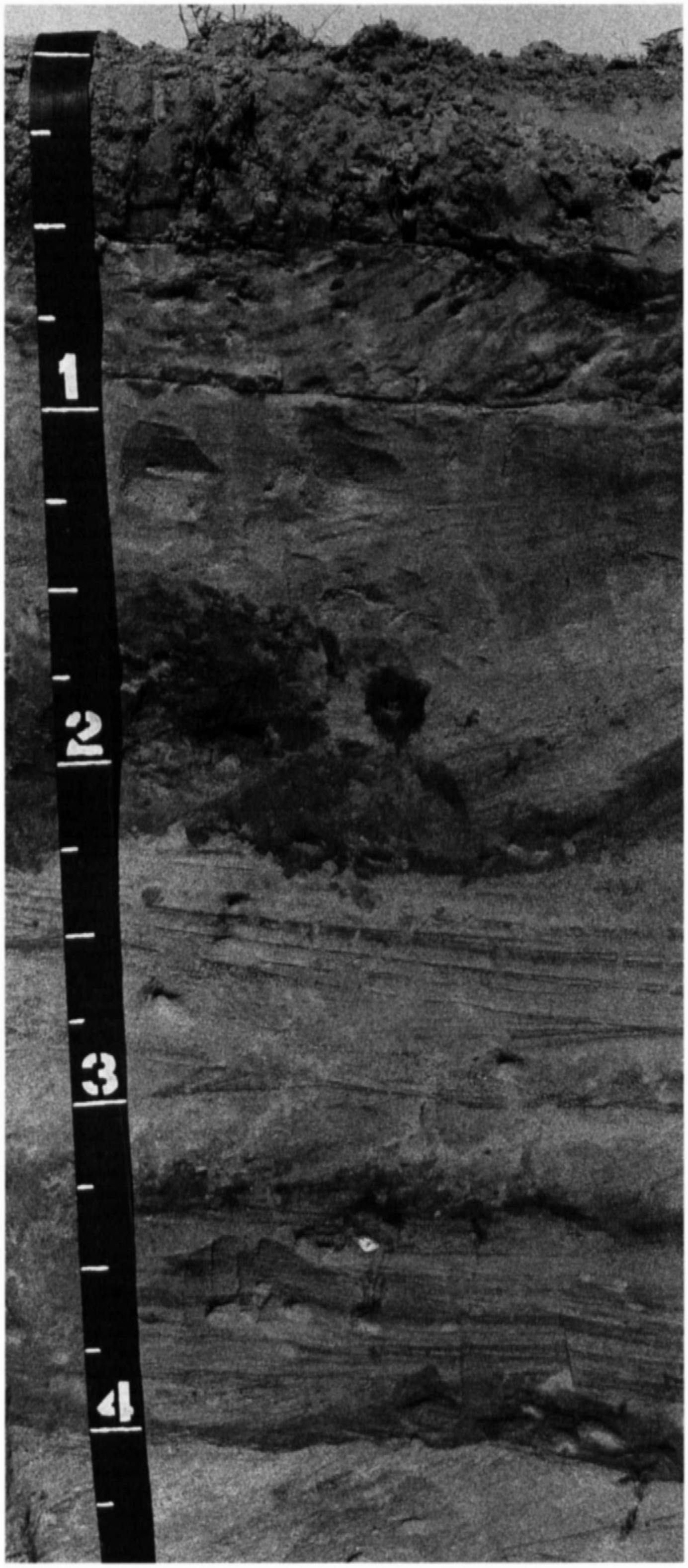

Figure 10.—Profile of Holillipah loamy sand, which has a layer of fine sandy loam between depths of 20 and 26 inches. The rest of the profile is stratified loamy sand, sand, or loamy fine sand. Depth is marked in feet.

and pale brown (10YR 6/3), stratified sand, grayish brown (10YR 5/2) moist; continuous yellowish brown (10YR 5/8) mottles in 1-millimeter strata, many large prominent brown (7.5YR 4/4) mottles, and few medium prominent dusky red (2.5YR 3/2) iron and manganese stains at the upper boundary; single grain; loose, nonsticky and nonplastic; 2 percent rounded pebbles; neutral; abrupt smooth boundary.

C6—46 to 48 inches; light gray (10YR 7/2) loamy fine sand, dark brown (10YR 3/3) moist; single grain; soft, very friable, nonsticky and nonplastic; neutral; abrupt smooth boundary.

C7—48 to 57 inches; light gray (10YR 7/1), stratified sand, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; neutral; abrupt smooth boundary.

C8—57 to 66 inches; light gray (10YR 7/2), stratified sand, grayish brown (10YR 5/2) moist; common fine prominent brownish yellow (10YR 6/8) mottles in fine strata; single grain; loose, nonsticky and nonplastic; neutral.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, the soil moisture control section is dry in all parts from about May through October and moist in some or all parts from about November through April. The texture is stratified sand, loamy fine sand, loamy sand, sandy loam, or fine sandy loam. The content of organic carbon decreases irregularly with increasing depth. Reaction is slightly acid or neutral.

The A horizon has dry color of 10YR 6/4 or 6/3 and moist color of 10YR 4/4 or 4/3.

The C horizon has dry color of 10YR 8/1, 7/4, 7/3, 7/2, 7/1, or 6/3 and moist color of 10YR 7/2, 6/2, 5/4, 5/3, 5/2, 4/4, 4/3, or 3/3. It has distinct or prominent mottles.

Holland Series

The Holland series consists of very deep, well drained soils on mountains. These soils formed in material weathered from granodiorite. Slope ranges from 2 to 50 percent.

Soils of the Holland series are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Holland loam, in an area of Holland-Hoda-Hotaw complex, 2 to 30 percent slopes; 1,600 feet south and 300 feet east of the northwest corner of sec. 36, T. 19 N., R. 7 E., Challenge quadrangle:

Oi—2 inches to 0; litter and duff.

A1—0 to 4 inches; brown (7.5YR 5/4) loam, brown (7.5YR 4/4) moist; weak very fine and fine granular structure; soft, friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine and fine interstitial pores; slightly acid; gradual smooth boundary.

A2—4 to 15 inches; reddish brown (5YR 5/4) loam, reddish brown (5YR 4/4) moist; weak fine subangular blocky structure; soft, friable, nonsticky and nonplastic; few medium and coarse and common fine roots; common very fine and fine interstitial pores; slightly acid; gradual wavy boundary.

Bt1—15 to 35 inches; reddish yellow (5YR 6/8) clay loam, yellowish red (5YR 4/8) moist; moderate fine subangular blocky structure; hard, firm, nonsticky and slightly plastic; few fine, medium, and coarse roots; common fine and very fine interstitial pores; common thin clay films on faces of peds and lining pores; moderately acid; clear wavy boundary.

Bt2—35 to 50 inches; reddish yellow (7.5YR 6/8) clay loam, strong brown (7.5YR 5/8) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few medium and coarse roots; common very fine and fine interstitial and common fine tubular pores; common thin clay films bridging mineral grains; moderately acid; gradual irregular boundary.

BCt—50 to 65 inches; reddish yellow (7.5YR 7/8) clay loam, reddish yellow (7.5YR 6/8) moist; massive; slightly hard, friable, nonsticky and slightly plastic; few medium roots; common very fine and fine interstitial pores; common thin clay films bridging mineral grains; strongly acid.

The mean annual soil temperature is 52 to 54 degrees F. The soil temperature is above 47 degrees F from about March 15 to December 15. The soil moisture control section is dry in all parts from about July 15 to October 15 and moist in some or all parts from about October 15 to July 15.

The A horizon has dry color of 10YR 5/3, 5/2, 4/3, 4/2, or 3/3; 7.5YR 5/4, 5/2, 4/4, or 4/2; or 5YR 5/4. It is sandy loam or loam. Reaction is moderately acid or slightly acid.

The Bt horizon has dry color of 7.5YR 6/8, 6/6, 6/4, 5/8, 5/6, 5/4, 4/6, or 4/4 or 5YR 6/8, 6/6, 5/8, 5/6, 5/4, 4/8, 4/6, or 4/4. It is sandy clay loam or clay loam. The content of clay ranges from 25 to 35 percent. Reaction is strongly acid to slightly acid.

The BCt horizon has dry color of 7.5YR 7/8, 5/6, or 4/6 and moist color of 7.5YR 4/4, 4/6, 5/4, or 6/8. It is sandy clay loam or clay loam.

Hollenbeck Series

The Hollenbeck series consists of moderately well drained soils in basins. These soils are deep to a hardpan. They formed in fine textured alluvium derived from basic igneous and metabasic rocks. Slope ranges from 0 to 3 percent.

Soils of the Hollenbeck series are fine, montmorillonitic, thermic Typic Chromoxererts.

Typical pedon of Hollenbeck silty clay loam, 0 to 1 percent slopes; 4,250 feet south and 125 feet east of the northwest corner of sec. 3, T. 13 N., R. 4 E., Olivehurst quadrangle:

Ap—0 to 8 inches; brown (10YR 4/3) silty clay loam, mixed very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) moist; many medium prominent strong brown (7.5YR 5/6) mottles, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; soft, friable, sticky and plastic; many fine roots; few very fine interstitial and tubular pores; neutral; abrupt smooth boundary.

Bw1—8 to 16 inches; grayish brown (10YR 5/2) silty clay, very dark grayish brown (10YR 3/2) moist; common coarse prominent strong brown (7.5YR 4/6) mottles, strong brown (7.5YR 4/6) moist; weak very coarse angular blocky structure; very hard, firm, sticky and plastic; common very fine roots; few very fine interstitial and tubular pores; mildly alkaline; clear smooth boundary.

Bw2—16 to 24 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; weak very coarse angular blocky structure; very hard, firm, sticky and plastic; few very fine roots; few very fine interstitial and tubular pores; few weak pressure faces and common wedge-shaped aggregates; common fine black (10YR 2/1) concretions; mildly alkaline; clear smooth boundary.

Bw3—24 to 43 inches; brown (7.5YR 5/4) clay, brown (7.5YR 4/4) moist; weak very coarse angular blocky structure; very hard, firm, sticky and plastic; many pressure faces; common fine black (10YR 2/1) concretions; mildly alkaline; clear smooth boundary.

Bk—43 to 47 inches; reddish yellow (7.5YR 6/6) clay loam, strong brown (7.5YR 4/6) moist; weak very coarse angular blocky structure; hard, firm, sticky and plastic; few fine tubular pores; many pressure faces; few fine soft masses of lime; common fine black (10YR 2/1) concretions; mildly alkaline; abrupt smooth boundary.

Bkqm—47 to 65 inches; reddish yellow (7.5YR 7/6), strongly cemented duripan, strong brown (7.5YR 4/6) moist; massive; very hard, very firm; few fine soft masses of lime; many fine black (10YR 2/1) soft masses and few fine black (10YR 2/1) concretions; common yellowish red (5YR 4/6) stains in fractures.

Depth to the duripan ranges from 40 to 60 inches. Some pedons do not have a duripan. The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless irrigated, the soils have cracks that are 1 centimeter or more wide and extend to a depth of 25 inches or more. The cracks are open from about June to October and closed the rest of the year.

The A and Bw horizons have dry color of 10YR 4/3, 5/3, or 5/2 or 7.5YR 5/2 and moist color of 10YR 3/3 or 3/2 or 7.5YR 3/2. They are silty clay loam or clay. Reaction is neutral to moderately alkaline.

The B horizon has dry color of 10YR 5/2 or 5/4 or 7.5YR 5/6, 6/6, 5/8, or 5/4 and moist color of 10YR 3/2, 3/3, 4/4, or 4/6 or 7.5YR 3/2, 3/4, 4/4, or 4/6. It is clay, clay loam, or silty clay. Reaction is neutral to moderately alkaline.

The Hollenbeck soil in map unit 133 is classified as a fine, mixed, thermic Chromic Pelloxerert. It is on hills, has claystone at a depth of 40 to 60 inches, has a pH of 5.6 to 6.5, and has slopes of 0 to 3 percent. These differences, however, do not significantly affect the use and management of the soil.

Horseshoe Series

The Horseshoe series consists of very deep, well drained soils on mountains. These soils formed in material weathered from andesitic tuff breccia. Slope ranges from 2 to 50 percent.

Soils of the Horseshoe series are fine-loamy, oxidic, mesic Xeric Haplohumults.

Typical pedon of Horseshoe loam, in an area of Aiken-Horseshoe complex, 2 to 8 percent slopes; 1,600 feet south and 600 feet east of the northwest corner of sec. 25, T. 20 N., R. 8 E., Strawberry Valley quadrangle:

Oi—3 inches to 0; needles, twigs, and bark.

A—0 to 7 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; strong very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; many very fine interstitial pores; common fine rounded concretions; 2 percent pebbles; moderately acid; clear smooth boundary.

AB—7 to 15 inches; yellowish red (5YR 4/6) loam, dark reddish brown (5YR 3/4) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine, fine, and medium and common coarse roots; common very fine interstitial and tubular pores; common fine rounded concretions; moderately acid; clear smooth boundary.

Bt1—15 to 32 inches; yellowish red (5YR 5/6) loam, reddish brown (5YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine, medium, and coarse roots; common very fine, fine, and medium tubular pores; common thin clay films lining pores; common fine rounded concretions; moderately acid; clear smooth boundary.

Bt2—32 to 47 inches; yellowish red (5YR 5/6) loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine and few medium and coarse roots; common very fine, fine, and medium tubular pores; common thin clay films lining pores and on faces of peds; common fine rounded concretions; very strongly acid; gradual smooth boundary.

Bt3—47 to 65 inches; strong brown (7.5YR 5/6) loam, strong brown (7.5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine, medium, and coarse roots; common very fine, fine, and medium tubular pores; common thin clay films lining pores and on faces of peds; common fine rounded concretions; very strongly acid; gradual smooth boundary.

BC—65 to 75 inches; brown (7.5YR 5/4) loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; few fine, medium, and coarse roots; common very fine and fine tubular pores; common fine rounded concretions; 10 percent soft fragments of andesitic tuff breccia; very strongly acid; abrupt wavy boundary.

Cr—75 inches; andesitic tuff breccia.

The mean annual soil temperature is 47 to 54 degrees F. The soil temperature is above 47 degrees F from about April 30 to November 15. The soil moisture control section is dry in all parts from about July 15 to October 15 and moist in some or all parts from about October 16 to July 14.

The A and AB horizons have dry color of 7.5YR 5/4 or 4/4 or 5YR 4/6 and moist color of 7.5YR 3/4 or 5YR 3/4. They are moderately acid or slightly acid.

The Bt and BC horizons have dry color of 7.5YR 5/6 or 5/4 or 5YR 5/6 and moist color of 7.5YR 5/8, 4/6, or 4/4 or 5YR 4/6 or 4/4. They are loam or clay loam. The content of clay ranges from 20 to 35 percent. Base saturation ranges from 15 to 35 percent. Reaction is very strongly acid to moderately acid.

Horst Series

The Horst series consists of very deep, well drained soils on stream terraces. These soils formed in alluvium derived from mixed sources. Slope ranges from 0 to 2 percent.

Soils of the Horst series are fine-silty, mixed, thermic Pachic Haploxerolls.

Typical pedon of Horst silt loam, 0 to 2 percent slopes; 1,350 feet south and 200 feet east of the intersection of

Spenceville Road and Jasper Lane, in the unsectionized Johnson Rancho land grant, T. 14 N., R. 5 E., Wheatland quadrangle:

Ap—0 to 10 inches; brown (10YR 4/3) silt loam, dark brown (7.5YR 3/2) moist; moderate coarse prismatic structure parting to moderate coarse subangular blocky; hard, friable, sticky and plastic; common very fine and few medium roots; few very fine tubular pores; neutral; clear smooth boundary.

A—10 to 26 inches; brown (10YR 4/3) silt loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and medium roots; few very fine tubular pores; mildly alkaline; gradual wavy boundary.

Bt1—26 to 39 inches; brown (10YR 4/3) silt loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and medium roots; many very fine tubular pores; few thin clay films on faces of peds and lining pores; mildly alkaline; gradual wavy boundary.

Bt2—39 to 49 inches; brown (7.5YR 5/4) silt loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; many very fine and few fine tubular pores; few thin clay films on faces of peds and lining pores; mildly alkaline; gradual wavy boundary.

Bt3—49 to 60 inches; brown (7.5YR 5/4) silt loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and few fine tubular pores; few thin clay films on faces of peds and lining pores; mildly alkaline; gradual wavy boundary.

BCt—60 to 70 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine tubular pores; few thin clay films lining pores; mildly alkaline.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about May 15 to October 31 and moist in some or all parts from about November 1 to May 15. The content of clay in the 10- to 40-inch textural control section ranges from 18 to 27 percent, and the content of fine sand or coarser sand ranges from 6 to 12 percent. The content of organic carbon is 1 to 3 percent in the upper 35 inches.

The A horizon has dry color of 10YR 5/3, 5/2, or 4/3 and moist color of 10YR 3/3 or 3/2 or 7.5YR 3/2. It is dominantly silt loam or sandy loam. In some pedons it is loamy sand in the lower part. Some pedons have overwash of pale brown sandy loam and loamy sand. Reaction is moderately acid to mildly alkaline.

The Bt horizon has dry color of 10YR 5/4 or 4/3 or 7.5YR 6/4 or 5/4 and moist color of 10YR 3/3 or 7.5YR 4/4 or 3/4. It is neutral or mildly alkaline.

The BCt horizon, if it occurs, is loam that has colors similar to those of the Bt horizon.

Hotaw Series

The Hotaw series consists of moderately deep, well drained soils on mountains. These soils formed in material weathered from granodiorite. Slope ranges from 5 to 75 percent.

Soils of the Hotaw series are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Hotaw loam, in an area of Holland-Hoda-Hotaw complex, 2 to 30 percent slopes; 700 feet south and 2,200 feet west of the northeast corner of sec. 6, T. 18 N., R. 8 E., Camptonville quadrangle:

O—1 inch to 0; litter and duff.

A1—0 to 4 inches; brown (7.5YR 5/4) loam, brown (7.5YR 4/4) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine and common medium roots; many very fine and fine interstitial pores; slightly acid; gradual smooth boundary.

A2—4 to 12 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common very fine, fine, and medium and few coarse roots; many very fine and fine interstitial pores; slightly acid; gradual wavy boundary.

Bt—12 to 34 inches; light yellowish brown (10YR 6/4) sandy clay loam, yellowish brown (10YR 5/6) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; common fine and medium and many coarse roots; common very fine and fine tubular pores; common moderately thick clay films lining pores; moderately acid; clear wavy boundary.

Cr—34 to 50 inches; weathered granodiorite.

The depth to weathered bedrock ranges from 20 to 40 inches. The mean annual soil temperature is 52 to 56 degrees F. The soil temperature is above 47 degrees F from about March 15 to December 15. The soil moisture control section is dry in all parts from about July 15 to October 15 and moist in some or all parts from about October 15 to July 15.

The A horizon has dry color of 10YR 6/4, 6/3, 5/8, 5/6, 5/4, 5/3, 4/3, 4/2, or 3/4 or 7.5YR 6/4, 5/4, 5/2, 4/4, or 4/2. It is loam or sandy loam. Reaction is moderately acid or slightly acid.

The Bt horizon has dry color of 10YR 6/4, 5/6, 5/3, or

4/3 or 7.5YR 6/8, 6/4, 5/8, 5/6, 5/4, 5/2, 4/6, 4/4, or 4/2. It is sandy clay loam or clay loam. The content of clay ranges from 25 to 35 percent. Reaction is strongly acid to slightly acid.

Hurlbut Series

The Hurlbut series consists of moderately deep, well drained soils on mountains. These soils formed in material weathered from metasedimentary rocks. Slope ranges from 30 to 75 percent.

Soils of the Hurlbut series are fine-loamy, mixed, mesic Dystric Xerochrepts.

Typical pedon of Hurlbut gravelly fine sandy loam, in an area of Hurlbut-Deadwood-Rock outcrop complex, 30 to 75 percent slopes; 1,700 feet south and 1,000 feet east of the northwest corner of sec. 8, T. 19 N., R. 8 E., Strawberry Valley quadrangle:

Oi—1 inch to 0; partially decomposed needles, leaves, and twigs.

A—0 to 3 inches; pale brown (10YR 6/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; many very fine and fine interstitial and common very fine tubular pores; 15 percent pebbles; slightly acid; clear smooth boundary.

Bw1—3 to 10 inches; brownish yellow (10YR 6/6) gravelly fine sandy loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine and fine tubular pores; 20 percent pebbles; slightly acid; gradual smooth boundary.

Bw2—10 to 23 inches; yellow (10YR 7/6) gravelly fine sandy loam, yellowish brown (10YR 5/8) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and few medium roots; many very fine and fine tubular pores; 20 percent pebbles; slightly acid; abrupt wavy boundary.

Cr—23 to 28 inches; white (10YR 8/2), weathered slate.

The depth to paralithic contact ranges from 20 to 40 inches. The mean annual soil temperature is 50 to 54 degrees F. The soil temperature is above 47 degrees F from about March 1 to December 30. The soil moisture control section is dry in all parts from about June 15 to October 31 and moist in some or all parts from about November 1 to June 15. Reaction is moderately acid or slightly acid. The content of rock fragments ranges from 5 to 25 percent.

The A horizon has dry color of 7.5YR 6/2, 6/4, or 5/4 or 10YR 5/4, 6/3, or 6/6 and moist color of 7.5YR 3/2, 3/4, 4/4, or 4/6 or 10YR 3/2, 3/3, or 4/3.

The B horizon has dry color of 5YR 4/6, 4/4, 5/6, or 6/6; 7.5YR 7/8; or 10YR 5/4, 6/6, 7/6, or 6/8. It has moist color of 5YR 4/6, 3/4, or 5/6; 7.5YR 6/8, 5/8, 5/6, 4/6, or 4/4; or 10YR 4/4, 6/6, 6/8, or 5/8. It is silt loam, gravelly silt loam, gravelly loam, or gravelly fine sandy loam with 18 to 27 percent clay.

Jocal Series

The Jocal series consists of very deep, well drained soils on mountains. These soils formed in material weathered from soft metasedimentary rocks. Slope ranges from 3 to 75 percent.

Soils of the Jocal series are fine-loamy, mixed, mesic Typic Haploxerults.

Typical pedon of Jocal loam, 3 to 8 percent slopes (fig. 11); 300 feet north and 700 feet west of the southeast corner of sec. 20, T. 20 N., R. 8 E., Strawberry Valley quadrangle:

Oi—2 inches to 0; partially decomposed needles, twigs, and bark.

A—0 to 4 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine interstitial pores; moderately acid; clear smooth boundary.

Bt1—4 to 8 inches; yellowish red (5YR 5/6) loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots; many very fine interstitial and tubular pores; common thin clay films lining pores; moderately acid; clear smooth boundary.

Bt2—8 to 20 inches; reddish yellow (7.5YR 6/6) clay loam, strong brown (7.5YR 5/6) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine interstitial and tubular pores; common thin clay films lining pores; moderately acid; clear smooth boundary.

Bt3—20 to 30 inches; reddish yellow (7.5YR 8/6) clay loam, strong brown (7.5YR 5/6) moist; moderate medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common very fine, fine, and medium roots; common very fine, fine, and medium tubular pores; many thin clay films lining pores; strongly acid; clear smooth boundary.

Bt4—30 to 42 inches; reddish yellow (7.5YR 8/6) silty clay loam, strong brown (7.5YR 5/6) moist; weak medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; common very fine, fine, and medium roots; common very fine, fine, and medium

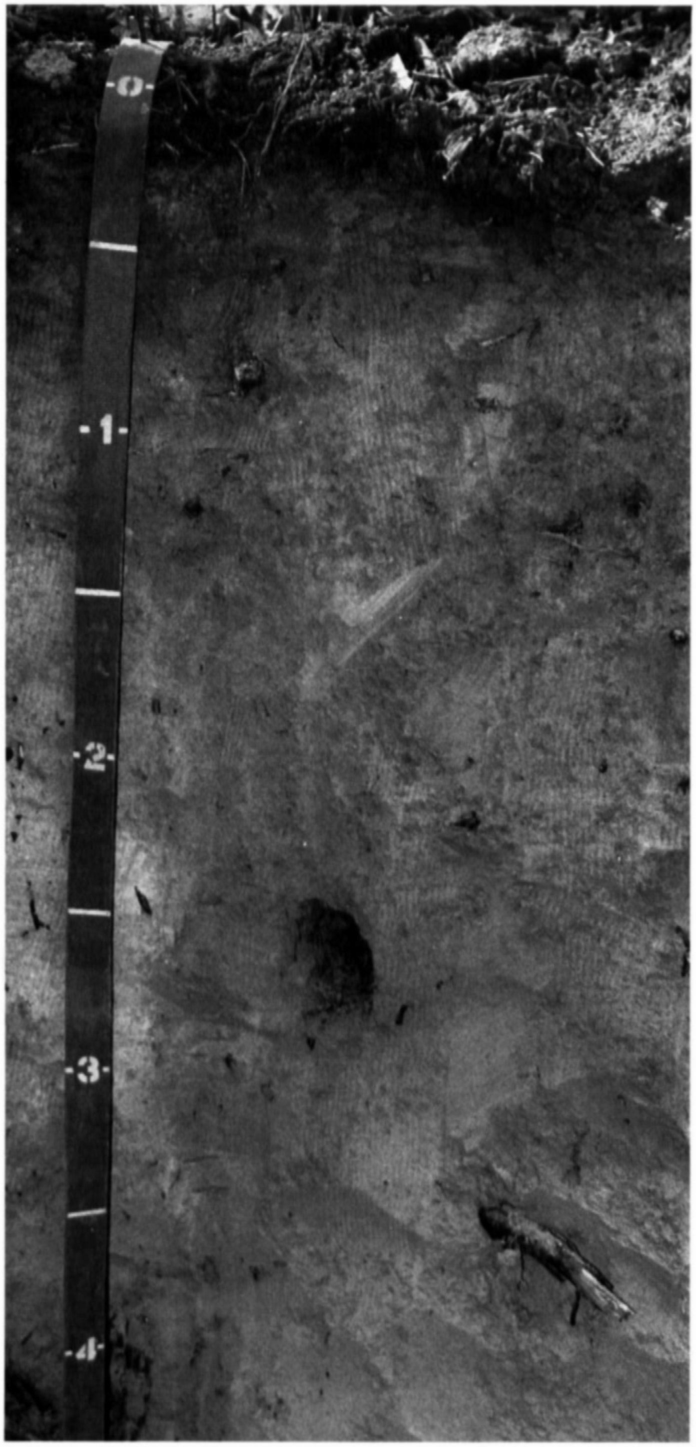

Figure 11.—Profile of Jocal loam. Depth is marked in feet.

tubular pores; common thin clay films lining pores; 10 percent saprolitic cobbles and pebbles; very strongly acid; abrupt smooth boundary.

Bt5—42 to 59 inches; pink (5YR 7/4) silty clay loam, reddish yellow (5YR 6/6) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine, medium, and coarse roots; few very fine and medium tubular pores; common thin clay films lining pores; 10 percent saprolitic cobbles and pebbles; very strongly acid; clear wavy boundary.

Bt6—59 to 73 inches; mixed pink (5YR 7/4) and light red (2.5YR 6/8) silty clay loam, mixed light reddish brown (5YR 6/4) and red (2.5YR 5/8) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine, fine, medium, and coarse roots; few very fine and medium pores; few thin clay films lining pores; very strongly acid.

The soils are more than 60 inches deep. The mean annual soil temperature is 47 to 54 degrees F. The soil temperature is above 47 degrees F from May 1 to November 15. The soil moisture control section is dry in all parts from about July 15 or August 1 to October 15 and moist in some or all parts from about October 15 to July 15 or August 1.

The A horizon has dry color of 7.5YR 5/4 or 5YR 5/4 or 4/4 and moist color of 7.5YR 3/4 or 5YR 3/4.

The Bt horizon has dry color of 7.5YR 8/6, 6/6, or 4/6 or 5YR 7/4 or 5/6 and moist color of 7.5YR 5/6 or 4/6 or 5YR 4/6, 6/6, or 5/8. It is loam, clay loam, or silty clay loam with 27 to 35 percent clay. Base saturation is 20 to 30 percent. Reaction is very strongly acid to moderately acid.

Kilaga Series

The Kilaga series consists of well drained soils on stream terraces. These soils are deep or very deep to a hardpan. They formed in alluvium derived from mixed sources. Slope is 0 to 1 percent.

Soils of the Kilaga series are fine, mixed, thermic Mollic Haploxeralfs.

Typical pedon of Kilaga clay loam, hardpan substratum, 0 to 1 percent slopes; 4,950 feet north of District 10 store and 3,250 feet east of Highway 70, in the unsectionized Honcut land grant, T. 16 N., R. 3 E., Yuba City quadrangle:

Ap—0 to 9 inches; brown (10YR 5/3) clay loam, dark yellowish brown (10YR 3/4) moist; massive; slightly hard, very friable, sticky and plastic; few very fine roots; few very fine tubular and common very fine interstitial pores; neutral; clear smooth boundary.

Bt1—9 to 21 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; many coarse prominent very dark grayish brown (2.5Y 3/2) mottles in the lower part; weak medium and coarse subangular blocky structure; hard, very friable, sticky and plastic; few very fine roots; few very fine tubular pores; many thin clay films lining pores; mildly alkaline; clear smooth boundary.

Bt2—21 to 28 inches; yellowish brown (10YR 5/4) silty clay loam, dark yellowish brown (10YR 3/4) moist; weak medium and coarse subangular blocky structure; very hard, firm, very sticky and plastic; few very fine roots; common very fine tubular pores; many thin clay films on faces of peds and lining pores; few fine rounded black (10YR 2/1) concretions; mildly alkaline; clear smooth boundary.

Bt3—28 to 49 inches; yellowish brown (10YR 5/4) silty clay, dark yellowish brown (10YR 4/4) moist; massive; very hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; common fine slickensides; few fine rounded black (10YR 2/1) concretions; mildly alkaline; clear smooth boundary.

BCq—49 to 55 inches; yellowish brown (10YR 5/4), weakly cemented silty clay, dark yellowish brown (10YR 4/4) moist; massive; hard, firm, sticky and plastic; common very fine tubular pores; many fine slickensides; few fine rounded black (10YR 2/1) concretions; mildly alkaline; clear smooth boundary.

Cqm—55 to 60 inches; light yellowish brown (10YR 6/4) duripan, dark yellowish brown (10YR 4/4) moist; massive; very hard, firm; few very fine tubular pores; few fine black (10YR 2/1) stains in fractures; abrupt smooth boundary.

2Cr—60 to 68 inches; very pale brown (10YR 7/4) siltstone, brown (10YR 5/3) moist; many fine distinct strong brown (7.5YR 4/6) mottles in pores; massive; very hard, firm; many very fine tubular pores.

Depth to the duripan ranges from 40 to more than 80 inches. The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, the soil moisture control section is dry in all parts from about May 15 to October 31 and moist in some or all parts from about November 1 to May 15.

The A horizon has dry color of 10YR 6/3, 5/3, 4/3, or 4/4 and moist color of 10YR 3/4, 3/3, or 3/2.

The Bt horizon has dry color of 10YR 5/4 or 5/3, 7.5YR 5/4 or 5/2, or 5YR 5/3, 5/4, 6/3, or 6/4 and moist color of 10YR 3/4 or 4/4, 7.5YR 4/2 or 4/4, or 5YR 4/3 or 4/4. It is clay loam, silty clay loam, clay, or silty clay. The content of clay ranges from 35 to 50 percent.

Kimball Series

The Kimball series consists of very deep, well drained soils on low fan terraces. These soils formed in alluvium derived from mixed sources. Slope is 0 to 1 percent.

Soils of the Kimball series are fine, mixed, thermic Mollic Palexeralfs.

Typical pedon of Kimball loam, 0 to 1 percent slopes, occasionally flooded; 2,900 feet west of the intersection of Powell Road and Highway 20, in the unsectionized New Helvetia land grant, T. 15 N., R. 4 E., Yuba City quadrangle:

Ap—0 to 6 inches; light yellowish brown (10YR 6/4) loam, dark brown (10YR 3/3) moist; common medium prominent strong brown (7.5YR 5/8) and brown (7.5YR 5/4) mottles; massive; hard, very friable, slightly sticky and slightly plastic; many very fine roots; common very fine interstitial pores; moderately acid; clear smooth boundary.

A—6 to 16 inches; pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; many coarse prominent dark reddish brown (5YR 3/4) and common medium prominent brown (7.5YR 5/4) mottles; massive; hard, very friable, slightly sticky and slightly plastic; many very fine roots; common very fine tubular pores; many fine black (10YR 2/1) rounded concretions; moderately acid; abrupt smooth boundary.

2Bt1—16 to 27 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; very hard, friable, sticky and plastic; few very fine roots; many very fine tubular pores; common moderately thick clay films lining pores and few moderately thick clay films on faces of peds; many fine black (10YR 2/1) rounded concretions; neutral; gradual smooth boundary.

2Bt2—27 to 42 inches; light brown (7.5YR 6/4) clay loam, brown (7.5YR 4/4) moist; weak coarse subangular blocky structure; very hard, friable, sticky and plastic; few very fine roots; few very fine tubular pores; common pressure faces; many moderately thick clay films lining pores; many fine black (10YR 2/1) rounded concretions; neutral; gradual smooth boundary.

2BCt—42 to 50 inches; very pale brown (10YR 7/4) loam, strong brown (7.5YR 4/6) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common moderately thick clay films lining pores; neutral; clear smooth boundary.

2BC—50 to 60 inches; pale brown (10YR 6/3) sandy clay loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, friable, sticky and slightly plastic; neutral.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, the soil moisture control section is dry in all parts from about June 1 to the middle of October and moist in some or all parts from about December to late April.

The A horizon has dry color of 10YR 6/4, 6/3, or 5/3 and moist color of 10YR 3/4 or 3/3. The content of clay ranges from 15 to 20 percent. Reaction is moderately acid or slightly acid.

The 2Bt horizon has dry color of 7.5YR 6/4, 5/6, or 5/4 and moist color of 7.5YR 3/4, 4/4, or 4/6 or 5YR 4/6. It is clay loam or clay with 35 to 50 percent clay. It has an abrupt upper boundary with an absolute clay increase of 15 to 25 percent over the A horizon.

The 2BC horizon has dry color of 10YR 7/4 or 6/3 or 7.5YR 5/6 or 5/4 and moist color of 10YR 5/4 or 7.5YR 4/6 or 4/4. It is loam, sandy clay loam, or clay loam with 20 to 35 percent clay.

Mariposa Series

The Mariposa series consists of shallow or moderately deep, well drained soils on mountains. These soils formed in material weathered from metamorphic rocks. Slope ranges from 2 to 75 percent.

Soils of the Mariposa series are fine-loamy, mixed, mesic Ruptic-Lithic-Xerochreptic Haploxerults.

Typical pedon of Mariposa gravelly loam, 30 to 50 percent slopes; 600 feet south and 1,500 feet east of the northwest corner of sec. 20, T. 19 N., R. 7 E., Challenge quadrangle:

Oi—2 inches to 0; partially decomposed leaves, twigs, and needles.

A—0 to 4 inches; brown (7.5YR 5/4) gravelly loam, dark reddish brown (5YR 3/4) moist; strong medium granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; many very fine interstitial pores; 20 percent pebbles and 5 percent cobbles; neutral; clear smooth boundary.

Bt1—4 to 10 inches; reddish brown (5YR 4/4) gravelly loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; common very fine interstitial and many very fine and fine tubular pores; 20 percent pebbles and 5 percent cobbles; few thin clay films lining pores; moderately acid; clear smooth boundary.

Bt2—10 to 17 inches; yellowish red (5YR 4/6) gravelly loam, dark red (2.5YR 3/6) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine, and medium and common coarse roots; common very fine and fine tubular pores; 20 percent pebbles and 5 percent cobbles; common thin clay films lining pores; moderately acid; clear smooth boundary.

Bt3—17 to 23 inches; yellowish red (5YR 5/6) gravelly clay loam, dark red (2.5YR 3/6) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine, medium, and coarse roots; common fine tubular pores; 20 percent pebbles and 5 percent cobbles; common thin clay films on faces of peds and lining pores; moderately acid; abrupt smooth boundary.

R—23 inches; gray (10YR 6/1), hard schist; tilted about 80 degrees from horizontal.

The depth to lithic contact ranges from 15 to 35 inches. It varies over very short distances. The mean annual soil temperature is 47 to 54 degrees F. The soil temperature is above 47 degrees F from March 15 to December 15. The soil moisture control section is dry in all parts from about July 1 to October 15 and moist in some or all parts from October 15 to June 30. The content of stones and cobbles ranges from 0 to 10 percent, and the content of gravel ranges from 15 to 25 percent.

The A horizon has dry color of 7.5YR 5/4, 5/6, or 4/4 and moist color of 7.5YR 3/4 or 5YR 3/4. It is gravelly or stony loam. Reaction is slightly acid or neutral.

The Bt horizon has dry color of 7.5YR 5/6 or 5YR 4/4, 4/6, 5/6, or 5/8 and moist color of 5YR 3/4, 4/6, or 3/6 or 2.5YR 3/6. It is gravelly loam, gravelly clay loam, stony loam, or stony clay loam. The content of clay ranges from 20 to 30 percent with an absolute clay increase of 3 to 4 percent over the A horizon in 50 to 70 percent of each pedon. In the remaining 30 to 50 percent of each pedon, where bedrock ledges interrupt at a shallow depth, the absolute clay increase over the A horizon is 1 to 2 percent. Reaction is moderately acid.

The Mariposa soils in this survey area are taxadjuncts to the series because they have a greater quantity of free iron oxides and carbon in the Bt horizon than is defined as the range for the series and have oxidic mineralogy. These differences, however, do not significantly affect the use and management of the soils.

Marysville Series

The Marysville series consists of moderately deep, well drained soils on stream terraces. These soils formed in alluvium derived from mixed sources and are underlain by unrelated siltstone. Slope is 0 to 1 percent.

Soils of the Marysville series are fine-silty, mixed, thermic Mollic Haploxeralfs.

Typical pedon of Marysville loam, 0 to 1 percent slopes; 2,700 feet south of the intersection of Highway 70 and Ramirez Road and 200 feet west, in the unsectionized Honcut land grant, Honcut quadrangle:

Ap—0 to 6 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; mildly alkaline; clear smooth boundary.

Bt1—6 to 13 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; common very fine tubular and few very fine interstitial pores; common thin clay films on faces of peds and lining pores; mildly alkaline; clear smooth boundary.

Bt2—13 to 23 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; hard, friable, sticky and slightly plastic; few very fine roots; common very fine tubular pores; moderately alkaline; gradual smooth boundary.

Bt3—23 to 31 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; hard, friable, sticky and slightly plastic; few very fine roots; common very fine tubular pores; many thin clay films on faces of peds and lining pores; moderately alkaline; clear wavy boundary.

Bt4—31 to 36 inches; yellowish brown (10YR 5/4) silty clay loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; hard, friable, sticky and slightly plastic; common very fine tubular pores; many thin clay films on faces of peds and lining pores; moderately alkaline; abrupt wavy boundary.

2Cr—36 inches; light gray (2.5Y 7/2) siltstone, grayish brown (2.5Y 5/2) moist; common very fine tubular pores; common black (10YR 2/1) and brown (7.5YR 4/4) manganese stains in fractures and pores; common moderately thick dark yellowish brown (10YR 4/4) clay films lining pores.

The depth to paralithic contact ranges from 20 to 40 inches. The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees the entire year. The soil moisture control section is dry in all parts from about May 15 to October 31 and moist in some part the rest of the year.

The A horizon has dry color of 10YR 5/3 and moist color of 10YR 3/4 or 3/3. The content of clay ranges from 20 to 27 percent. Reaction is neutral or mildly alkaline.

The Bt horizon has dry color of 10YR 6/4 or 5/4 and moist color of 10YR 4/6, 4/4, or 3/4. The content of clay ranges from 27 to 35 percent. Reaction is mildly alkaline or moderately alkaline.

Mildred Series

The Mildred series consists of moderately deep, well drained soils on mountains. These soils formed in material weathered from basic intrusive igneous rocks. Slope ranges from 3 to 50 percent.

Soils of the Mildred series are fine, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Mildred cobbly loam, 15 to 30 percent slopes; 2,550 feet south and 1,850 feet west of the northeast corner of sec. 35, T. 18 N., R. 6 E., Rackerby quadrangle:

A—0 to 3 inches; pale brown (10YR 6/3) cobbly loam, dark yellowish brown (10YR 4/4) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few fine roots; common very fine interstitial and few very fine tubular pores; 10 percent pebbles, 20 percent cobbles, and 3 percent stones; slightly acid; clear wavy boundary.

Bt—3 to 9 inches; light brown (7.5YR 6/4) cobbly clay loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine and few fine roots; common very fine tubular pores; few thin clay films on faces of peds and common moderately thick clay films lining pores; 10 percent pebbles, 20 percent cobbles, and 3 percent stones; slightly acid; abrupt smooth boundary.

2Bt1—9 to 15 inches; reddish brown (5YR 4/4) clay, yellowish red (5YR 4/6) moist; strong medium prismatic structure parting to weak medium subangular blocky; hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; common pressure faces; neutral; clear smooth boundary.

2Bt2—15 to 20 inches; brown (10YR 5/3) clay, brown (10YR 4/3) moist; strong medium prismatic structure parting to weak medium subangular blocky; very hard, very firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; common pressure faces; neutral; clear smooth boundary.

2BCt—20 to 23 inches; reddish yellow (7.5YR 6/6) clay loam, strong brown (7.5YR 5/6) moist; strong medium prismatic structure parting to weak medium subangular blocky; very hard, very firm, very sticky and very plastic; few very fine and medium roots; common very fine tubular pores; few pressure faces; common moderately thick clay films on faces of peds and many moderately thick clay films lining pores; neutral; abrupt wavy boundary.

2Cr—23 inches; mixed reddish yellow (5YR 7/8), light gray (10YR 7/1), and white (10YR 8/1), weathered norite.

The depth to paralithic contact ranges from 20 to 40 inches. The mean annual soil temperature is 52 to 56 degrees F. The soil temperature is above 47 degrees from March 1 to December 31. The soil moisture control section is dry in all parts from about June 15 to October 31 and moist in some or all parts from about November 1 to June 15.

The A horizon has dry color of 10YR 6/3 or 7.5YR 5/6, 5/4, or 5/3 and moist color of 10YR 4/4 or 3/4 or 7.5YR 3/4. The content of clay ranges from 18 to 27 percent. The content of rock fragments ranges from 15 to 35 percent. It includes 0 to 5 percent stones, 5 to 25 percent cobbles, and 10 to 25 percent gravel. Reaction is moderately acid or slightly acid.

The Bt horizon has dry color of 10YR 6/4 or 7.5YR 7/4, 6/4, 5/4, or 5/3 and moist color of 10YR 4/3 or 7.5YR 4/6, 4/4, 4/3, or 3/4. The content of clay ranges from 27 to 35 percent. The content of rock fragments ranges from 15 to 35 percent. It includes 0 to 5 percent stones, 5 to 25 percent cobbles, and 10 to 25 percent gravel. Reaction is slightly acid or neutral.

The 2Bt horizon has dry color of 10YR 5/3; 7.5YR 6/6, 6/4, 5/5, or 5/4; or 5YR 5/6, 5/4, or 4/4. It has moist color of 10YR 4/3; 7.5YR 5/6, 4/4, or 3/4; or 5YR 4/6 or 4/4. It is clay loam or clay with 35 to 60 percent clay. It has an abrupt upper boundary with an absolute clay increase of 15 to 30 percent over the Bt horizon. The content of rock fragments ranges from 0 to 15 percent. Reaction is slightly acid or neutral.

Musick Series

The Musick series consists of very deep, well drained soils on mountains. These soils formed in material weathered from granodiorite. Slope ranges from 2 to 50 percent.

Soils of the Musick series are fine-loamy, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Musick loam, in an area of Hoda-Musick complex, 2 to 30 percent slopes; 600 feet north and 600 feet east of the southwest corner of sec. 17, T. 18 N., R. 8 E., Camptonville quadrangle:

Oi—2 inches to 0; partially decomposed leaves, needles, and twigs.

A1—0 to 3 inches; brown (7.5YR 5/4) loam, dark reddish brown (5YR 3/4) moist; moderate very fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; few very fine interstitial pores; slightly acid; clear wavy boundary.

A2—3 to 8 inches; brown (7.5YR 5/4) loam, yellowish red (5YR 4/6) moist; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, and medium and few coarse roots; common fine interstitial and few medium and coarse tubular pores; few thin clay films on faces of peds; slightly acid; abrupt smooth boundary.

Bt1—8 to 16 inches; reddish brown (2.5YR 4/4) clay loam, dark red (2.5YR 3/6) moist; moderate coarse subangular blocky structure; very hard, firm, sticky and very plastic; few fine and medium roots; few fine interstitial pores; continuous thick clay films on faces of peds and lining pores; slightly acid; clear irregular boundary.

Bt2—16 to 35 inches; red (2.5YR 5/6) clay loam, red (2.5YR 4/6) moist; massive; slightly hard, firm, sticky and plastic; few very fine and fine roots; few very fine interstitial pores; many moderately thick clay films lining pores; moderately acid; gradual irregular boundary.

BCt—35 to 80 inches; red (2.5YR 5/6) sandy clay loam, red (2.5YR 4/6) moist; massive; slightly hard, firm, sticky and plastic; few fine, medium, and coarse roots; many very fine interstitial pores; common moderately thick clay films bridging mineral grains; moderately acid.

The depth to weathered granitic rock ranges from 60 to more than 80 inches. The mean annual soil temperature is 53 to 55 degrees F. The soil temperature is above 47 degrees F from March 15 to December 15. The soil moisture control section is dry in all parts from about July 15 to October 15 and moist in some or all parts from about October 15 to June 30.

The A horizon has dry color of 10YR 5/3, 4/3, or 4/2 or 7.5YR 5/4, 5/2, 4/4, or 4/2. It has moist color of 10YR 4/4 or 3/3; 7.5YR 5/4, 5/2, 4/4, 4/2, 3/4, or 3/2; or 5YR 5/4, 5/3, 4/6, 4/4, 4/3, 3/4, 3/3, or 3/2. It is moderately acid or slightly acid.

The Bt and BCt horizons have dry color of 5YR 5/8, 5/6, 5/4, 4/8, 4/6, or 4/4 or 2.5YR 5/8, 5/6, 4/8, 4/6, 4/4, or 3/6. They are clay loam or sandy clay loam. The content of clay ranges from 20 to 35 percent. Reaction is strongly acid to slightly acid.

Oakdale Series

The Oakdale series consists of very deep, well drained soils on stream terraces. These soils formed in alluvium derived from mixed sources. Slope ranges from 0 to 5 percent.

Soils of the Oakdale series are coarse-loamy, mixed, thermic Mollic Haploxeralfs.

Typical pedon of Oakdale sandy loam, 0 to 5 percent slopes; 1,850 feet south and 1,050 feet west of the northeast corner of sec. 34, T. 15 N., R. 4 E., Olivehurst quadrangle:

A—0 to 9 inches; yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 3/4) moist; massive; hard, friable, nonsticky and nonplastic; common very fine roots; many very fine and few fine tubular pores; 1 percent pebbles; neutral; clear smooth boundary.

Bt1—9 to 18 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine, fine, and medium tubular pores; few thin clay films lining pores and common thin clay films on faces of peds; 1 percent pebbles; slightly acid; clear smooth boundary.

Bt2—18 to 30 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine and few medium tubular pores; few thin clay films lining pores and many thin clay films on faces of peds; 1 percent pebbles; slightly acid; clear smooth boundary.

Bt3—30 to 41 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine and few medium tubular pores; few thin clay films lining pores and many thin clay films on faces of peds; 1 percent pebbles; slightly acid; clear smooth boundary.

Bt4—41 to 53 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 3/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine and few medium tubular pores; few thin clay films lining pores and many thin clay films on faces of peds; 1 percent pebbles; neutral; clear smooth boundary.

BC—53 to 61 inches; brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine and few medium tubular pores; 1 percent pebbles; neutral; clear smooth boundary.

C—61 to 70 inches; brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4) moist; massive; hard, friable, nonsticky and nonplastic; few very fine roots; few very fine, fine, and medium tubular pores; 1 percent pebbles; neutral.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, the soil moisture control section is dry in all parts from about May 15 to October 31 and moist in some or all parts from about November 1 to May 15. The content of gravel ranges from 0 to 3 percent.

The A horizon has dry color of 10YR 5/4 or 5/3 or 7.5YR 5/4 and moist color of 10YR 3/4, 3/3, or 3/2 or 7.5YR 3/4. The content of clay ranges from 5 to 15 percent.

The Bt horizon has dry color of 10YR 6/4 or 5/4 or 7.5YR 6/4 or 5/4 and moist color of 7.5YR 3/4 or 4/4. The content of clay ranges from 15 to 18 percent with an absolute clay increase of 3 percent over the A horizon. Reaction is slightly acid or neutral.

The BC and C horizons have dry color of 7.5YR 6/4 or 5/4 and moist color of 7.5YR 5/4 or 4/4. The content of clay ranges from 5 to 15 percent.

Orose Series

The Orose series consists of shallow, well drained soils on foothills. These soils formed in material weathered from basic intrusive igneous rocks, mainly gabbrodiorite. Slope ranges from 3 to 30 percent.

Soils of the Orose series are loamy, mixed, thermic, shallow Ultic Haploxeralfs.

Typical pedon of Orose sandy loam, in an area of Flanly-Orose-Verjeles complex, 3 to 8 percent slopes; 2,300 feet north and 2,200 feet west of the southeast corner of sec. 30, T. 18 N., R. 7 E., Challenge quadrangle:

A—0 to 2 inches; dark yellowish brown (10YR 4/4) sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and nonplastic; many very fine roots; many very fine interstitial pores; slightly acid; clear smooth boundary.

Bt1—2 to 7 inches; brown (7.5YR 4/4) sandy loam, dark brown (7.5YR 3/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and nonplastic; common very fine and few coarse roots; many very fine interstitial and few fine tubular pores; few thin clay films lining pores and bridging sand grains; 5 percent pebbles and 5 percent cobbles; moderately acid; clear smooth boundary.

Bt2—7 to 13 inches; brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; common very fine and fine and few coarse roots; common very fine interstitial and few fine tubular pores; few thin clay films lining pores and bridging sand grains; 5 percent pebbles and 5 percent cobbles; moderately acid; clear smooth boundary.

Bt3—13 to 17 inches; brown (7.5YR 5/4) sandy loam, brown (7.5YR 4/4) moist; massive; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine and few coarse roots; common fine tubular pores; common thin clay films bridging sand grains and few thin clay films lining pores; moderately acid; abrupt smooth boundary.

Cr—17 to 30 inches; olive gray (5Y 5/2), weathered gabbrodiorite.

The depth to paralithic contact ranges from 10 to 20 inches. The mean annual soil temperature is 59 to 63 degrees F. The soil temperature is above 47 degrees F from February 15 to January 15. The soil moisture control section is dry in all parts from about June 1 to October 31 and moist in some or all parts from about November 1 to May 31. Reaction is moderately acid or slightly acid.

The A horizon has dry color of 10YR 6/2, 5/4, 5/2, 4/4, or 4/3 or 7.5YR 5/4 and moist color of 10YR 3/4 or 3/2 or 7.5YR 3/4. The content of clay ranges from 5 to 10 percent. The content of stones ranges from 0 to 3 percent, the content of cobbles ranges from 0 to 5 percent, and the content of gravel ranges from 0 to 5 percent.

The Bt horizon has dry color of 10YR 6/4 or 6/3 or 7.5YR 5/4 or 4/4 and moist color of 10YR 4/4 or 4/3 or 7.5YR 5/4, 4/4, or 3/4. The content of clay ranges from 10 to 18 percent with a clay increase of at least 3 percent over the A horizon. The content of stones ranges from 0 to 3 percent, the content of cobbles ranges from 0 to 10 percent, and the content of gravel ranges from 0 to 10 percent.

Pardee Series

The Pardee series consists of shallow, well drained soils on hills. These soils formed in gravelly and cobbly alluvium derived from mixed sources and are underlain by unrelated consolidated andesitic tuffaceous conglomerate. Slope ranges from 1 to 8 percent.

Soils of the Pardee series are loamy-skeletal, mixed, thermic Lithic Mollic Haploxeralfs.

Typical pedon of Pardee gravelly loam, in an area of Pardee-Ranchoseco complex, 0 to 3 percent slopes; 400 feet north and 1,750 feet west of the southeast corner of sec. 14, T. 15 N., R. 5 E., Browns Valley quadrangle:

A—0 to 4 inches; brown (7.5YR 5/4) gravelly loam, dark brown (7.5YR 3/4) moist; common fine distinct reddish yellow (7.5YR 6/8) mottles in the upper 2 inches; massive; very hard, friable, nonsticky and nonplastic; common very fine roots; many very fine tubular pores; 20 percent pebbles, 2 percent cobbles, and 2 percent stones; moderately acid; clear smooth boundary.

BA—4 to 11 inches; brown (7.5YR 5/4) very cobbly loam, dark brown (7.5YR 3/4) moist; weak coarse subangular blocky structure; very hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial and tubular pores; 20 percent pebbles, 20 percent cobbles, and 2 percent stones; slightly acid; clear smooth boundary.

Bt—11 to 17 inches; strong brown (7.5YR 5/6) very cobbly loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; very hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine and few fine interstitial and common very fine tubular pores; common thin clay films on faces of peds and lining pores; 20 percent pebbles, 20 percent cobbles, and 3 percent stones; slightly acid; abrupt wavy boundary.

2R—17 inches; mixed gray (10YR 6/1) and light brown (7.5YR 6/4), hard andesitic tuffaceous conglomerate.

The depth to lithic contact ranges from 10 to 20 inches. The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about May 15 to October 30 and moist in some or all parts from about November 1 to May 15.

The A horizon has dry color of 7.5YR 5/4 or 5/6 and moist color of 7.5YR 3/4. The content of rock fragments ranges from 15 to 35 percent.

The Bt horizon has dry color of 7.5YR 5/4 or 5/6 and moist color of 7.5YR 3/4 or 5YR 3/3. It is very gravelly loam, very gravelly clay loam, or very cobbly loam with 18 to 30 percent clay.

Pendola Series

The Pendola series consists of very deep, well drained soils on mountains. These soils formed in material weathered from basic metavolcanic rocks. Slope ranges from 15 to 75 percent.

Soils of the Pendola series are loamy-skeletal, mixed, mesic Ultic Haploxeralfs.

Typical pedon of Pendola cobbly sandy loam, in an area of Boomer-Pendola-Sites complex, 30 to 50 percent slopes; 2,000 feet south and 1,500 feet east of the northwest corner of sec. 3, T. 18 N., R. 8 E., Camptonville quadrangle:

Oi—1 inch to 0; partially decomposed needles, leaves, and twigs.

A1—0 to 2 inches; brown (7.5YR 4/2) cobbly sandy loam, dark brown (7.5YR 3/2) moist; strong medium granular structure; soft, friable, nonsticky and slightly plastic; few very fine and fine roots; common very fine and fine interstitial pores; 10 percent pebbles and 10 percent cobbles; slightly acid; abrupt smooth boundary.

A2—2 to 9 inches; brown (7.5YR 4/4) cobbly sandy loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, firm, nonsticky and slightly plastic; common very fine and fine and few medium roots; common very fine and fine interstitial pores; 15 percent pebbles and 15 percent cobbles; slightly acid; clear smooth boundary.

Bt1—9 to 21 inches; red (2.5YR 4/6) very cobbly loam, dark red (2.5YR 3/6) moist; weak medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common very fine, fine, medium, and coarse roots; common fine interstitial pores; many colloids staining mineral grains; 5 percent pebbles and 30 percent cobbles; slightly acid; diffuse wavy boundary.

Bt2—21 to 40 inches; red (2.5YR 4/6) very cobbly clay loam, dark red (2.5YR 3/6) moist; weak medium and coarse subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common fine and medium and few coarse roots; few fine and medium tubular pores; many moderately thick clay films on faces of peds and lining pores; 5 percent pebbles and 45 percent cobbles; slightly acid; gradual wavy boundary.

Bt3—40 to 60 inches; red (2.5YR 4/6) very cobbly heavy clay loam, red (2.5YR 4/6) moist; weak coarse subangular blocky structure; slightly hard, firm, sticky and plastic; few fine and medium roots; common fine and medium interstitial and few fine tubular pores; continuous thin clay films on faces of peds and many thin clay films lining pores; 5 percent pebbles and 50 percent cobbles; slightly acid; diffuse wavy boundary.

BCt—60 to 90 inches; red (2.5YR 4/6) very cobbly clay loam, red (2.5YR 4/6) moist; weak coarse subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few fine and medium roots; few fine tubular pores; many thin clay films on faces of peds and common moderately thick clay films lining pores; 5 percent pebbles and 45 percent cobbles; slightly acid.

The depth to paralithic contact ranges from 60 to more than 90 inches. The mean annual soil temperature is 50 to 54 degrees F. The soil temperature is below 47 degrees F from December 15 to March 15. The soil moisture control section is dry in all parts from about July 15 to October 15 and moist in some or all parts from about October 15 to July 15.

The A horizon has dry color of 7.5YR 5/4, 5/2, 4/4, or 4/2 or 5YR 5/4, 5/3, 4/4, or 4/3 and moist color of 7.5YR 3/2 or 5YR 3/4. The content of rock fragments ranges from 15 to 35 percent. It includes 10 to 20 percent cobbles and 5 to 20 percent gravel.

The B horizon has dry color of 2.5YR 5/8, 5/6, 4/8, 4/6, or 3/6 and moist color of 2.5YR 4/6 or 3/6. It is very cobbly loam or very cobbly clay loam with 5 to 10 percent gravel and 30 to 55 percent cobbles. The content of clay ranges from 18 to 35 percent.

Perkins Series

The Perkins series consists of very deep, well drained soils on stream terraces. These soils formed in alluvium derived from mixed sources. Slope ranges from 0 to 30 percent.

Soils of the Perkins series are fine-loamy, mixed, thermic Mollic Haploxeralfs.

Typical pedon of Perkins loam, 0 to 2 percent slopes; 3,400 feet south and 1,150 feet east of the northwest corner of sec. 6, T. 14 N., R. 6 E., Camp Far West quadrangle:

A—0 to 5 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/4) moist; massive; very hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine interstitial and tubular pores; 2 percent pebbles; neutral; clear smooth boundary.

Bt1—5 to 13 inches; strong brown (7.5YR 5/6) clay loam, dark brown (7.5YR 3/4) moist; weak coarse subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine, fine, and medium tubular pores; common thin clay films lining pores; 5 percent pebbles; neutral; clear smooth boundary.

Bt2—13 to 23 inches; yellowish red (5YR 5/6) clay loam, dark reddish brown (5YR 3/4) moist; moderate coarse subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; common very fine roots; common very fine and fine and many medium tubular pores; common thin clay films on faces of peds and lining pores; 5 percent pebbles; neutral; gradual smooth boundary.

Bt3—23 to 35 inches; yellowish red (5YR 5/6) loam, reddish brown (5YR 4/4) moist; weak coarse subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine, fine, and medium and few coarse tubular pores; common thin clay films on faces of peds and lining pores; 5 percent pebbles; neutral; gradual smooth boundary.

Bt4—35 to 47 inches; yellowish red (5YR 5/6) loam, reddish brown (5YR 4/4) moist; weak coarse subangular blocky structure; very hard, friable, sticky and plastic; few very fine roots; common very fine and fine and few medium tubular pores; common thin clay films on faces of peds; 5 percent pebbles; neutral; gradual smooth boundary.

Bt5—47 to 58 inches; yellowish red (5YR 5/6) loam, yellowish red (5YR 4/6) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine and few medium tubular pores; common thin clay films lining pores; 5 percent pebbles; neutral; clear smooth boundary.

BC—58 to 66 inches; yellowish red (5YR 5/6) sandy loam, yellowish red (5YR 4/6) moist; massive; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots; common very fine and fine pores; 5 percent pebbles; neutral; clear smooth boundary.

2C—66 to 72 inches; yellowish red (5YR 4/6) very cobbly sandy loam, dark reddish brown (5YR 3/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine pores; 20 percent pebbles and 35 percent cobbles; neutral.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about May 15 to October 31 and moist in some or all parts from about November 1 to May 15. Reaction is slightly acid or neutral.

The A horizon has dry color of 10YR 5/6, 5/4, or 4/3 or 7.5YR 5/4 and moist color of 10YR 3/4 or 3/3, 7.5YR 3/4, or 5YR 3/4. It is gravelly loam or loam.

The Bt horizon has dry color of 7.5YR 5/6, 5/4, or 3/4 or 5YR 5/6 and moist color of 7.5YR 4/6, 4/4, or 3/4 or 5YR 5/4, 4/6, 4/4, or 3/4. It is loam, clay loam, sandy clay loam, gravelly loam, gravelly clay loam, or gravelly sandy clay loam with an average of 25 to 35 percent clay and 2 to 30 percent gravel.

The BC and 2C horizons have dry color of 7.5YR 4/6 or 5YR 4/6 or 5/6 and moist color of 7.5YR 4/6 or 3/4, 5YR 4/6 or 3/4, or 2.5YR 3/6. They are stratified loam, sandy clay loam, sandy loam, or the gravelly, cobbly, very gravelly, or very cobbly equivalents of those textures. The content of clay ranges from 10 to 30 percent, and the content of rock fragments ranges from 5 to 60 percent.

Ranchoseco Series

The Ranchoseco consists of very shallow, moderately well drained soils on hills. These soils formed in gravelly and cobbly alluvium derived from mixed sources and are underlain by unrelated consolidated andesitic tuffaceous conglomerate. Slope ranges from 0 to 3 percent.

Soils of the Ranchoseco series are loamy-skeletal, mixed, nonacid, thermic Lithic Xerorthents.

Typical pedon of Ranchoseco very cobbly loam, in an area of Pardee-Ranchoseco complex, 0 to 3 percent slopes; 600 feet north and 1,600 feet west of the southeast corner of sec. 14, T. 15 N., R. 5 E., Browns Valley quadrangle:

A—0 to 3 inches; brown (7.5YR 5/4) very cobbly loam, dark brown (7.5YR 3/4) moist; many fine distinct yellowish red (5YR 5/6) mottles; massive; hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine interstitial pores; 10 percent pebbles, 30 percent cobbles, and 3 percent stones; moderately acid; clear smooth boundary.

C—3 to 8 inches; reddish yellow (7.5YR 6/6) very cobbly loam, dark brown (7.5YR 3/4) moist; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine interstitial pores; 10 percent pebbles, 30 percent cobbles, and 3 percent stones; slightly acid; abrupt smooth boundary.

2R—8 inches; reddish yellow (7.5YR 6/6), hard andesitic tuffaceous conglomerate.

The depth to lithic contact is 4 to 10 inches. The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about May 15 to October 30 and moist in some or all parts from about November 1 to May 15. The content of rock fragments ranges from 35 to 55 percent. Reaction is moderately acid or slightly acid.

The A horizon has dry color of 7.5YR 5/6 or 5/4 and moist color of 7.5YR 3/4. It has 5 to 20 percent gravel, 15 to 30 percent cobbles, and 2 to 5 percent stones. The content of clay ranges from 12 to 22 percent.

The C horizon has dry color of 7.5YR 6/6 or 6/4 and moist color of 7.5YR 4/4 or 3/4. It has 5 to 20 percent gravel, 15 to 30 percent cobbles, and 2 to 5 percent stones. The content of clay ranges from 15 to 25 percent.

Redding Series

The Redding series consists of well drained soils on high fan terraces. These soils are moderately deep to a hardpan. They formed in alluvium derived from mixed sources. Slope ranges from 0 to 8 percent.

Soils of the Redding series are fine, mixed, thermic Abruptic Durixeralfs.

Typical pedon of Redding gravelly loam, in an area of Redding-Corning complex, 3 to 8 percent slopes; 1,350 feet north and 450 feet east of the southwest corner of sec. 22, T. 15 N., R. 5 E., Browns Valley quadrangle:

A—0 to 6 inches; brown (7.5YR 5/4) gravelly loam, dark reddish brown (5YR 3/4) moist; weak medium subangular blocky structure; hard, very friable, nonsticky and nonplastic; common very fine roots; many very fine and fine tubular and common medium and coarse interstitial pores; 20 percent pebbles; moderately acid; clear smooth boundary.

BA—6 to 13 inches; yellowish red (5YR 5/6) gravelly loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; hard, very friable, slightly sticky and nonplastic; common very fine roots; common very fine and fine tubular and common medium and coarse interstitial pores; 20 percent pebbles; slightly acid; clear smooth boundary.

Bt—13 to 19 inches; yellowish red (5YR 5/6) gravelly loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine tubular and common medium interstitial pores; common thin clay films on faces of peds and lining pores; 20 percent pebbles and 5 percent cobbles, the cobbles concentrated at the lower boundary; slightly acid; abrupt smooth boundary.

2Bt1—19 to 27 inches; reddish brown (5YR 5/4) clay, dark reddish brown (5YR 3/4) moist; strong medium prismatic structure parting to strong medium angular blocky; extremely hard, firm, very sticky and very plastic; common very fine tubular pores; pressure faces on peds; 10 percent pebbles; neutral; clear smooth boundary.

2Bt2—27 to 33 inches; red (2.5YR 4/6) clay, dark red (2.5YR 3/6) moist; strong medium prismatic structure parting to strong medium angular blocky; extremely hard, firm, very sticky and very plastic; common very fine tubular pores; pressure faces on peds; 10 percent pebbles; neutral; abrupt smooth boundary.

3Bqm—33 to 60 inches; yellowish red (5YR 5/6), silica-cemented duripan; 25 percent pebbles and 2 percent cobbles.

Depth to the duripan ranges from 20 to 40 inches. The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about May 15 to October 31 and moist in some or all parts from about November 1 to May 15.

The A and BA horizons have dry color of 7.5YR 6/6 or 5/4 or 5YR 5/6 and moist color of 10YR 5/6, 7.5YR 3/4, or 5YR 4/4, 3/4, or 3/3. The content of clay ranges from 10 to 25 percent. The content of rock fragments ranges from 15 to 30 percent. Reaction is moderately acid or slightly acid.

The Bt horizon has dry color of 5YR 5/6 or 5/4 or 2.5YR 4/6 and moist color of 7.5YR 4/6 or 4/4; 5YR 5/6, 4/6, 4/4, or 3/4; or 2.5YR 3/6 or 3/4. It is loam, clay loam, clay, gravelly loam, gravelly clay loam, or gravelly clay with 18 to 60 percent clay (35 to 60 percent by weighted average). This horizon has an abrupt upper boundary with an absolute clay increase of at least 15 percent within 1 inch. The content of rock fragments ranges from 5 to 35 percent. Reaction is slightly acid or neutral.

The 3Bqm horizon has moist color of 10YR 7/6, 7.5YR 7/6, or 5YR 5/6 or 4/4.

Ricecross Series

The Ricecross series consists of very deep, well drained soils on stream terraces. These soils formed in alluvium derived from mixed sources. Slope ranges 0 to 2 percent.

Soils of the Ricecross series are fine-loamy, mixed, thermic Pachic Ultic Argixerolls.

Typical pedon of Ricecross loam, 0 to 2 percent slopes; 1,650 feet south and 1,750 feet west of the northeast corner of sec. 24, T. 17 N., R. 6 E., French Corral quadrangle:

A—0 to 6 inches; brown (7.5YR 5/4) loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; few very fine and fine tubular and common very fine interstitial pores; 5 percent pebbles; slightly acid; clear smooth boundary.

Bt1—6 to 11 inches; brown (7.5YR 4/4) loam, dark reddish brown (5YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; common fine tubular and few very fine and fine interstitial pores; common thin clay films on faces of peds and lining pores; 5 percent pebbles; slightly acid; clear smooth boundary.

Bt2—11 to 19 inches; brown (7.5YR 4/4) loam, dark reddish brown (5YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; few very fine and fine interstitial and common fine tubular pores; common thin clay films on faces of peds and lining pores; 5 percent pebbles; neutral; gradual smooth boundary.

Bt3—19 to 33 inches; brown (7.5YR 4/4) clay loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and coarse roots; common very fine tubular pores; many thin clay films lining pores and on faces of peds; 5 percent pebbles; neutral; clear smooth boundary.

Bt4—33 to 50 inches; brown (7.5YR 4/4) clay loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; many thin clay films lining pores and on faces of peds and few moderately thick clay films on faces of peds; 5 percent pebbles; neutral; clear smooth boundary.

Bt5—50 to 72 inches; brown (7.5YR 5/4) clay loam, mixed reddish brown (5YR 4/4) and dark reddish brown (5YR 3/4) moist; common fine black (10YR 2/1) stains; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; common very fine tubular pores; many thin clay films lining pores and on faces of peds; 5 percent pebbles; neutral.

The mean annual soil temperature is 58 to 61 degrees F. The soil temperature is above 47 degrees F from February 15 to January 15. The soil moisture control section is dry in all parts from about June 1 to October 31 and moist in some or all parts from about November 1 to

May 31. The content of rock fragments ranges from 0 to 15 percent. The content of organic matter ranges from 1 to 3 percent in the upper 36 inches.

The A horizon has dry color of 10YR 5/3, 5/2, 4/3, or 4/2 or 7.5YR 5/4, 4/4, or 3/4 and moist color of 10YR 3/3, 3/2, or 2/2 or 7.5YR 3/2. The content of clay ranges from 15 to 25 percent.

The Bt horizon has dry color of 10YR 5/3; 7.5YR 5/6, 5/4, or 4/4; or 5YR 5/3. It has moist color of 10YR 3/3, 7.5YR 4/4 or 3/4, or 5YR 4/4, 3/4, or 3/3. Moist values and chromas of more than 3 are below a depth of 30 inches. This horizon is loam or clay loam with 20 to 30 percent clay. Reaction is slightly acid or neutral.

The Ricecross soil in map unit 212 does not have clay films in the B horizon. This difference, however, does not significantly affect the use and management of the soil.

San Joaquin Series

The San Joaquin series consists of moderately well drained soils on low fan terraces. These soils are moderately deep to a hardpan. They formed in alluvium derived from mixed sources. Slope ranges from 0 to 3 percent.

Soils of San Joaquin series are fine, mixed, thermic Abruptic Durixeralfs.

Typical pedon of San Joaquin loam, 0 to 1 percent slopes; 2,600 feet south and 1,900 feet west of the northeast corner of sec. 22, T. 15 N., R. 5 E., Browns Valley quadrangle:

A—0 to 4 inches; light brown (7.5YR 6/4) loam, brown (7.5YR 4/4) moist; many fine distinct yellowish red (5YR 5/8) mottles, strong brown (7.5YR 5/6) moist; massive; very hard, friable, nonsticky and nonplastic; many very fine and fine roots; common very fine, fine, and medium tubular and interstitial pores; 1 percent pebbles; slightly acid; clear smooth boundary.

BA—4 to 9 inches; strong brown (7.5YR 5/6) loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure parting to fine subangular blocky; hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine, fine, and medium tubular and interstitial pores; 1 percent pebbles; slightly acid; clear smooth boundary.

Bt—9 to 16 inches; strong brown (7.5YR 5/6) loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure parting to fine subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine and fine and common medium tubular and interstitial pores; common thin clay films bridging sand grains; 1 percent pebbles; slightly acid; abrupt smooth boundary.

2Bt—16 to 25 inches; brown (7.5YR 5/4) clay, dark brown (7.5YR 3/4) moist; strong medium prismatic structure parting to angular blocky; extremely hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular and common very fine and fine interstitial pores; common pressure faces; 10 to 15 percent black (10YR 2/1) concretions; 1 percent pebbles; neutral; abrupt smooth boundary.

3Bqm—25 to 60 inches; a duripan that is brown (7.5YR 4/4) when moist; strong medium and fine angular blocky structure; extremely hard, very firm, nonsticky and nonplastic; many black (10YR 2/1) stains on faces of blocks; layers varying in hardness, generally becoming softer with increasing depth.

Depth to the duripan ranges from 20 to 40 inches. The mean annual soil temperature is 60 to 64 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about May 15 to October 31 and moist in some or all parts from about November 1 to May 15.

The A horizon has dry color of 10YR 5/3 or 7.5YR 6/6, 6/4, 5/6, 5/4, or 4/4 and moist color of 10YR 3/3; 7.5YR 4/6, 4/4, or 3/4; or 5YR 4/4 or 3/4. It is moderately acid or slightly acid.

The Bt and 2Bt horizons have dry color of 7.5YR 6/4, 5/6, 5/4, or 4/4 and moist color of 7.5YR 5/4, 4/6, 4/4, or 3/4 or 5YR 4/6, 4/4, 3/4, or 3/3. They are loam, clay loam, or clay with a weighted average of 35 to 45 percent clay. The 2Bt horizon has an abrupt upper boundary with an absolute clay increase of at least 15 percent within 1 inch. Reaction is slightly acid or neutral.

The 3Bqm horizon has moist color of 7.5YR 5/6, 4/6, 4/4, or 4/2. It is indurated with iron, manganese, and silica and typically becomes less indurated with increasing depth.

Shanghai Series

The Shanghai series consists of very deep, somewhat poorly drained soils on flood plains. These soils formed in alluvium derived from mixed sources. Slope is 0 to 1 percent.

Soils of the Shanghai series are fine-silty, mixed, nonacid, thermic Aquic Xerofluvents.

Typical pedon of Shanghai silt loam, 0 to 1 percent slopes; 1,750 feet north of Hooper Road and 1,250 feet east of Hallwood Boulevard, in the unsectionized Honcut Rancho land grant, T. 16 N., R. 4 E., Yuba City quadrangle:

Ap—0 to 8 inches; very pale brown (10YR 7/4) silt loam, dark yellowish brown (10YR 4/4) moist; weak medium granular structure; slightly hard, very friable, sticky and slightly plastic; many very fine and common medium roots; few very fine interstitial pores; slightly acid; clear wavy boundary.

A—8 to 20 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, sticky and slightly plastic; many very fine roots; few very fine interstitial and tubular pores; neutral; abrupt smooth boundary.

C1—20 to 35 inches; very pale brown (10YR 7/4), stratified silt and silt loam, mixed yellowish brown (10YR 5/4), dark yellowish brown (10YR 4/4), and brownish yellow (10YR 6/6) moist; many medium prominent strong brown (7.5YR 5/6) and common fine distinct very pale brown (10YR 7/4) mottles; massive; slightly hard, very friable, sticky and slightly plastic; common very fine and few coarse roots; common very fine tubular pores; neutral; abrupt smooth boundary.

C2—35 to 46 inches; very pale brown (10YR 8/3), stratified silt loam, mixed yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/4) moist; few fine distinct yellowish brown (10YR 5/6) mottles; massive; slightly hard, very friable, sticky and slightly plastic; few very fine roots; common very fine tubular pores; few fine black (10YR 2/1) stains; neutral; abrupt smooth boundary.

C3—46 to 53 inches; mixed very pale brown (10YR 7/4 and 7/3) silt loam, silt, and fine sandy loam occurring as strata 1/2 inch to 2 inches thick, mixed yellowish brown (10YR 5/4), light yellowish brown (10YR 6/4), and brown (10YR 5/3) moist; common fine prominent yellowish red (5YR 5/6) mottles; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; neutral; abrupt smooth boundary.

C4—53 to 69 inches; very pale brown (10YR 8/3), stratified silt loam, silty clay loam, and silt, mixed yellowish brown (10YR 5/6) and pale olive (5Y 6/3) moist; few fine prominent strong brown (7.5YR 5/8) and reddish yellow (5YR 6/8) mottles; massive; hard, firm, sticky and slightly plastic; few very fine roots; common very fine tubular pores; few fine black (10YR 2/1) stains; mildly alkaline.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, the soil moisture control section is dry in all parts from about May through October and moist in some or all parts from about November through April. The 10- to 40-inch control section is stratified silty clay loam, silt loam, silt, very fine sandy loam, or fine sandy loam. It is dominantly silt loam with less than 15 percent sand coarser than very fine sand. Some pedons have a layer of clay below a depth of 40 inches. The content of clay ranges from 20 to 35 percent. The content of organic matter decreases irregularly with increasing depth. Reaction is slightly acid to mildly alkaline.

The A horizon has dry color of 10YR 7/4, 6/4, or 5/4 and moist color of 10YR 4/4 or 4/3.

The C horizon has dry color of 10YR 8/4, 8/3, 7/4, 7/3, or 6/4 and moist color of 10YR 6/6, 6/4, 5/6, 5/4, 5/3, or 4/4 or 5Y 6/3. It has distinct or prominent mottles.

Sites Series

The Sites series consists of deep or very deep, well drained soils on mountains. These soils formed in material weathered from metamorphic rocks. Slope ranges from 2 to 50 percent.

Soils of the Sites series are clayey, oxidic, mesic Xeric Haplohumults.

Typical pedon of Sites loam, 3 to 8 percent slopes; 1,600 feet north and 800 feet west of the southeast corner of sec. 19, T. 19 N., R. 7 E., Challenge quadrangle:

Oi—4 inches to 0; partially decomposed needles, leaves, twigs, and bark.

A—0 to 6 inches; strong brown (7.5YR 4/6) loam, dark brown (7.5YR 3/4) moist; strong fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and medium roots; many very fine interstitial and tubular pores; slightly acid; clear smooth boundary.

Bt1—6 to 16 inches; yellowish red (5YR 4/6) clay loam, yellowish red (5YR 4/6) moist; moderate medium subangular blocky structure; soft, very friable, sticky and slightly plastic; many fine and medium roots; common very fine interstitial pores; common thin clay films on faces of peds; moderately acid; clear smooth boundary.

Bt2—16 to 27 inches; yellowish red (5YR 4/6) clay, red (2.5YR 4/6) moist; moderate medium subangular blocky structure; soft, very friable, sticky and slightly plastic; many medium and coarse and common fine roots; common fine, medium, and coarse tubular pores; many thin clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt3—27 to 40 inches; red (2.5YR 4/6) clay, dark reddish brown (2.5YR 3/4) moist; strong medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few fine and medium roots; common fine, medium, and coarse tubular pores; many thin clay films on faces of peds; moderately acid; gradual smooth boundary.

Bt4—40 to 51 inches; red (2.5YR 4/6) clay, dark reddish brown (2.5YR 3/4) moist; strong medium subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few fine and medium roots; common fine and medium tubular pores; many thin clay films on faces of peds; 5 percent soft schist pebbles; strongly acid; clear wavy boundary.

Bt5—51 to 61 inches; reddish brown (2.5YR 4/4) clay loam, dark reddish brown (2.5YR 3/4) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine and medium roots; common fine and medium tubular pores; common thin clay films on faces of peds and lining pores; 5 percent soft schist pebbles; strongly acid; clear irregular boundary.

Cr—61 to 71 inches; mixed red (2.5YR 4/6) and strong brown (7.5YR 5/8), soft schist; tilted at about 60 degrees from horizontal.

The depth to paralithic contact ranges from 40 to more than 80 inches. The mean annual soil temperature is 47 to 54 degrees F. The soil temperature is above 47 degrees F from March 15 to December 15. The soil moisture control section is dry in all parts from about July 15 to October 15 and moist in some or all parts from about October 15 to July 15.

The A horizon has dry color of 7.5YR 5/4 or 4/6 or 5YR 4/4 and moist color of 7.5YR 3/4 or 5YR 3/4 or 3/3. It is loam, clay loam, or gravelly loam. The content of rock fragments ranges from 0 to 30 percent. It includes 0 to 5 percent cobbles and 0 to 25 percent gravel. The content of organic carbon is 2 to 4 percent.

The Bt horizon has dry color of 5YR 4/6, 4/8, or 5/6 or 2.5YR 4/6, 4/4, 3/6, or 5/8 and moist color of 5YR 4/6 or 3/3 or 2.5YR 3/4, 3/6, or 4/6. It is clay loam, clay, gravelly clay loam, or gravelly clay. By weighted average, the content of clay in the control section ranges from 35 to 60 percent. The content of rock fragments ranges from 0 to 30 percent. The content of organic carbon is 2 to 3 percent in the upper part of the horizon and 1 to 2 percent in the lower part. Base saturation is 15 to 30 percent. Reaction is strongly acid or moderately acid.

Slacreek Series

The Slacreek series consists of moderately deep, well drained soils on mountains. These soils formed in material weathered from metavolcanic rocks, mainly schist. Slope ranges from 30 to 75 percent.

Soils of the Slacreek series are loamy-skeletal, mixed, frigid Ultic Haploxeralfs.

Typical pedon of Slacreek gravelly sandy loam, in an area of Slacreek-Rock outcrop complex, 30 to 75 percent slopes; 2,050 feet west of the northeast corner of sec. 11, T. 20 N., R. 8 E., Strawberry Valley quadrangle:

Oi—1/2 inch to 0; decomposing fir needles and twigs.

A—0 to 6 inches; brown (7.5YR 4/4) gravelly sandy loam, dark brown (7.5YR 3/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; common very fine interstitial pores; 30 percent pebbles; slightly acid; clear wavy boundary.

BA—6 to 9 inches; yellowish red (5YR 5/6) gravelly loam, yellowish red (5YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine interstitial and few very fine tubular pores; 30 percent pebbles; moderately acid; clear smooth boundary.

Bt1—9 to 14 inches; yellowish red (5YR 5/6) gravelly loam, yellowish red (5YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine and few coarse roots; common very fine interstitial and few very fine tubular pores; few thin clay films lining pores; 30 percent pebbles; moderately acid; clear smooth boundary.

Bt2—14 to 26 inches; strong brown (7.5YR 5/6) very gravelly loam, yellowish red (5YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine and few coarse roots; common very fine interstitial pores; few thin clay films lining pores; 50 percent pebbles and 10 percent cobbles; moderately acid; clear smooth boundary.

Bt3—26 to 31 inches; reddish yellow (7.5YR 6/6) very gravelly loam, strong brown (7.5YR 4/6) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine interstitial pores; common thin clay films lining pores; 50 percent pebbles and 10 percent cobbles; moderately acid; abrupt wavy boundary.

Bt4—31 to 34 inches; reddish yellow (7.5YR 7/6) very gravelly loam, strong brown (7.5YR 5/6) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few fine and coarse roots; common very fine interstitial pores; few thin clay films lining pores; 60 percent pebbles; strongly acid; abrupt wavy boundary.

R—34 inches; hard, fractured schist.

The depth to lithic contact ranges from 20 to 40 inches. The mean annual soil temperature is 43 to 46 degrees F. The soil temperature is above 41 degrees F from April 15 to December 1 and above 47 degrees F from June 1 to November 1. The soil moisture control section is dry in all parts from about August 1 to September 30 and moist in some or all parts the rest of the year.

The A and BA horizons have dry color of 7.5YR 4/4 or 5YR 5/6 and moist color of 7.5YR 3/2 or 3/4 or 5YR 3/2, 3/3, 3/4, or 4/6. Moist chromas of 3 or less are within a depth of 6 inches. The content of clay ranges from 5 to 15 percent. The content of rock fragments ranges from 20 to 40 percent. It includes 20 to 30 percent gravel and 0 to 10 percent cobbles. Reaction is moderately acid or slightly acid.

The Bt horizon has dry color of 7.5YR 4/4, 5/6, 6/6, or 7/6 or 5YR 5/6 and moist color of 7.5YR 5/6 or 4/6 or 5YR 4/6 or 3/4. The content of clay ranges from 15 to 25 percent. The content of rock fragments ranges from 35 to 65 percent. It includes 30 to 50 percent gravel and 5 to 15 percent cobbles. Base saturation ranges from 35 to 50 percent. Reaction is strongly acid or moderately acid.

Sobrante Series

The Sobrante series consists of moderately deep, well drained soils on foothills. These soils formed in material weathered from basic metavolcanic rocks. Slope ranges from 3 to 75 percent.

Soils of the Sobrante series are fine-loamy, mixed, thermic Mollic Haploxeralfs.

Typical pedon of Sobrante loam (fig. 12), in an area of Auburn-Sobrante complex, 3 to 8 percent slopes; 1,650 feet north and 1,450 feet west of the southeast corner of sec. 34, T. 15 N., R. 6 E., Camp Far West quadrangle:

A—0 to 5 inches; brown (7.5YR 4/4) loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine interstitial pores; 5 percent pebbles; slightly acid; clear smooth boundary.

Bt1—5 to 11 inches; dark reddish brown (5YR 3/4) loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, fine, and medium roots; common very fine, fine, and medium tubular pores; few thin clay films on faces of peds and lining pores; 5 percent pebbles; slightly acid; gradual smooth boundary.

Bt2—11 to 19 inches; dark reddish brown (5YR 3/4) loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few fine and common medium roots; common very fine and fine tubular pores; common thin clay films on faces of peds and lining pores; 5 percent pebbles; slightly acid; gradual smooth boundary.

Bt3—19 to 27 inches; strong brown (7.5YR 5/6) loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few fine and common medium roots; few fine tubular pores; common moderately thick clay films on faces of peds and lining pores; 5 percent pebbles; slightly acid; abrupt wavy boundary.

Figure 12.—Profile of Sobrante loam, which has weathered bedrock between depths of 27 and 39 inches. Depth is marked in feet.

Cr—27 to 39 inches; yellowish brown (10YR 5/8), weathered greenstone; soft in the upper part, becoming increasingly hard with increasing depth; common fine and coarse roots; gradual wavy boundary.

R—39 inches; hard, very fractured greenstone.

The depth to lithic contact ranges from 20 to 40 inches. The mean annual soil temperature is 59 to 64 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about May 31 to November 1. The content of rock fragments ranges from 3 to 30 percent. It includes 3 to 25 percent gravel and 0 to 5 percent cobbles. Reaction is moderately acid or slightly acid.

The A horizon has dry color of 7.5YR 5/4 or 4/4 and moist color of 7.5YR 4/4 or 3/4. It is gravelly loam or loam with 10 to 25 percent clay.

The Bt horizon has dry color of 7.5YR 5/6 or 5YR 4/6, 4/4, 3/6, or 3/4 and moist color of 7.5YR 3/4 or 5YR 3/4 or 4/4. It is gravelly clay loam, gravelly loam, loam, or clay loam with 25 to 35 percent clay.

Surnuf Series

The Surnuf series consists of very deep, well drained soils on mountains. These soils formed in material weathered from gabbrodiorite. Slope ranges from 8 to 50 percent.

Soils of the Surnuf series are fine, oxidic, mesic Ultic Palexeralfs.

Typical pedon of Surnuf loam, 8 to 15 percent slopes; 700 feet north and 700 feet east of the southwest corner of sec. 29, T. 18 N., R. 7 E., Challenge quadrangle:

Oi—1 inch to 0; partially decomposed needles, twigs, and bark.

A—0 to 5 inches; reddish yellow (7.5YR 6/6) loam, strong brown (7.5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine, and medium and few coarse roots; many very fine and common fine and medium tubular pores; 1 percent pebbles and 1 percent cobbles; moderately acid; clear smooth boundary.

BAt—5 to 12 inches; reddish yellow (5YR 6/6) loam, yellowish red (5YR 4/6) moist; weak medium subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine, fine, and medium and few coarse roots; many very fine and common fine and medium tubular pores; common cicada burrows; few moderately thick clay films lining pores and common thin clay films bridging sand grains; 1 percent pebbles and 1 percent cobbles; moderately acid; clear smooth boundary.

Bt1—12 to 19 inches; red (2.5YR 5/6) clay, red (2.5YR 4/6) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine and few medium roots; common very fine tubular pores; common cicada burrows; many moderately thick clay films on faces of peds and few moderately thick clay films lining pores; 1 percent pebbles and 1 percent cobbles; moderately acid; gradual smooth boundary.

Bt2—19 to 34 inches; red (2.5YR 4/8) clay loam, dark red (2.5YR 3/6) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; common very fine and fine and few medium roots; few very fine tubular pores; common cicada burrows; many thick clay films on faces of peds and few moderately thick clay films lining pores; 1 percent pebbles and 1 percent cobbles; 5 percent reddish yellow (7.5YR 7/8), soft rock fragments with many very fine and fine tubular pores and common thick clay films on rock surfaces; moderately acid; gradual smooth boundary.

Bt3—34 to 54 inches; red (2.5YR 5/8) clay loam, red (2.5YR 4/8) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few very fine, fine, and medium roots; few very fine tubular pores; common cicada burrows; many thick clay films on faces of peds; 1 percent pebbles and 1 percent cobbles; 30 percent reddish yellow (7.5YR 7/8), soft rock fragments with many very fine and fine tubular pores and common thick clay films on rock surfaces; strongly acid; gradual smooth boundary.

Bt4—54 to 66 inches; light red (2.5YR 6/8) clay loam, red (2.5YR 4/8) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; few very fine, fine, and medium roots; few very fine tubular pores; common cicada burrows; few pressure faces; many thick clay films on faces of peds; 1 percent pebbles and 1 percent cobbles; 50 percent reddish yellow (7.5YR 7/8), soft rock fragments with many very fine and fine tubular pores and common thick clay films on rock surfaces; strongly acid; gradual smooth boundary.

BCt—66 to 77 inches; light red (2.5YR 6/8) clay loam, red (2.5YR 4/8) moist; massive; hard, friable, sticky and plastic; few very fine, fine, and coarse roots; common very fine tubular pores; many thick clay films on faces of peds; 1 percent pebbles and 1 percent cobbles; 50 percent reddish yellow (7.5YR 7/8), soft rock fragments with many very fine and fine tubular pores and common thick clay films on rock surfaces; strongly acid.

The solum is more than 60 inches thick. The mean annual soil temperature is 52 to 56 degrees F. The soil temperature is above 47 degrees F from March 1 to December 31. The soil moisture control section is dry in all parts from about June 15 to October 31 and moist in some or all parts from about November 1 to June 15. Base saturation ranges from 50 to 75 percent.

The A horizon has dry color of 7.5YR 6/6 or 5YR 6/4, 5/4, or 4/6 and moist color of 7.5YR 4/6 or 5YR 3/4. It is loam or cobbly loam with 18 to 27 percent clay. The content of rock fragments ranges from 0 to 35 percent. It includes 0 to 20 percent cobbles and 0 to 15 percent gravel. Reaction is moderately acid or slightly acid.

The BAt and Bt horizons have dry color of 5YR 6/8, 6/6, 5/6, or 4/6 or 2.5YR 6/8, 5/8, 5/6, 4/6, or 3/6 and moist color of 5YR 5/6, 4/6, or 3/6 or 2.5YR 4/8, 4/6, or 3/6. The BAt horizon is loam or cobbly loam with 18 to 27 percent clay, and the Bt horizon is clay loam, clay, cobbly clay loam, or cobbly clay with 35 to 60 percent clay. The content of rock fragments ranges from 0 to 35 percent. It includes 0 to 20 percent cobbles and 0 to 15 percent gravel. Reaction is strongly acid or moderately acid.

Timbuctoo Series

The Timbuctoo series consists of moderately deep, well drained soils on foothills. These soils formed in material weathered from basic metavolcanic rocks. Slope ranges from 3 to 50 percent.

Soils of the Timbuctoo series are fine, mixed, thermic Typic Rhodoxeralfs.

Typical pedon of Timbuctoo gravelly loam, in an area of Sobrante-Timbuctoo complex, 15 to 30 percent slopes; 2,500 feet north and 2,200 feet east of the southwest corner of sec. 17, T. 16 N., R. 6 E., Smartville quadrangle:

A—0 to 4 inches; yellowish red (5YR 4/6) gravelly loam, dark reddish brown (5YR 3/4) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine interstitial and tubular pores; 20 percent pebbles, 5 percent cobbles, and 1 percent stones; slightly acid; clear smooth boundary.

Bt1—4 to 9 inches; red (2.5YR 4/6) gravelly clay loam, dark red (2.5YR 3/6) moist; strong medium subangular blocky structure; hard, very friable, slightly sticky and plastic; few very fine, fine, and medium roots; common very fine interstitial and common fine tubular pores; few thin clay films on faces of peds and lining pores; 20 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary.

Bt2—9 to 18 inches; dark red (2.5YR 3/6) gravelly clay, dark red (2.5YR 3/6) moist; strong medium subangular blocky structure; hard, very friable, sticky and plastic; few very fine and fine roots; common very fine interstitial and common fine tubular pores; common moderately thick clay films on faces of peds and lining pores; 20 percent pebbles and 5 percent cobbles; neutral; clear wavy boundary.

Bt3—18 to 26 inches; dark red (2.5YR 3/6) gravelly clay, dark red (2.5YR 3/6) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine and common coarse roots; common fine tubular pores; 20 percent pebbles and 2 percent cobbles; many moderately thick clay films on faces of peds and lining pores; neutral; clear wavy boundary.

BCt—26 to 38 inches; dark red (2.5YR 3/6) gravelly sandy clay loam, dark red (2.5YR 3/6) moist; moderate medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and common coarse roots; few fine tubular pores; 20 percent pebbles and 2 percent cobbles; many moderately thick clay films on faces of peds; neutral; abrupt wavy boundary.

Cr—38 to 45 inches; mixed black (N 2/0) and olive (5Y 4/3), weathered diabase.

R—45 inches; hard diabase.

The depth to paralithic contact ranges from 20 to 40 inches. The mean annual soil temperature is 59 to 63 degrees F. The soil temperature is above 47 degrees F the entire year. The soil moisture control section is dry in all parts from about June 1 to October 31 and moist in some or all parts from about November 1 to May 31. The content of rock fragments ranges from 15 to 35 percent. Reaction is slightly acid or neutral.

The A horizon has dry color of 5YR 5/6 or 4/6 and moist color of 5YR 4/6 or 3/4. The content of clay ranges from 18 to 27 percent. The content of stones ranges from 0 to 3 percent, the content of cobbles ranges from 0 to 10 percent, and the content of gravel ranges from 15 to 25 percent.

The Bt and BCt horizons have dry color of 2.5YR 3/6 or 4/6 and moist color of 2.5YR 3/6 or 4/6. The texture is gravelly clay loam or gravelly clay in the Bt horizon and gravelly sandy clay loam in the BCt horizon. The content of clay ranges from 35 to 45 percent in the upper 20 inches. The content of cobbles ranges from 0 to 10 percent, and the content of gravel ranges from 15 to 25 percent.

Trainer Series

The Trainer series consists of very deep, somewhat poorly drained soils on stream terraces. These soils formed in alluvium derived from mixed sources. Slope is 0 to 1 percent.

Soils of the Trainer series are fine-loamy, mixed, thermic Aquic Xerochrepts.

Typical pedon of Trainer loam, 0 to 1 percent slopes, occasionally flooded; 1,150 feet north and 600 feet west of the southeast corner of sec. 22, T. 16 N., R. 4 E., Yuba City quadrangle:

Ap—0 to 4 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; weak medium granular structure; very hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine and fine tubular and common very fine and fine interstitial pores; slightly acid; clear smooth boundary.

A—4 to 9 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; common fine distinct dark reddish brown (5YR 3/4) and few coarse prominent very dark grayish brown (2.5Y 3/2) mottles; few medium prominent grayish brown (10YR 5/2) and brown (10YR 5/3) mottles along root channels; weak medium granular structure; very hard, friable, slightly sticky and slightly plastic; few very fine roots; few very fine and fine tubular and interstitial pores; few fine black (10YR 2/1) concentrations and concretions; mildly alkaline; clear wavy boundary.

Bt1—9 to 16 inches; brown (7.5YR 5/4) loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; very hard, very friable, slightly sticky and slightly plastic; few very fine roots; few very fine and coarse tubular pores; few thin clay films lining pores; few fine and medium black (10YR 2/1) concretions and concentrations; mildly alkaline; clear smooth boundary.

Bt2—16 to 23 inches; brown (7.5YR 5/4) loam, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; very hard, very friable, slightly sticky and slightly plastic; few very fine tubular pores; few thin clay films lining pores and bridging sand grains; few fine and medium black (10YR 2/1) concretions and concentrations; moderately alkaline; gradual smooth boundary.

Bt3—23 to 36 inches; very pale brown (10YR 7/4) sandy loam, yellowish brown (10YR 5/4) moist; common fine distinct brown (7.5YR 4/4) mottles; weak medium subangular blocky structure; very hard, very friable, slightly sticky and slightly plastic; few very fine tubular pores; common thin clay films lining pores and bridging sand grains; few fine and medium black (10YR 2/1) concentrations and concretions; moderately alkaline; gradual smooth boundary.

BCt—36 to 48 inches; reddish yellow (7.5YR 6/6) sandy loam, brown (7.5YR 4/4) moist; nonsticky and nonplastic; few very fine tubular pores; few thin clay films bridging sand grains; common medium grayish brown (10YR 5/2) bleached sand coatings on faces of peds; few fine and medium black (10YR 2/1) concentrations and concretions; moderately alkaline; clear smooth boundary.

C1—48 to 59 inches; reddish yellow (7.5YR 6/6) sandy loam, strong brown (7.5YR 5/6) moist; massive; slightly hard, very friable, nonsticky and nonplastic; moderately alkaline; abrupt smooth boundary.

C2—59 to 66 inches; reddish yellow (7.5YR 6/6) coarse sandy loam, strong brown (7.5YR 4/6) moist; massive; slightly hard, very friable, nonsticky and nonplastic; moderately alkaline.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, the soil moisture control section is dry in all parts from about May 15 through October 31 and moist in some or all parts from about November 1 through May 15. Reaction ranges from slightly acid to moderately alkaline.

The A horizon has dry color of 10YR 5/4, 5/3, or 4/4 or 7.5YR 5/4 and moist color of 10YR 3/4 or 3/3 or 7.5YR 3/4.

The Bt horizon has dry color of 10YR 7/4 or 7.5YR 7/4, 6/4, 5/4, or 6/6 and moist color of 10YR 5/4 or 7.5YR 5/6, 5/4, 4/4, 3/4, or 4/6. It is sandy loam, loam, or sandy clay loam with 18 to 27 percent clay. Distinct or prominent mottles are below a depth of 20 inches.

The BC horizon has dry color of 7.5YR 5/4 or 6/6 and moist color of 7.5YR 4/4, 4/6, or 5/6. It is sandy loam or coarse sandy loam.

Tujunga Series

The Tujunga series consists of very deep, excessively drained soils on flood plains. These soils formed in alluvium derived from mainly granitic sources. Slope ranges from 0 to 2 percent.

Soils of the Tujunga series are mixed, thermic Typic Xeropsamments.

Typical pedon of Tujunga gravelly sand, 0 to 2 percent slopes; 200 feet south and 4,300 feet west of the intersection of Walnut Avenue and Hallwood Boulevard, in the unsectionized New Helvetia land grant, T. 15 N., R. 4 E., Yuba City quadrangle:

A—0 to 7 inches; light yellowish brown (10YR 6/4), gravelly sand, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; many very fine and few fine roots; many very fine interstitial pores; 20 percent rounded quartz pebbles; slightly acid; gradual smooth boundary.

C1—7 to 55 inches; light gray (10YR 7/1) sand, gray (10YR 6/1) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; many very fine interstitial pores; 5 percent rounded quartz pebbles; neutral; abrupt smooth boundary.

C2—55 to 65 inches; light gray (10YR 7/1) gravelly sand, gray (10YR 6/1) moist; single grain; loose, nonsticky and nonplastic; few fine roots; many very fine interstitial pores; 30 percent rounded quartz pebbles; neutral.

The mean annual soil temperature is 64 or 65 degrees F. The soil temperature is above 47 degrees F the entire year. Unless the soils are irrigated, the soil moisture control section is dry in all parts from about April 15 to November 15 and moist in some or all parts from about November 15 to April 15. The content of coarse sand and very coarse sand is more than 35 percent.

The A horizon has dry color of 10YR 6/4 or 6/3 and moist color of 10YR 5/3, 4/4, or 4/3. It is gravelly sand or sand with 2 to 25 percent gravel.

The C horizon has dry color of 10YR 8/1, 7/1, or 7/2 and moist color of 10YR 6/2, 6/1, or 5/1. It is gravelly sand or sand with 2 to 35 percent gravel.

Verjeles Series

The Verjeles series consists of moderately deep, moderately well drained soils on foothills. These soils formed in material weathered from basic intrusive igneous rocks. Slope ranges from 3 to 15 percent.

Soils of the Verjeles series are fine-loamy, mixed, thermic Ultic Haploxeralfs.

Typical pedon of Verjeles sandy loam, in an area of Flanly-Orose-Verjeles complex, 3 to 8 percent slopes; 2,650 feet north and 2,950 feet west of the southeast corner of sec. 30, T. 18 N., R. 7 E., Challenge quadrangle:

Oi—1/2 inch to 0; partially decomposed leaves and twigs.

A—0 to 5 inches; brown (7.5YR 4/4) sandy loam, dark brown (7.5YR 3/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; many very fine interstitial pores; 10 percent pebbles and 3 percent cobbles; moderately acid; clear smooth boundary.

Bt1—5 to 11 inches; strong brown (7.5YR 4/6) loam, dark reddish brown (5YR 3/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; common very fine, fine, and medium tubular and common fine interstitial pores; few thin clay films lining pores and on faces of peds; 10 percent pebbles and 7 percent cobbles; moderately acid; clear smooth boundary.

Bt2—11 to 20 inches; yellowish red (5YR 4/6) loam, dark reddish brown (5YR 3/4) moist; moderate medium subangular blocky structure; very hard, friable, sticky and plastic; common very fine, fine, and medium roots; common very fine, fine, and medium tubular and few fine interstitial pores; common thin clay films bridging sand grains and few thin clay films lining pores and on faces of peds; 10 percent pebbles and 3 percent cobbles, concentrated in the lower part of the horizon; moderately acid; abrupt smooth boundary.

2Bt1—20 to 31 inches; strong brown (7.5YR 5/6) clay, strong brown (7.5YR 4/6) moist; weak medium prismatic structure parting to weak medium subangular blocky; extremely hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; common moderately thick clay films on faces of peds and common thick clay films lining pores; slightly acid; abrupt smooth boundary.

2Bt2—31 to 37 inches; light yellowish brown (2.5Y 6/4) clay loam, olive brown (2.5Y 4/4) moist; common fine prominent strong brown (7.5YR 5/8) mottles, strong brown (7.5YR 4/6) moist; weak medium prismatic structure parting to weak medium subangular blocky; extremely hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; common moderately thick clay films on faces of peds; slightly acid; abrupt smooth boundary.

2Cr—37 to 42 inches; pale olive (5Y 6/3), soft, weathered gabbrodiorite, olive (5Y 4/3) moist.

The depth to paralithic contact ranges from 20 to 40 inches. The mean annual soil temperature is 59 or 60 degrees F. The soil temperature is above 47 degrees F from February 15 to December 31. The soil moisture control section is dry in all parts from about June 1 to October 31 and moist in some or all parts from about November 1 to May 31. Reaction is moderately acid or slightly acid.

The A horizon has dry color of 7.5YR 5/6, 5/4, or 4/4 and moist color of 7.5YR 3/4. The content of clay ranges from 10 to 20 percent. The content of rock fragments ranges from 0 to 15 percent. It includes 0 tc 3 percent stones, 0 to 10 percent cobbles, and 0 to 15 percent gravel.

The Bt horizon has dry color of 7.5YR 4/6 or 4/4 or 5YR 4/6 and moist color of 7.5YR 3/4 or 5YR 3/4. It is loam or clay loam with 25 to 30 percent clay. The content of rock fragments ranges from 0 to 15 percent. It includes 0 to 3 percent stones, 0 to 10 percent cobbles, and 9 to 15 percent gravel.

The 2Bt horizon has dry color of 7.5YR 5/6, 10YR 4/4, or 2.5Y 6/4 and moist color of 10YR 4/4 or 4/3, 7.5YR 4/6, or 2.5Y 4/4. The upper part is clay with 40 to 60 percent clay, and the lower part is clay loam with 27 to 40 percent clay. The upper boundary is abrupt with a clay increase of 15 to 30 percent over the Bt horizon.

Woodleaf Series

The Woodleaf series consists of moderately deep, well drained soils on mountains. These soils formed in material weathered from ultramafic rocks with a large amount of serpentine minerals. Slope ranges from 3 to 30 percent.

Soils of the Woodleaf series are clayey-skeletal, serpentinitic, mesic Ultic Haploxeralfs.

Typical pedon of Woodleaf gravelly loam, 3 to 15 percent slopes; 3,000 feet south and 1,300 feet west of the northeast corner of sec. 16, T. 19 N., R. 7 E., Clipper Mills quadrangle:

Oi—1/2 inch to 0; partially decomposed twigs and needles.

A1—0 to 4 inches; dark yellowish brown (10YR 4/4) gravelly loam, dark yellowish brown (10YR 3/4) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; many very fine and fine interstitial and common very fine tubular pores; 20 percent pebbles, 5 percent cobbles, and 1 percent stones; moderately acid; clear smooth boundary.

A2—4 to 9 inches; strong brown (7.5YR 4/6) gravelly loam, dark reddish brown (5YR 3/4) moist; moderate fine granular structure; slightly hard, very friable, sticky and slightly plastic; common very fine, fine, medium, and coarse roots; many very fine and fine interstitial and common very fine and fine tubular pores; 25 percent pebbles, 5 percent cobbles, and 1 percent stones; moderately acid; clear wavy boundary.

2Bt1—9 to 17 inches; yellowish red (5YR 4/6) very gravelly clay loam, dark reddish brown (5YR 3/3) moist; weak medium subangular blocky structure; hard, friable, sticky and plastic; many fine and medium and common very fine and coarse roots; many very fine, fine, and medium tubular pores; common thin clay films on faces of peds and lining pores; 30 percent pebbles, 15 percent cobbles, and 2 percent stones; moderately acid; clear wavy boundary.

2Bt2—17 to 28 inches; brown (7.5YR 4/4) very gravelly clay, dark brown (7.5YR 3/4) moist; strong medium subangular blocky structure; very hard, firm, sticky and plastic; common medium and coarse and few very fine and fine roots; few very fine and fine tubular pores; many thick clay films on faces of peds; 30 percent pebbles, 15 percent cobbles, and 2 percent stones; slightly acid; abrupt wavy boundary.

R—28 inches; serpentine bedrock.

The depth to lithic contact ranges from 20 to 40 inches. The mean annual soil temperature is 47 to 54 degrees F. The soil temperature is above 47 degrees F from April 1 to November 15. The soil moisture control section is dry in some or all parts from about July 15 to September 15 and moist in some or all parts from about September 15 to July 15. Base saturation is 50 to 75 percent.

The A horizon has dry color of 10YR 5/4, 4/4, or 4/3 or 7.5YR 4/6 and moist color of 10YR 3/3 or 3/4, 7.5YR 3/4, or 5YR 3/4. The content of clay ranges from 18 to 27 percent. The content of rock fragments ranges from 15 to 35 percent. It includes 0 to 3 percent stones, 5 to 15 percent cobbles, and 10 to 30 percent gravel. Reaction is moderately acid or slightly acid.

The 2Bt horizon has dry color of 10YR 6/4 or 6/6; 7.5YR 4/3, 4/4, or 4/6; or 5YR 4/6. It has moist color of 10YR 4/4, 7.5YR 3/4, or 5YR 3/3 or 3/4. It is very gravelly clay loam or very gravelly clay with 35 to 60 percent clay. The content of rock fragments ranges from 35 to 55 percent. It includes 0 to 3 percent stones, 10 to 25 percent cobbles, and 25 to 40 percent gravel. Reaction is moderately acid to neutral. The ratio of calcium to magnesium is 1:5 or more. It generally increases with increasing depth.

Formation of the Soils

Soil is a continually evolving body of mineral and organic material maintained in the midst of a stream of pedogenic, biologic, and hydrologic processes. Horizons form in soils as a result of these processes. Soils are classified and mapped and management interpretations are made on the basis of the presence, absence, and arrangement of soil horizons.

The soils in Yuba County vary widely in the kind and number of soil horizons and the degree of horizon development. For example, San Joaquin soils have an A horizon, a clayey argillic (2Bt) horizon, and a duripan (3Bqm horizon, or hardpan). Other soils have only weak or indistinct horizons. Columbia soils have only a relatively thin A horizon and a stratified C horizon. The differentiation of soil horizons is the result of one or more of the following processes—additions, removals, transfers, and transformations (Simonson, 1959).

The soils in Yuba County have an A horizon as a result of additions of organic matter. Conejo soils, for example, have a dark A horizon (a mollic epipedon) to a depth of 20 to 30 inches as a result of constant additions of organic matter from decaying plants.

Many of the soils in Yuba County have an illuvial B horizon as a result of the transformation of primary minerals into silicate clays in the A horizon. These silicate clays are subsequently removed by eluviation from the A horizon and transferred to the subsoil, forming an illuvial argillic B horizon. Generally, only 2 or 3 percent of the clay in an illuvial B horizon has been transferred.

B horizons are normally redder than A or C horizons. Reddish colors form as iron weathers from primary minerals, oxidizes, and coats soil particles. Sites soils have a yellowish red or red, strongly developed B horizon.

San Joaquin soils have a strongly cemented duripan (3Bqm horizon). Cementation is a result of transformation in place of primary minerals into silica and into sesquioxides, mainly iron. The silica and sesquioxides are cementing agents. Some of the silica and sesquioxides also have been transferred to the 3Bqm horizon from overlying horizons.

The additions, removals, transfers, and transformations in soils do not necessarily result in horizon differentiation. Capay soils have only A and C horizons because their deep-cracking clays allow the physical transfer of surface soil down the cracks into lower part of the profile. This mixing prevents the formation of a B horizon.

Finally, the "changes proceeding during the differentiation of horizons in a profile depend themselves upon a host of simpler processes such as hydration, oxidation, solution, leaching, precipitation and mixing. These simpler and more basic reactions proceed in all soils. They are controlled in their turn by factors such as time, climate, living organisms, parent materials and topography" (Simonson, 1959). Each soil in Yuba County is affected by these five factors (Jenny, 1941), but the relative effect of each factor varies from one soil to another and is directly related to the landform.

Yuba County can be separated into various landforms—flood plains, basins, stream terraces, fan terraces, foothills, and mountains.

Flood plains.—Flood plains are the lowest of the alluvial landforms in the county and the closest to rivers or streams, and fan terraces are the highest of the alluvial landforms and generally, although not always, are the farthest from rivers or streams (fig. 13). In general, the soils in the lower areas are younger, less developed, and more fertile than the soils in the higher areas.

Flood plains are along the Feather, Yuba, and Bear Rivers; along Honcut Creek; and along the smaller creeks and drainageways.

The major drainageways were originally confined within broad natural levees sloping away from the rivers or streams, but in recent historic time they have been confined by manmade levees. The natural levees formed through the deposition of alluvium during periods of flooding. During these periods the coarser textured material settled out first and typically was deposited nearest the rivers and streams. The finer textured material generally was deposited farther from the rivers or streams. Columbia, Holillipah, Shanghai, and other soils in areas of the natural levee deposits are among the most fertile and most productive soils in the county.

The alluvium deposited during the frequent periods when the rivers and streams flooded originated from a variety of rock sources in the Sierra Nevada. These deposits are probably less than 3,000 years old

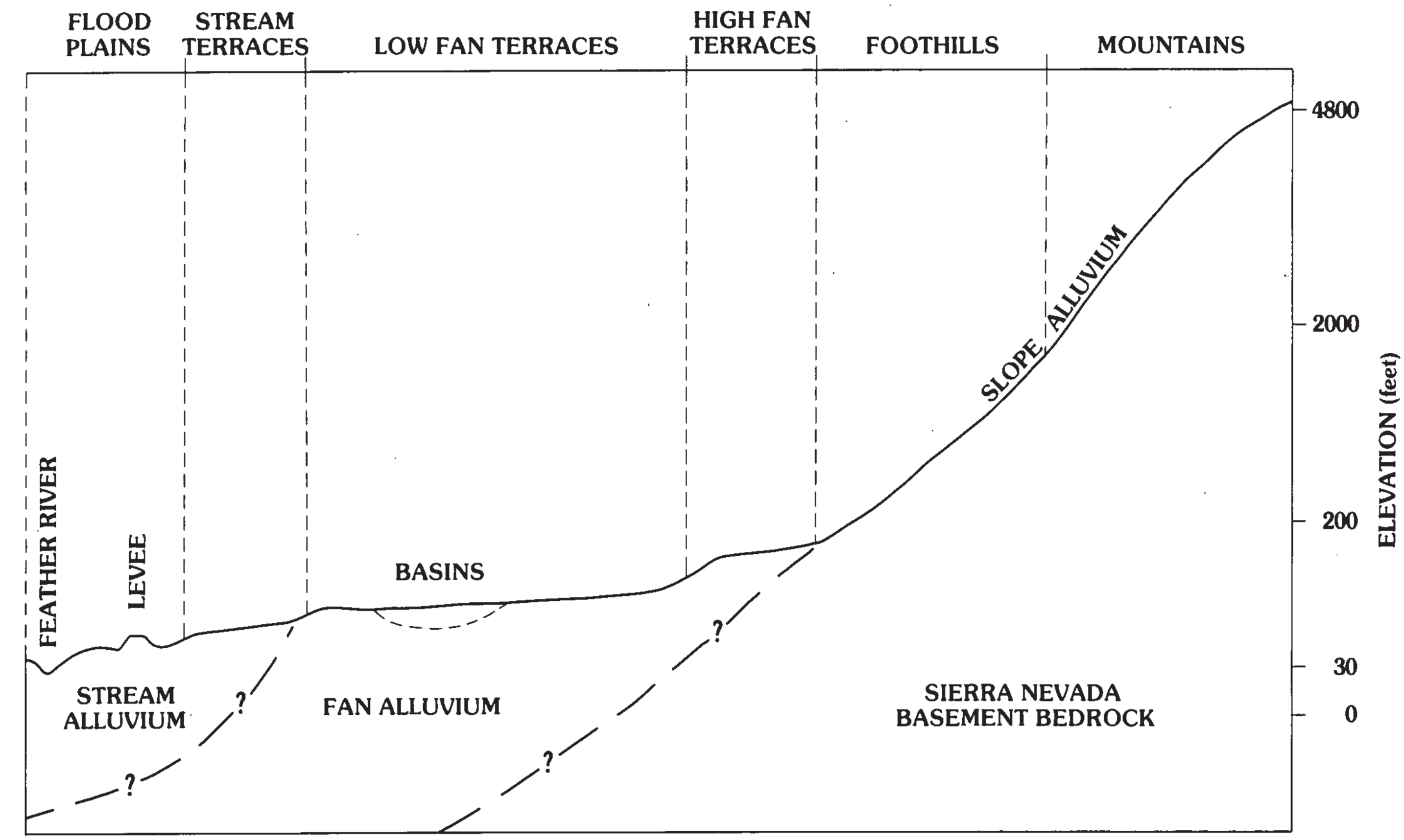

Figure 13.—Landforms in Yuba County, California.

(Busacca, 1982). The most recent deposits were laid down by flooding associated with hydraulic mining in the watershed upstream from about 1855 to 1884.

The Shanghai, Columbia, and Holillipah soils outside the present manmade levees formed in alluvium that may be no older than 120 years because of the deposition of mining debris during floods in the early 1860's, before levee construction (Chamberlain and Wells, 1879). Inside the levees alluvium is deposited on or removed from these same soils during the years in which they are flooded.

The native vegetation on these soils consisted mainly of a dense stand of California white oak, Fremont cottonwood, willows, shrubs, forbs, and grasses. As plants, organic material, and surface soil horizons are covered by soil during periods of flooding, a record of past flooding is preserved in the soils and is evidenced by an irregular decrease in content of organic matter with increasing depth. Because of flooding and deposition, Shanghai, Columbia, and Holillipah soils have few morphological features. The parent material has not been in place long enough. The soils are characterized by a weakly expressed, dark surface layer (ochric epipedon); an irregular decrease in content of organic matter with increasing depth; and stratified textures and colors.

Basins.— When the Feather, Yuba, and Bear Rivers overflowed, floodwater filled low basins in the southwestern part of the county. As the floodwater subsided and drained slowly back into the main channels, clays and silts from a variety of sources settled out of suspension and were deposited in the basins. The surface of these deposits dates back to the age when the area was protected from flooding.

The dominantly montmorillonitic clays deposited in the basins swell as they become wet and shrink as they become dry, leaving cracks as much as 3 feet deep in the soils. These cracks are repeatedly filled with surface soil containing organic matter. A large amount of organic matter accumulated from the decaying tules and marsh grasses in these areas when the unreclaimed soils were undrained and frequently flooded (Strathorn and others, 1911). This accumulation of organic matter gives the Capay soils their dark colors. The presence of a water table in these soils before they were protected from flooding and drained has led to the segregation and accumulation of iron and manganese oxides in the form of stains or small, rounded concretions or pellets. The shrink-swell, self-churning action of these soils has prevented the development of most other morphological characteristics.

Stream terraces.—Stream terraces are higher and older than flood plains. The Conejo and Horst soils on stream terraces formed in alluvium derived from a variety of rock sources. Before the construction of levees, these stream terraces were occasionally flooded, but only minute amounts of sediment were deposited. The majority of the soils formed in late Pleistocene material of the Modesto Formation, which is 10,000 to 42,000 years old (Busacca, 1982).

The combination of dense vegetation on these soils and a Mediterranean climate, as modified by time, has contributed to the weathering and development in these soils. The warm temperature favors rapid chemical weathering, and rainwater moving through the soils leaches dissolved minerals and suspended material, including clays, downward through the profile. The native vegetation, mainly an open canopy of California white oak with a dense understory of shrubs, forbs, and grasses, accounts for an accumulation of organic matter in the surface layer of these soils. As a result of these factors, soils on this surface have distinct morphological characteristics. Conejo and Horst soils, for example, have a mollic epipedon that is more than 20 inches thick and have a cambic B horizon.

Perkins and Kilaga soils are slightly higher on the landscape than the Conejo and Horst soils. They do not have a mollic epipedon, probably because their native vegetation is not so dense as that on the Conejo and Horst soils and thus less organic matter was added to the surface layer. The same Mediterranean climate, as modified by time, that formed a cambic B horizon in Conejo and Horst soils has, over a longer period of time, contributed to the formation of an argillic (Bt) horizon in Perkins and Kilaga soils.

Fan terraces.—Low fan terraces are higher and older than stream terraces. The San Joaquin and Kimball soils on low fan terraces formed in alluvium derived from a variety of rock sources and were only rarely flooded. The majority of the soils formed in middle Pleistocene material of the Riverbank Formation, which is 130,000 to 450,000 years old (Busacca, 1982).

High fan terraces are more dissected, higher, and older than low fan terraces. The Corning and Redding soils on high fan terraces formed in gravelly and cobbly alluvium derived from a variety of rock sources. The majority of the soils formed in late Pliocene material of the Laguna Formation, which is 1.7 to 3.6 million years old (Busacca, 1982).

The San Joaquin, Kimball, Redding, and Corning soils in areas of these deposits probably represent several episodes of soil formation. A lithologic discontinuity between the ochric epipedon and the argillic (2Bt) horizon in these soils and a lithologic discontinuity between the argillic horizon and the duripan (3Bqm horizon) in Redding and San Joaquin soils provide evidence that both the duripan and the argillic horizon are remnants of relict paleosols.

The climatic cycle of hot, dry summers and cool, moist winters in the survey area, as modified by time, has contributed to the formation of very distinct morphological characteristics in the soils on fan terraces, probably in three separate episodes. It is also possible that these soils began forming under a climate that is much wetter than the current climate (Nikiforoff, 1941).

In the first episode a duripan (3Bqm horizon) formed through the dissolution of silica, iron, and manganese followed by precipitation at a uniform depth. This duripan was subsequently stripped from some areas, which are now made up mainly of Kimball and Corning soils. The duripan remains in San Joaquin and Redding soils.

In the second episode an argillic (2Bt) horizon formed in these soils. The abrupt upper boundary of this horizon and small areas in which the soils do not have an argillic horizon but do have a duripan suggest that the argillic horizon was stripped by erosion, but probably to a lesser extent than the duripan.

In the third and final episode, the present surface layer (A horizon), which typically is sandy loam or loam, formed. In some areas a weak sandy loam or loam argillic (Bt) horizon or cambic (Bw) horizon formed directly above the 2Bt horizon.

The A horizons (ochric epipedons) are relatively light colored and low in content of organic matter because warm, moist springs and hot summers favor rapid decomposition of the organic matter produced by the annual grasses and forbs. The soils on fan terraces are older, more highly weathered, and less fertile than the soils in the lower areas and consequently produce less vegetation. Also, much of the precipitation that falls on the higher lying soils runs off the surface or is not retained for plant growth because of a lower available water capacity. Because these soils have a low content of organic matter and support dominantly shallow-rooted annual grasses, the surface layer has weak structure or is massive and becomes extremely hard during summer.

The soils on fan terraces have mound-intermound microrelief in areas that have not been leveled. There are several theories that explain the origin of this microrelief. The most plausible are those that attribute the microrelief to geologic erosion, frost heaving, rodents, and hydrostatic ground-water pressure. Erosion is the most likely cause (Hilgard, 1884), especially in areas where the intermounds are connected and thus provide an outlet for water. In some areas, the relief is nearly level and the intermounds have no outlet. They form a "bathtub" during the wettest part of the year. "It is possible that a mound microrelief of certain regions was produced by the hydrostatic pressure of ground water descending from the steep slopes of the high Sierra into the relatively flat plain of the Central Basin" (Nikiforoff, 1941). In other words, water pressure pushed up the mounds. Frost heaving under an assumed earlier colder climate also is a possible explanation.

Foothills.—Soils in the foothills are on three general types of slopes—stable slopes (0 to 15 percent), metastable slopes (15 to 45 percent), and active slopes (more than 45 percent). In general, horizon development is more strongly expressed on the stable slopes and less strongly expressed on the active slopes. In the Argonaut and Verjeles soils on stable slopes, an argillic (2Bt) horizon has formed over bedrock and is overlain by slope alluvium. In the Sobrante and Flanly soils on metastable slopes, a less well developed argillic (Bt) horizon has formed. The Auburn soils on active slopes have an only weakly developed cambic B horizon.

Aspect has important effect on soil formation, especially at the higher elevations. Soils are generally more highly developed on north- and east-facing slopes than on the drier south- and west-facing slopes. On south-facing slopes, temperatures are higher and the soils dry sooner in summer. On north-facing slopes, the temperatures are lower and the soils stay moist longer in summer. More moisture is available to support plant communities and to aid the processes of soil formation.

Timbuctoo soils have a strongly developed argillic horizon and are generally on north and east aspects. Sobrante soils have a less strongly developed argillic horizon and are generally on south and west aspects in the same area.

There is a direct correlation between climate and organisms in the foothills. The combination of climate and vegetation has affected soil formation. As elevation increases, the amount of precipitation increases and the vegetation changes from a cover of blue oak and annual grasses to a more dense cover of blue oak, interior live oak, and annual grasses. Under dense stands of hardwood trees and shrubs, leaves form a thin layer of litter on the surface of the soils. The content of organic matter tends to be higher in soils under dense stands of hardwoods than in other soils. Also, temperatures are generally lower at the higher elevations (Lytle, 1987), and organic matter does not decompose so rapidly. There is an explosion of soil microbiological activity in spring, when warm, moist conditions prevail, and organic matter is more quickly destroyed at the lower elevations with warmer temperatures. As organic matter decomposes, organic acids are released. As bases are then leached out of the profile, the soils tend to become more acid. The soils on the lower part of the foothills have a lower content of organic matter than the soils on the higher part. As a result, they tend to be less acid and have higher base saturation.

Parent material is probably most responsible for the differences among the soils in the foothills. Sobrante and other soils that formed in material weathered from basic metavolcanic rocks are less acid and have higher base saturation than Flanly and other soils that formed in material weathered from acid intrusive igneous rocks.

Mountains.—Many of the observations about the formation of soils in the foothills apply to the formation of soils in the mountains. In the mountains, time is the most difficult factor to quantify. In general, however, the principles for the mountains are the same as those for the foothills. On stable and metastable slopes, Sites soils and other Xeric Haplohumults that formed principally in slope alluvium are generally very deep; have a thick, well developed argillic horizon; and are very old. Yuba County was below the reach of the last period of glaciation in the Sierra Nevada. Soil development has been proceeding for millions of years.

The soils on metastable slopes are generally less well developed than the soils on stable slopes. Hurlbut soils and other Dystric Xerochrepts that formed in colluvium on active slopes, such as those in the steep inner gorge of the Yuba River, have an only weakly developed cambic (Bw) horizon. Aspect is important in the mountains. Soils are generally more highly developed on north- and east-facing slopes than on the drier south- and west-facing slopes, especially at the lower elevations in the mountains. In areas at the lower elevations where greenstone is the source of the parent material, Boomer soils, which are Ultic Haploxeralfs, are on north- and east-facing slopes and Sobrante soils, which are Mollic Haploxeralfs, are on south- and west-facing slopes. In areas at the lower elevations where granodiorite is the source of the parent material, Holland soils, which are more than 60 inches deep, are on north- and east-facing slopes and Flanly soils, which are 20 to 40 inches deep, are on south- and west-facing slopes.

As in the foothills, there is a direct correlation between climate and vegetation in the mountains. As elevation increases, the amount of precipitation increases and the vegetation changes from ponderosa pine and manzanita to ponderosa pine and Douglas-fir and then to a mixed conifer forest of ponderosa pine, Douglas-fir, sugar pine, and white fir.

Temperature decreases as elevation increases. As a result, the thickness of the layer of litter and the content of organic matter in the soils increase. As in the foothills, organic matter decomposes more slowly at colder temperatures and more organic matter accumulates. Organic acids released from the layer of litter and large amounts of water, as much as 85 inches of precipitation per year at the higher elevations, have leached the soils of bases, mainly calcium, magnesium, and potassium. Boomer and Sites soils formed in similar types of parent material. Boomer soils, which are Ultic Haploxeralfs at the lower elevations where the annual precipitation is 35 to 50 inches, have been leached less than Sites soils, which are Xeric Haplohumults at the higher elevations where the annual precipitation is 50 to 85 inches.

Leaching also moved clay downward in the soils and weathered clays from primary minerals at different rates. Boomer soils, which are at the lower elevations, have an argillic horizon of clay loam, and Sites soils, which are at the higher elevations, have an argillic horizon of clay. The clay minerals are dominated by kaolinite in the Sites soils and by a mixture of montmorillonite, mica, and kaolinite in the Boomer soils. This difference indicates a higher degree of weathering in the Sites soils.

Finally, parent material is responsible for most of the differences among the soils in the mountains. The acid intrusive igneous parent material in which Hotaw, Chaix, Chawanakee, and other soils formed weathers much more slowly than the metasedimentary and metavolcanic parent material in which Sites, Jocal, and other soils formed. The degree of profile development reflects the different rates of weathering. Woodleaf soils, which formed in material that has a large amount of serpentine minerals, are the most extreme example of the effect of parent material on soil formation. The natural infertility of soils that formed in this material has retarded plant growth, increasing the extent of geologic erosion and preventing deep soil development. Under the same climate and on the same kind of landscape, Sites soils, which are very deeply weathered, formed in material weathered from metamorphic rocks.

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Glossary

Active slope. A hill or mountain slope that is responding to valley incision. Erosion (either geologic or accelerated) exceeds regolith weathering. Detritus accumulates behind obstructions, indicating the contemporary transport of slope alluvium. Slope gradients generally are more than 45 percent.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Arroyo. The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in alluvium.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 2.5
Low	2.5 to 5.0
Moderate	5.0 to 7.5
High	7.5 to 10.0
Very high	more than 10.0

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Basin. A broad structural lowland, commonly elongated many miles across, between mountain ranges.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Butte. An isolated small mountain or hill with steep or precipitous sides and a top variously flat, rounded, or pointed that may be a residual mass isolated by erosion or an exposed volcanic neck.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

Colluvium. Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Concretions. Cemented bodies with crude internal symmetry organized around a point, a line, or a plane. They typically take the form of concentric layers visible to the naked eye. Calcium carbonate, iron oxide, and manganese oxide are common compounds making up concretions. If formed in place, concretions of iron oxide or manganese oxide are generally considered a type of redoximorphic concentration.

Conglomerate. A coarse grained, clastic rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual."

Contour stripcropping. Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cropping system. Growing crops according to a planned system of rotation and management practices.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cuesta. A hill or ridge that has a gentle slope on one side and a steep slope on the other; specifically, an asymmetric, homoclinal ridge capped by resistant rock layers of slight or moderate dip.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Drainage class (natural). Refers to the frequency and duration of wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained.* These classes are defined in the "Soil Survey Manual."

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley that generally is more open and has broader bottom land than a ravine or gulch.

Duff. A generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Duripan. A subsurface soil horizon that is cemented by silica and sesquioxides.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Effective rooting depth. See Potential rooting depth.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion hazard. The severity with which water erodes a soil that lacks a plant cover.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Synonym: scarp.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity*.

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, or clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly, a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of clayey soils that shrink and swell considerably with changes in moisture content.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 35 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water. Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

High-residue crops. Such crops as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the "Soil Survey Manual." The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Soft, consolidated bedrock beneath the soil.

R layer.—Consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties are depth to a seasonal high water table, the infiltration rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.
Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.
Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.
Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.
Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.
Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.
Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.
Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Landform. A feature on the earth's surface that has a characteristic shape and is attributable to natural causes.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Mechanical treatment. Use of mechanical equipment for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Metastable slope. A slope that is relatively stable at present but that may become active if the environmental balance is disturbed, for example, by road construction or the removal of vegetation. Slope gradients generally are 15 to 45 percent.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Descriptive terms are as follows: abundance—*few, common,* and *many;* size—*fine, medium,* and *coarse;* and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium,* from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse,* more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau), and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Natural levees. Wedge-shaped deposits of the coarsest textured suspended-load material that formed long, low ridges on channel banks and slope gently away from streams.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. The depth to which roots have been observed to penetrate.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Paleosol. A soil that formed on a landscape of the past and that has distinctive morphological features resulting from a soil-forming environment that no longer exists on the site.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water or air to move downward through the profile. The rate at which a saturated soil transmits water is accepted as a measure of this quality. In soil physics, the rate is referred to as "saturated hydraulic conductivity," which is defined in the "Soil Survey Manual." In line with conventional usage in the engineering profession and with traditional usage in published soil surveys, this rate of flow continues to be expressed as "permeability." Terms describing permeability, measured in inches per hour, are as follows:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid or very rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Potential native plant community. See Climax plant community.

Potential rooting depth (effective rooting depth). The depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This practice increases the vigor and reproduction capacity of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-sized particles.

Saprolite. Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Site class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skyline yarding. See Cable yarding.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow intake (in tables). The slow movement of water into the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stable slope. A slope that is more stable than a metastable or active slope. Slope gradients generally are 0 to 15 percent.

Stone line. A concentration of rock fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grain* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon." Technically, the A horizon. The part of the profile that has the highest content of organic matter and the darkest color.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Underlying material. The part of the soil below the A, AC, or B horizon that is relatively unaffected by the processes of soil formation.

Upland. Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Windthrow. The uprooting and tipping over of trees by the wind.

Appendixes

Appendix A.—Prime Farmlands

Prime farmland is land best suited for producing food, forage, fiber, and oilseed crops and also available for these uses (the land could be cropland, pastureland, rangeland, forest land, or other land but not urban builtup land or water). It has the soil quality, growing season, and moisture supply needed to produce sustained high yields of crops economically when treated and managed, including water management, according to modern farming methods.

Prime farmland meets all of the following criteria:

1. The soils have:

a. Aquic, udic, ustic, or xeric moisture regimes and an available water capacity of at least 4 inches (10 cm) per 40 to 80 inches (1 to 1.52 meters) of soil to produce the commonly grown cultivated crops (cultivated crops include, but are not limited to, grain, forage, fiber, oilseed, sugarbeets, vegetables, orchard, vineyard, and bush fruit crops) adapted to the region in 7 or more years out of 10; or

b. Xeric, ustic, aridic, or torric moisture regimes in which the available water capacity is at least 4 inches (10 cm) per 40 to 60 inches (1 to 1.52 meters) of soil and the area has a developed irrigation water supply that is dependable (a dependable water supply is one in which enough water is available for irrigation in 8 out of 10 years for the crops commonly grown) and of adequate quality; and,

2. The soils have a temperature regime that is frigid, mesic, thermic, or hyperthermic (pergelic and cryic regimes are excluded). These are soils that, at a depth of 20 inches (50 cm), have a mean annual temperature higher than 32 degrees F (0 degrees C). In addition, the mean summer temperature at this depth in soils with an O horizon is higher than 47 degrees F (8 degrees C); in soils that have no O horizon, the mean summer temperature is higher than 59 degrees F (15 degrees C); and,

3. The soils have a pH between 4.5 and 8.4 in all horizons within a depth of 40 inches (1 meter); and,

4. The soils either have no water table or have a water table that is maintained at a sufficient depth during the cropping season to allow cultivated crops common to the area to be grown; and,

5. The soils can be managed so that, in all horizons within a depth of 40 inches (1 meter), during part of each year the conductivity of the saturation extract is less than 4 mmhos/cm and the exchangeable sodium percentage (ESP) is less than 15; and,

6. The soils are not flooded frequently during the growing season (less often than once in 2 years); and,

7. The product of K (erodibility factor) x percent slope is less than 2.0; and,

8. The soils have a permeability rate of at least 0.06 inch (0.15 cm) per hour in the upper 20 inches (50 cm) and the mean annual soil temperature at a depth of 20 inches (50 cm) is less than 59 degrees F (15 degrees C); the permeability rate is not a limiting factor if the mean annual soil temperature is 59 degrees F (15 degrees C) or higher; and,

9. Less than 10 percent of the surface layer [upper 6 inches (15 cm)] in these soils consists of rock fragments coarser than 3 inches (7.6 cm); and,

10. The soils have a minimum rooting depth of 40 inches (1 meter).

Appendix B.—Guide for Placing Soils in Capability Classes

Criteria	Capability class							
	I	II	III	IV	V	VI [1]	VII [2]	VIII
Soil depth (in) [3]	≥40	≥40	≥20	≥10	≥20	≥10	Any	Any
ETp 32 degrees F [4]	≥20	≥14	≥10	≥6	≥6	≥4	---	Any
4ETa [5]	≥20	≥16	≥12	≥8	≥8	≥6	≥2	Any
Surface texture (irrigated)	SL-C	LS-C, may be GR	Any, may be GR, CB	Any, may be GRV, CBV, ST [6]	Any, may be GRX, CBX, STV	Any, may be GRX, CBX, STV	Any	Any
Surface texture (nonirrigated)	SL-CL	SL-C, may be GR	SL-C, may be, GR, CB	LS-C, GRV, CBV, ST [6]	Any, may be GRX, CBX, STV	Any, may be GRX, CBX, STV	Any	Any
Permeability (in/hr) [7]	0.2-6.0	0.06-20	<0.06-20	Any	Any	Any	Any	Any
Depth to water table (in) [8]	>60	>36	>20	>20	Any	Any	Any	Any
Available water capacity (in) [9]	≥7.5 avg. AWC ≥0.13 in/in	≥5.0 avg. AWC ≥0.08 in/in	≥3.5 avg. AWC ≥0.06 in/in	≥2.5 avg. AWC ≥0.04 in/in	≥3.0 avg. AWC	≥2.0 avg. AWC	≥1.0 avg. AWC	Any
Slope (%): [10]								
Group A	<2	<5	<8	<15	<2	<25	<50	Any
Group B	<2	<8	<15	<25	<2	<50	<75	Any
Erosion hazard	None or slight	None through moderate	None through high	Any	None or slight	Any	Any	Any
Flooding	None or rare	None through occasional	None through occasional	None through frequent [11]	Any	Any	Any	Any
Salinity/EC x 10 at 25 degrees C (mmhos/cm) [12]	<4	<8	<16	<16	<8	Dryland, <16 Irrigated, any	Any	Any
Alkali ESP [12]	None	<25	<50	<50	<25	Dryland, <25 Irrigated, <50	Any	Any
Toxic substances [13]	None	None or slight	None through moderate	None through moderate	None or slight	Dryland, slight Irrigated, slight through moderate	Any	Any

Guide for Placing Soils in Capability Classes—Continued

Criteria	Capability class							
	I	II	III	IV	V	VI [1]	VII [2]	VIII
Frost-free season (32 degrees F)	≤140 days	≤100 days	≤80 days	≥50 days	Any	Any	Any	Any

[1] Range and woodland mechanical practices can be applied to class VI land.

[2] Range and woodland mechanical practices are impractical on class VII land.

[3] Claypans with permeability of less than 0.06 inch/hour will be treated as limiting the effective depth.

[4] Potential evapotranspiration for the frost-free season above 32 degrees F is a relative index for irrigated frost-sensitive crops. ETp 32 degrees F for Marysville, California, is 33 (Thornwaite).

[5] Actual evapotranspiration, 4-inch available water capacity, is a relative index for frost-tolerant dryland crops, such as small grain, and for pasture and range. 4ETa for Marysville, California, is 12 (Thornwaite).

[6] Coarse fragments interfere with tillage but do not prevent cropping.

[7] Permeability of the least permeable subsurface horizon.

[8] Depth to the water table during the growing season.

[9] Avaialble moisture between field capacity and wilting point.

[10] Group A includes soils with K factors of 0.37 or more and soils that are subject to rill and gully erosion, such as soils that formed in granitic material and soils that have a claypan. Other soils are in group B.

[11] Frequent flooding that does not prevent normal cropping.

[12] For salts and alkali to be a major limitation, there should be other soil limitations, such as slow permeability and a high water table.

[13] Such as boron and magnesium, which are leached with difficulty.

Appendix C.—Criteria Used in Rating Soils for Selected Uses

The following tables show the criteria used in rating soils for selected uses in tables 13, 14, 15, 16, and 17 in this survey. Soils are rated for the uses expected to be important or potentially important to users of soil survey information. Ratings for proposed uses are given in terms of limitations and restrictive features. Only the most restrictive features are listed in the tables. Therefore, if a soil is rated severe, only those soil features that cause the soil to be rated severe are given. There may be other limitations that should be overcome if the soil is to be used for a specific purpose.

The first column in the guides in this appendix shows the properties or features used as criteria for rating the soil for the use. The properties are listed in descending order of estimated importance. In the "Limits" column, limits of the properties are given for rating the soils and for recognizing a restrictive property or properties. In the "Restrictive feature" column, a key phrase indicates the feature causing the problem.

Camp Areas

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Flooding	None	---	Rare, common	Flooding.
3. Slope (percent)	<8	8-15	>15	Slope.
4. USDA texture modifier (surface layer)	---	STV, BYV, CB, FL	STX, BYX, CBX, FLX, CBV, FLV, CNX, CRX, SHX, SYX	Large stones.
5. Coarse fragments in the surface layer (percent) [1]	<25	25-50	>50	Small stones.
6. Depth to high water table (feet)	--- >2.5	--- 1.5-2.5	+ <1.5	Ponding. Wetness.
7. Permeability in the upper 40 inches (in/hr) [2]	>0.6	0.06-0.6	<0.06	Percs slowly.
8. USDA texture (surface layer) [2]	---	---	SC, SIC, C	Too clayey.
9. Unified (surface layer)	---	---	PT	Excess humus.
10. USDA texture (surface layer)	---	LCOS, VFS, [3] LFS, [3] LS	COS, S, FS	Too sandy.
11. Depth to bedrock (inches)	---	---	<20	Depth to rock.
12. Depth to cemented pan (inches)	---	---	<20	Cemented pan.
13. USDA texture (surface layer) [4]	---	SIL, SI, VFSL, L	---	Dusty.
14. Sodium adsorption ratio in the upper 40 or great group or phase	---	---	>12 (natric, halic, alkali phases)	Excess sodium.
15. Salinity in the surface layer (mmhos/cm)	<4	4-8	>8	Excess salt.
16. Soil reaction (pH in the surface layer)	---	---	<3.6	Too acid.
17. Other	---	---	(5)	Fragile.

[1] 100 minus percent passing No. 10 sieve.
[2] Rate soils in UST, TOR, ARID, BOR, or XER suborders, great groups, or subgroups one class better.
[3] Rate *slight* if finer textured material is within 20 inches of the surface.
[4] Disregard unless soil is in TOR, ARID, or XER suborders, great groups, or subgroups.
[5] If the soil is easily damaged by use or disturbance, rate *severe—fragile.*

Picnic Areas

Property	Limits: Slight	Limits: Moderate	Limits: Severe	Restrictive feature
1. USDA texture	---	---	Ice	Permafrost.
2. Slope (percent)	<8	8-15	>15	Slope.
3. Flooding	None, rare, occasional	Frequent	---	Flooding.
4. Depth to high water table (feet)	---	---	+	Ponding.
	>2.5	1.0-2.5	<1.0	Wetness.
5. USDA texture modifier (surface layer)	---	STV, BYV, CB, FL	STX, BYX, CBX, FLX, CBV, FLV, CNX, CRX, SHX, SYX	Large stones.
6. USDA texture (surface layer) [1]	---	---	SC, SIC, C	Too clayey.
7. USDA texture (surface layer)	---	LCOS, VFS,[2] LFS,[2] LS	COS, S, FS	Too sandy.
8. Unified (surface layer)	---	---	PT	Excess humus.
9. Coarse fragments in the surface layer (percent) [3]	<25	25-50	>50	Small stones.
10. Sodium adsorption ratio in the upper 40 or great group or phase	---	---	>12 (natric, halic, alkali phases)	Excess sodium.
11. Salinity in the surface layer (mmhos/cm)	<4	4-8	>8	Excess salt.
12. Soil reaction (pH) in the surface layer	---	---	<3.6	Too acid.
13. Permeability in the upper 40 inches (in/hr) [1]	>0.6	0.06-0.6	<0.06	Percs slowly.
14. USDA texture (surface layer) [4]	---	SIL, SI, VFSL, L	---	Dusty.
15. Depth to bedrock (inches)	---	---	<20	Depth to rock.
16. Depth to cemented pan (inches)	---	---	<20	Cemented pan.
17. Other	---	---	(5)	Fragile.

[1] Rate soils in UST, TOR, ARID, BOR, or XER suborders, great groups, or subgroups one class better.
[2] Rate *slight* if finer textured material is within 20 inches of the surface.
[3] 100 minus percent passing No. 10 sieve.
[4] Disregard unless soil in in TOR, ARID, or XER suborders, great groups, or subgroups.
[5] If the soil is easily damaged by use or disturbance, rate *severe—fragile*.

Playgrounds

Property	Limits: Slight	Limits: Moderate	Limits: Severe	Restrictive feature
1. USDA texture	---	---	Ice	Permafrost.
2. USDA texture modifier (surface layer)	---	ST	STV, STX, BYV, BYX, CB, CBV, FL, FLV, BY, CBX, CNX, CRX, FLX, SHX, SYX	Large stones.
3. Slope (percent)	<2	2-6	>6	Slope.
4. Coarse fragments in the surface layer (percent) [1]	<10	10-25	>25	Small stones.
5. USDA texture (surface layer) [2]	---	---	SC, SIC, C	Too clayey.
6. USDA texture (surface layer)	---	LCOS, VFS, [3] LFS, [3] LS	COS, S, FS	Too sandy.
7. Unified (surface layer)	---	---	PT	Excess humus.
8. Depth to high water table (feet)	--- >2.5	--- 1.5-2.5	+ <1.5	Ponding. Wetness.
9. Flooding	None, rare	Occasional	Frequent	Flooding.
10. Depth to bedrock (inches)	>40	[4] 20-40	<20	Depth to rock.
11. Depth to cemented pan (inches)	>40	[4] 20-40	<20	Cemented pan.
12. Permeability in the upper 40 inches (in/hr) [2]	>0.6	0.06-0.6	<0.06	Percs slowly.
13. USDA texture (surface layer) [5]	---	SIL, SI, VFSL, L	---	Dusty.
14. Sodium adsorption ratio in the upper 40 or great group or phase	---	---	>12 (natric, halic, alkali phases)	Excess sodium.
15. Salinity in the surface layer (mmhos/cm)	<4	4-8	>8	Excess salt.
16. Soil reaction (pH) in the surface layer	---	---	<3.6	Too acid.
17. Other	---	---	(6)	Fragile.

[1] 100 minus percent passing No. 10 sieve.
[2] Rate soils in UST, TOR, ARID, BOR, or XER suborders, great groups, or subgroups one class better.
[3] Rate *slight* if finer textured material is within 20 inches of the surface.
[4] Rate *slight* if slopes are 0 to 2 percent.
[5] Disregard unless soil is in TOR, ARID, or XER suborders, great groups, or subgroups.
[6] If the soil is easily damaged by use or disturbance, rate *severe—fragile*.

Paths and Trails

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Fraction greater than 3 inches in the surface layer (percent by weight)	<25	25-50	>50	Large stones.
3. Depth to high water table (feet)	---	---	+	Ponding.
	>2	1-2	<1	Wetness.
4. USDA texture (surface layer) [1]	---	---	SC, SIC, C	Too clayey.
5. USDA texture (surface layer)	---	LCOS, VFS, [2] LFS, [2] LS	COS, S, FS	Too sandy.
6. Unified (surface layer)	---	---	PT	Excess humus.
7. Slope (percent)	<15	15-25	>25	Slope.
8. Erosion factor K (surface layer)	---	---	[3] >.3	Erodes easily.
9. Coarse fragments in the surface layer (percent by weight) [4]	---	---	>65	Small stones.
10. Flooding	None, rare, occasional	Frequent	---	Flooding.
11. USDA texture (surface layer) [5]	---	SIL, SI, VFSL, L	---	Dusty.
12. Other	---	---	(6)	Fragile.

[1] Rate soils in UST, TOR, ARID, BOR, or XER suborders, great groups, or subgroups one class better.
[2] Rate *slight* if finer textured material is within 20 inches of the surface.
[3] Disregard if slopes are 8 percent or less.
[4] 100 minus percent passing No. 10 sieve.
[5] Disregard unless soil is in TOR, ARID, or XER suborders, great groups, or subgroups.
[6] If the soil is easily damaged by use or disturbance, rate *severe—fragile.*

Septic Tank Absorption Fields

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Total subsidence (inches)	---	---	>24	Subsides.
3. Flooding	None	Rare	Common	Flooding.
4. Depth to bedrock (inches)	>72	40-72	<40	Depth to rock.
5. Depth to cemented pan (inches)	>72	40-72	<40	Cemented pan.
6. Depth to high water table (feet)	---	---	+	Ponding.
	>6	4-6	<4	Wetness.
7. Permeability (in/hr):				
24 to 60 inches	2.0-6.0	[1] 0.6-2.0	<0.6	Percs slowly.
24 to 40 inches	---	---	>6.0	Poor filter.
8. Slope (percent)	<8	8-15	>15	Slope.
9. Fraction greater than 3 inches (percent by wieght) [2]	<25	25-50	>50	Large stones.
10. Downslope movement	---	---	(3)	Slippage.
11. Formation of pits	---	---	(4)	Pitting.

[1] Recheck to see if rating should be *slight*.

[2] Weighted average to 40 inches.

[3] If the soil is susceptible to movement downslope when loaded, excavated, or wet, rate *severe—slippage*.

[4] If the soil is susceptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate *severe—pitting*.

Sewage Lagoons

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Permeability between 12 and 60 inches (in/hr)	<0.6	0.6-2.0	>2.0	Seepage.
3. Depth to bedrock (inches)	>60	40-60	<40	Depth to rock.
4. Depth to cemented pan	>60	40-60	<40	Cemented pan.
5. Flooding	None, rare	---	Common [1]	Flooding.
6. Slope (percent)	<2	2-7	>7	Slope.
7. Unified (any depth)	---	OL, OH	PT	Excess humus.
8. Depth to high water table (feet)	---	---	+	Ponding.
	>5	[2] 3.5-5	[2] <3.5	Wetness.
9. Fraction greater than 3 inches (percent by weight) [3]	<20	20-35	>35	Large stones.
10. Downslope movement	---	---	(4)	Slippage.
11. Formation of pits	---	---	(5)	Pitting.
12. Differential settling	---	---	(6)	Unstable fill.

[1] If floodwater will not enter or damage the sewage lagoon because of low velocity and a water depth of less than 5 feet, disregard flooding.
[2] If the floor of the sewage lagoon has a layer at least 20 inches thick with permeability of less than 0.2 in/hr, disregard wetness.
[3] Weighted average to 20 inches.
[4] If the soil is susceptible to movement downslope when loaded, excavated, or wet, rate *severe—slippage*.
[5] If the soil is susceptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate *severe—pitting*.
[6] If the soil is susceptible to differential settling, rate *severe—unstable fill.*

Sanitary Landfill (Trench)

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Flooding	None	Rare	Common	Flooding.
3. Depth to bedrock (inches)	---	---	<72	Depth to rock.
4. Depth to cemented pan (inches):				
Thick	---	---	<72	Cemented pan.
Thin	---	<72	---	Cemented pan.
5. Permeability of bottom layer (in/hr) [1]	---	---	>2.0	Seepage.
6. Depth to high water table (feet)	---	---	+	Ponding.
Apparent	---	---	<6	Wetness.
Perched	>4	2-4	<2	Wetness.
7. Slope (percent)	<8	8-15	>15	Slope.
8. USDA texture [1 2 3]	---	CL, SC, SICL	SIC, C	Too clayey.
9. USDA texture [3]	---	LCOS, LS, LFS, LVFS	COS, S, FS, VFS, SG	Too sandy.
10. Unified [3]	---	---	OL, OH, PT	Excess humus.
11. Fraction greater than 3 inches (percent by weight) [4]	<20	20-35	>35	Large stones.
12. Sodium adsorption ratio in the upper 40 inches or great group or phase [1]	---	---	>12 (natric, halic, alkali phases)	Excess sodium.
13. Soil reaction (pH) at any depth	---	---	<3.6	Too acid.
14. Salinity at any depth (mmhos/cm)	---	---	>16	Excess salt.
15. Downslope movement	---	---	(5)	Slippage.
16. Differential settling	---	---	(6)	Unstable fill.

[1] Disregard in all Arisisols except Salorthids and Aquic subgroups, in all Aridic subgroups, and in all Torri great groups of Entosils except Aquic subgroups.
[2] Rate one class better if the soil is in kaolinitic family and experience confirms.
[3] Thickest layer between 10 and 60 inches.
[4] Weighted average to 60 inches.
[5] If the soil is susceptible to movement downslope when loaded, excavated, or wet, rate *severe—slippage*.
[6] If the soil is susceptible to differential settling, rate *severe—unstable fill*.

Sanitary Landfill (Area)

Property	Limits: Slight	Limits: Moderate	Limits: Severe	Restrictive feature
1. USDA texture	---	---	Ice	Permafrost.
2. Flooding	None	Rare	Common	Flooding.
3. Depth to bedrock (inches) [1]	>60	40-60	<40	Depth to rock.
4. Depth to cemented pan (inches) [1]	>60	40-60	<40	Cemented pan.
5. Permeability between 20 and 40 inches (in/hr) [1]	---	---	>2.0	Seepage.
6. Depth to high water table (feet)	---	---	+	Ponding.
Apparent	>5	3.5-5	<3.5	Wetness.
Perched	>3	1.5-3	<1.5	Wetness.
7. Slope (percent)	<8	8-15	>15	Slope.
8. Downslope movement	---	---	(2)	Slippage.
9. Formation of pits	---	---	(3)	Pitting.
10. Differential settling	---	---	(4)	Unstable fill.

[1] Disregard in all Aridisols except Salorthids and Aquic subgroups, in all Aridic subgroups, and in all Torri great groups of Entisols except Aquic subgroups.
[2] If the soil is susceptible to movement downslope when loaded, excavated, or wet, rate *severe—slippage*.
[3] If the soil is susceptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate *severe—pitting*.
[4] If the soil is susceptible to differential settling, rate *severe—unstable fill*.

Daily Cover for Landfill

Property	Limits			Restrictive feature
	Good	Fair	Poor	
1. USDA texture	---	---	Ice	Permafrost.
2. Depth to bedrock (inches)	>60	40-60	<40	Depth to rock.
3. Depth to cemented pan (inches)	>60	40-60	<40	Cemented pan.
4. Unified [1]	---	---	SP, SW, SP-SM, SW-SM, GP, GW, GP-GM, GW-GM	Seepage.
5. USDA texture [1] [2] [3]	---	CL, SICL, SC	SIC, C	Too clayey.
6. USDA texture [1]	---	LCOS, LS, LFS, VFS	S, FS, COS, SG	Too sandy.
7. Unified [1] [3]	---	---	OL, OH, CH, MH	Hard to pack.
8. Coarse fragments (percent) [1] [4]	<25	25-50	>50	Small stones.
9. Fraction greater than 3 inches (percent by weight) [1] [4]	<25	25-50	>50	Large stones.
10. Slope (percent)	<8	8-15	>15	Slope.
11. Depth to high water table (feet)	--- >3.5	--- 1.5-3.5	+ <1.5	Ponding. Wetness.
12. Unified [1]	---	---	PT	Excess humus.
13. Layer thickness (inches)	>60	40-60	<40	Thin layer.
14. Soil reaction (pH) [1]	---	---	<3.6	Too acid.
15. Salinity in the upper 60 inches (mmhos/cm) [2]	---	---	>16	Excess salt.
16. Sodium adsorption ratio or great group or phase [1] [2]	---	---	>12 (halic, natric, alkali phases)	Excess sodium.
17. Carbonates	---	---	[5]	Excess lime.

[1] Thickest layer between 10 and 60 inches.
[2] Disregard in all Aridisols except Salorthids and Aquic subgroups, in all Aridic subgroups, and in all Torri great groups of Entisols except Aquic subgroups.
[3] Rate one class better if the soil is in kaolinitic family and experience confirms.
[4] 100 minus percent passing No. 10 sieve, plus fraction greater than 3 inches. Use dominant condition or restrictive feature.
[5] If the amount of carbonate is so high that plant growth is restricted, rate *poor—excess lime.*

Shallow Excavations

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Depth to bedrock (inches):				
Hard	>60	40-60	<40	Depth to rock.
Soft	>40	20-40	<20	Depth to rock.
3. Depth to cemented pan (inches):				
Thick	>60	40-60	<40	Cemented pan.
Thin	>40	20-40	<20	Cemented pan.
4. USDA texture (20 to 60 inches)	---	[1] SI	COS, S, FS, VFS, LCOS, LS, LFS, LVFS, G, SG	Cutbanks cave.
5. USDA texture (20 to 60 inches)	---	C, SIC	---	Too clayey.
6. Soil order	---	---	Vertisols	Cutbanks cave.
7. Bulk density between depths of 20 and 60 inches (g/cc)	---	>1.8	---	Dense layer.
8. Unified (20 to 60 inches)	---	---	OL, OH, PT	Excess humus.
9. Fraction greater than 3 inches (percent by weight) [2]	<25	25-50	>50	Large stones.
10. Depth to high water table (feet)	---	---	+	Ponding.
	>6	2.5-6	<2.5	Wetness.
11. Flooding	None, rare	Common	---	Flooding.
12. Slope (percent)	<8	8-15	>15	Slope.
13. Downslope movement	---	---	(3)	Slippage.

[1] In areas of loess, rating should be *slight*.

[2] Weighted average to 40 inches.

[3] If the soil is susceptible to movement downslope when loaded, excavated, or wet, rate *severe—slippage*.

Dwellings Without Basements

Property	Limits: Slight	Limits: Moderate	Limits: Severe	Restrictive feature
1. USDA texture	---	---	Ice	Permafrost.
2. Total subsidence (inches)	---	---	>12	Subsides.
3. Flooding	None	---	Rare, common	Flooding.
4. Depth to high water table (feet)	---	---	+	Ponding.
	>2.5	1.5-2.5	<1.5	Wetness.
5. Shrink-swell potential [1]	Low	Moderate	High, very high	Shrink-swell.
6. Unified [1]	---	---	OL, OH, PT	Low strength.
7. Slope (percent)	<8	8-15	>15	Slope.
8. Depth to bedrock (inches):				
Hard	>40	20-40	<20	Depth to rock.
Soft	>20	<20	---	Depth to rock.
9. Depth to cemented pan (inches):				
Thick	>40	20-40	<20	Cemented pan.
Thin	>20	<20	---	Cemented pan.
10. Fraction greater than 3 inches (percent by weight) [2]	<25	25-50	>50	Large stones.
11. Downslope movement	---	---	(3)	Slippage.
12. Formation of pits	---	---	(4)	Pitting.
13. Differential settling	---	---	(5)	Unstable fill.

[1] Thickest layer between 10 and 40 inches.

[2] Weighted average to 40 inches.

[3] If the soil is suscsptible to movement downslope when loaded, excavated, or wet, rate *severe—slippage*.

[4] If the soil is suscsptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate *severe—pitting*.

[5] If the soil is suscsptible to differential settling, rate *severe—unstable fill*.

Dwellings With Basements

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Total subsidence (inches)	---	---	>12	Subsides.
3. Flooding	None	---	Rare, common	Flooding.
4. Depth to high water table (feet)	--- >6	--- 2.5-6	+ <2.5	Ponding. Wetness.
5. Depth to bedrock (inches):				
Hard	>60	40-60	<40	Depth to rock.
Soft	>40	20-40	<20	Depth to rock.
6. Depth to cemented pan (inches):				
Thick	>60	40-60	<40	Cemented pan.
Thin	>40	20-40	<20	Cemented pan.
7. Slope (percent)	<8	8-15	>15	Slope.
8. Shrink-swell potential [1]	Low	Moderate	High, very high	Shrink-swell.
9. Unified (bottom layer)	---	---	OL, OH, PT	Low strength.
10. Fraction greater than 3 inches (percent by weight) [2]	<25	25-50	>50	Large stones.
11. Downslope movement	---	---	(3)	Slippage.
12. Formation of pits	---	---	(4)	Pitting.
13. Differential settling	---	---	(5)	Unstable fill.

[1] Thickest layer between 10 and 60 inches.
[2] Weighted average to 40 inches.
[3] If the soil is suscsptible to movement downslope when loaded, excavated, or wet, rate *severe—slippage.*
[4] If the soil is suscsptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate *severe—pitting.*
[5] If the soil is suscsptible to differential settling, rate *severe—unstable fill.*

Small Commercial Buildings

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Total subsidence (inches)	---	---	>12	Subsides.
3. Flooding	None	---	Rare, common	Flooding.
4. Depth to high water table (feet)	--- >2.5	--- 1.5-2.5	+ <1.5	Ponding. Wetness.
5. Shrink-swell potential [1]	Low	Moderate	High, very high	Shrink-swell.
6. Slope (percent)	<4	4-8	>8	Slope.
7. Unified [1]	---	---	OL, OH, PT	Low strength.
8. Depth to bedrock (inches):				
Hard	>40	20-40	<20	Depth to rock.
Soft	>20	<20	---	Depth to rock.
9. Depth to cemented pan (inches):				
Thick	>40	20-40	<20	Cemented pan.
Thin	>20	<20	---	Cemented pan.
10. Fraction greater than 3 inches (percent by weight) [2]	<25	25-50	>50	Large stones.
11. Downslope movement	---	---	(3)	Slippage.
12. Formation of pits	---	---	(4)	Pitting.
13. Differential settling	---	---	(5)	Unstable fill.

[1] Thickest layer between 10 and 40 inches.

[2] Weighted average to 40 inches.

[3] If the soil is suscsptible to movement downslope when loaded, excavated, or wet, rate *severe—slippage*.

[4] If the soil is suscsptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate *severe—pitting*.

[5] If the soil is suscsptible to differential settling, rate *severe—unstable fill*.

Local Roads and Streets

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Total subsidence (inches)	---	---	>12	Subsides.
3. Depth to bedrock (inches):				
Hard	>40	20-40	<20	Depth to rock.
Soft	>20	<20	---	Depth to rock.
4. Depth to cemented pan (inches):				
Thick	>40	20-40	<20	Cemented pan.
Thin	>20	<20	---	Cemented pan.
5. Shrink-swell potential [1]	Low	Moderate	High, very high	Shrink-swell.
6. AASHTO group index number [1 2 3]	<5	5-8	>8	Low strength.
7. Depth to high water table (feet)	---	---	+	Ponding.
	>2.5	1.0-2.5	<1.0	Wetness.
8. Slope (percent)	<8	8-15	>15	Slope.
9. Flooding	None	Rare	Common	Flooding.
10. Potential for frost action	Low	Moderate	High	Frost action.
11. Fraction greater than 3 inches (percent by weight) [4]	<25	25-50	>50	Large stones.
12. Downslope movement	---	---	(5)	Slippage.
13. Formation of pits	---	---	(6)	Pitting.
14. Differential settling	---	---	(7)	Unstable fill.

[1] Thickest layer between 10 and 40 inches.

[2] GIN = (F-35)[.2 + .005(LL-40)] + .01 (F-15)(PI-10) where F = percent passing No. 200 sieve. If F is $\leq$35 and PI is $\geq$ 11, use only part 2 of equation. Use median values.

[3] Rate one slass better if the soil is in kaolinitic family and experience confirms.

[4] Weighted average to 40 inches.

[5] If the soil is suscsptible to movement downslope when loaded, excavated, or wet, rate *severe—slippage*.

[6] If the soil is suscsptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate *severe—pitting*.

[7] If the soil is suscsptible to differential settling, rate *severe—unstable fill*.

Lawns, Landscaping, and Golf Fairways

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Salinity in the surface layer (mmhos/cm)	<4	4-8	>8	Excess salt.
3. Sodium adsorption ratio in the upper 40 inches or great group or phase	---	---	>12 (halic, natric, alkali phases)	Excess sodium.
4. Soil reaction (pH) in the surface layer		---	---	>3.6 Too acid.
5. Sulfidic materials (great group)	---	---	Sulfaquents, Sulfihemists	Excess sulfur.
6. Coarse fragments in the surface layer (percent by weight) [1]	<25	25-50	>50	Small stones.
7. Fraction greater than 3 inches in the surface layer (percent by weight)	<5	5-30	>30	Large stones.
8. Depth to high water table (feet)	--- >2	--- 1-2	+ <1	Ponding. Wetness.
9. Available water capacity (in/in) [2]	>.10	.05-.10	<.05	Droughty.
10. Flooding	None, rare	Occasional	Frequent	Flooding.
11. Slope (percent)	<8	8-15	>15	Slope.
12. Depth to bedrock (inches)	>40	20-40	<20	Depth to rock.
13. Depth to cemented pan (inches)	>40	20-40	<20	Cemented pan.
14. USDA texture (surface layer) [3]	---	---	SIC, C, SC	Too clayey.
15. USDA texture (surface layer)	---	---	FB, HM, MUCK, SP, MPT, PEAT	Excess humus.
16. USDA texture (surface layer)	---	LCOS, S	COS	Too sandy.
17. Carbonates	---	---	(4)	Excess lime.

[1] 100 minus percent passing No. 10 sieve.
[2] Weighted average to 40 inches.
[3] Rate one class better if the soil is in kaolinitic family and experience cofirms.
[4] If the amount of carbonate is so high that plant growth is restricted, rate *severe—excess lime.*

Roadfill

Property	Limits			Restrictive feature
	Good	Fair	Poor	
1. USDA texture	---	---	Ice	Permafrost.
2. Depth to bedrock (inches)	>60	40-60	<40	Depth to rock.
3. Depth to thick cemented pan (inches)	>60	40-60	<40	Cemented pan.
4. Shrink-swell potential [1]	Low	Moderate	High, very high	Shrink-swell.
5. AASHTO group index number [1] [2] [3]	<5	5-8	>8	Low strength.
6. Layer thickness (inches)	>60	30-60	<30	Thin layer.
7. Fraction greater than 3 inches (percent by weight) [4]	<25	25-50	>50	Large stones.
8. Depth to high water table (feet)	>3	1-3	<1	Wetness.
9. Slope (percent)	<15	15-25	>25	Slope.
10. Content of gypsum (percent)	---	10-15	>15	Excess gypsum.

[1] Evaluate the thickest layer between 10 and 60 inches and also the bottom layer. Choose the best rating. When rating is based on the bottom layer, verify thickness.

[2] GIN = (F-35)[.2 + .005(LL-40)] + .01 (F-15)(PI-10) where F = percent passing No. 200 sieve. If F is $\leq$35 and PI is $\geq$ 11, use only part 2 of equation. Use median values.

[3] Rate one class better if the soil is in kaolinitic family and experience confirms.

[4] Weighted average to 40 inches.

Sand

Property	Limits		Restrictive feature
	Probable source	Improbable source	
1. USDA texture	---	Ice	Permafrost.
2. Unified [1]	SW, SP, SW-SM, SP-SM	---	---
	[2] GW, [2] GP, [2] GW-GM, [2] GP-GM	---	---
	---	[3] GW, [3] GP, [3] GW-GM, [3] GP-GM	Small stones.
	---	PT	Excess humus.
	---	All other	Excess fines.
3. Layer thickness (inches)	>36	<36	Thin layer.
4. Fraction greater than 3 inches (percent by weight) [4]	<50	>50	Large stones.

[1] Evaluate the thickest layer between 10 and 60 inches and also the bottom layer. Choose the best rating. When rating is based on the bottom layer, verify thickness.

[2] Percent passing No. 4 sieve minus percent passing No. 200 sieve is greater than 25.

[3] Percent passing No. 4 sieve minus percent passing No. 200 sieve is less than 25.

[4] Thickest layer between 10 and 60 inches.

Gravel

Property	Limits		Restrictive feature
	Probable source	Improbable source	
1. USDA texture	---	Ice	Permafrost.
2. Unified [1]	GW, GP, GW-GM, GP-GM	---	---
	[2] SW, [2] SP, [2] SW-SM, [2] SP-SM	[3] SW, [3] SP, [3] SW-SM, [3] SP-SM	Too sandy.
	---	PT	Excess humus.
	---	All other	Excess fines.
3. Layer thickness (inches)	>36	<36	Thin layer.
4. Fraction greater than 3 inches (percent by weight) [4]	<50	>50	Large stones.

[1] Evaluate the thickest layer between 10 and 60 inches and also the bottom layer. Choose the best rating. When rating is based on the bottom layer, verify thickness.

[2] 100 minus percent passing No. 4 sieve is greater than 25.

[3] 100 minus percent passing No. 4 sieve is less than 25.

[4] Thickest layer between 10 and 60 inches.

Topsoil

Property	Limits			Restrictive feature
	Good	Fair	Poor	
1. USDA texture	---	---	Ice	Permafrost.
2. Depth to bedrock (inches)	>40	20-40	<20	Depth to rock.
3. Depth to cemented pan (inches)	>40	20-40	<20	Cemented pan.
4. Depth to bulk density greater than 1.8 g/cc (inches)	>40	20-40	<20	Area reclaim.
5. USDA texture [1]	---	LCOS, LS, LFS, LVFS	COS, S, FS, VFS	Too sandy.
6. USDA texture [1]	---	[2] SCL, [2] CL, [2] SICL	SIC, C, SC	Too clayey
7. USDA texture [1]	---	---	FB, HM, SP, MPT, MUCK, PEAT, CE	Excess humus.
8. Fraction greater than 3 inches (percent by weight): [3]				
0 to 40 inches	<5	5-25	>25	Large stones.
40 to 60 inches	<15	15-30	>30	Area reclaim.
9. Coarse fragments (percent): [3]				
0 to 40 inches	<5	5-25	>25	Small stones.
40 to 60 inches	<25	25-50	>50	Area reclaim.
10. Salinity (mmhos/cm) [1]	<4	4-8	>8	Excess salt.
11. Layer thickness (inches)	>40	20-40	<20	Thin layer.
12. Depth to high water table (feet)	---	---	<1	Wetness.
13. Sodium adsorption ratio in the upper 40 inches or great group or phase	---	---	>12 (halic, natric, alkali phases)	Excess sodium.
14. Soil reaction (pH) [1]	---	---	<3.6	Too acid.
15. Slope (percent)	<8	8-15	>15	Slope.
16. Carbonates	---	---	(4)	Excess lime.

[1] Thickest layer between 0 and 40 inches.
[2] If the soil has more than 3 percent organic matter and less than 35 percent clay, rate *good.*
[3] 100 minus percent passing No. 10 sieve, plus fraction greater than 3 inches. Use dominant condition or restrictive feature.
[4] If the amount of carbonate is so high that plant growth is restricted, rate *poor—excess lime.*

Pond Reservoir Areas

Property	Limits			Restrictive feature
	Slight	Moderate	Severe	
1. USDA texture	---	---	Ice	Permafrost.
2. Permeability between 20 and 60 inches (in/hr)	<0.6	0.6-2.0	>2.0	Seepage.
3. Depth to bedrock (inches)	>60	20-60	<20	Depth to rock.
4. Depth to cemented pan (inches)	>60	20-60	<20	Cemented pan.
5. Slope (percent)	<3	3-8	>8	Slope.
6. USDA texture (all depths)	---	---	MARL, GYP	Seepage.
7. Downslope movement	---	---	(1)	Slippage.
8. Formation of pits	---	---	(2)	Pitting.

[1] If the soil is susceptible to movement downslope when loaded, excavated, or wet, rate *severe—slippage*.

[2] If the soil is susceptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, rate *severe—pitting*.

Embankments, Dikes, and Levees

Property	Limits: Slight	Limits: Moderate	Limits: Severe	Restrictive feature
1. USDA texture	---	---	Ice	Permafrost.
2. Layer thickness (inches)	>60	30-60	>30	Thin layer.
3. Unified [1]	---	---	GW, GP, SW, SP, GW-GM, GP-GM, SW-SM, SP-SM, [2] SM, [2] GM	Seepage.
4. Unified [1]	---	[3] GM, [4] CL	[5] ML, [6] SM, [6] SP, CL-ML	Piping.
5. Unified [1]	---	---	PT, OL, OH	Excess humus.
6. Unified [1]	---	---	MH, [7] CH	Hard to pack.
7. Fraction greater than 3 inches (percent by weight) [8]	<15	15-35	>35	Large stones.
8. Depth to high water table (feet)	---	---	+	Ponding.
Apparent	>4	2-4	<2	Wetness.
Perched	>3	1-3	<1	Wetness.
9. Sodium adsorption ratio in the upper 40 or great group or phase	---	---	>12 (natric, halic, alkali phases)	Excess sodium.
10. Salinity at any depth (mmhos/cm)	<8	8-16	>16	Excess salt.
11. Content of gypsum (percent)	---	5-10	>10	Excess gypsum.

[1] Thickest layer between 10 and 60 inches.

[2] Rate *moderate* if more than 20 percent passing No. 200 sieve and *slight* if more than 30 percent passing No. 200 sieve.

[3] Rate *slight* if less than 35 percent passing No. 200 sieve, less than 50 percent passing No. 40 sieve, and less than 65 percent passing No. 10 sieve. The soil must meet all three criteria before it is rated *slight*.

[4] Rate *slight* if PI is greater than 15.

[5] Rate *moderate* if PI is greater than 10.

[6] Rate *moderate* if less than 70 percent passing No. 40 sieve and less than 90 percent passing No. 10 sieve, and rate *slight* if less than 60 percent passing No. 40 sieve and less than 75 percent passing No. 10 sieve.

[7] Rate *moderate* if PI is less than 40.

[8] Weighted average to 40 inches.

Drainage

Property	Limits	Restrictive feature [1]
1. USDA texture	Ice	Permafrost.
2. Depth to high water table (feet) [2]	[3] >3	Deep to water.
	+	Ponding.
3. Permeability in the upper 40 inches (in/hr)	<0.2	Percs slowly.
4. Depth to bedrock (inches)	<40	Depth to rock.
5. Depth to cemented pan (inches)	<40	Cemented pan.
6. Flooding	Common	Flooding.
7. Total subsidence	Any entry	Subsides.
8. Fraction greater than 3 inches (percent by weight) [4]	>25	Large stones.
9. Potential for frost action	High	Frost action.
10. Slope (percent)	>3	Slope.
11. USDA texture [4]	COS, S, FS, VFS, LCOS, LS, LFS, LVFS, SG, G	Cutbanks cave.
12. Salinity at any depth (mmhos/cm)	>8	Excess salt.
13. Sodium adsorption ratio in the upper 40 inches or great group or phase	>12 (natric, halic, alkali phases)	Excess sodium.
14. Sulfidic materials (great group)	Sulfaquents, Sulfihemists	Excess sulfur.
15. Soil reaction (pH) at any depth	<3.6	Too acid.
16. Downslope movement	(5)	Slippage.
17. Complex landscape	(6)	Complex slope.
18. Availability of outlets	(7)	Poor outlets.

[1] If the soil has no restrictive features, the rating is *favorable*.
[2] If the soil is deep to water, disregard other properties.
[3] For irrigated areas, consider other restrictive features if the water table is between 3 and 5 feet.
[4] Thickest layer between 10 and 60 inches.
[5] If the soil is susceptible to movement downslope when loaded, excavated, or wet, list *slippage* as a restrictive feature.
[6] If complex or irregular slopes cause difficulty in design, installation, or functioning of the system, list *complex slope* as a restrictive feature.
[7] If good outlets are difficult to find, list *poor outlets* as a restrictive feature.

Irrigation

Property	Limits	Restrictive feature [1]
1. USDA texture	Ice	Permafrost.
2. Slope (percent)	>3	Slope.
3. Fraction greater than 3 inches (percent by weight) [2]	>25	Large stones.
4. Depth to high water table (feet)	+ [3] <3	Ponding. Wetness.
5. Available water capacity (in/in) [2]	<0.10	Droughty.
6. USDA texture (surface layer)	COS, S, FS, VFS, LCOS, LS, LFS, LVFS	Fast intake.
7. USDA texture (surface layer)	SIC, C, SC	Slow intake.
8. Wind erodibility group	1, 2, 3	Soil blowing.
9. Permeability in the upper 60 inches (in/hr)	<0.2	Percs slowly.
10. Depth to bedrock (inches)	<40	Depth to rock.
11. Depth to cemented pan (inches)	<40	Cemented pan.
12. Fragipan (great group)	All Fragi	Rooting depth.
13. Bulk density in the upper 40 inches (g/cc)	>1.7	Rooting depth.
14. Erosion factoe K (surface layer)	>.35	Erodes easily.
15. Flooding	Common	Flooding.
16. Sodium adsorption ratio in the upper 40 inches or great group or phase	>12 (natric, halic, alkali phases)	Excess sodium.
17. Salinity in the upper 40 inches (mmhos/cm)	>4	Excess salt.
18. Soil reaction (pH) at any depth	<3.6	Too acid.
19. Complex landscape	(4)	Complex slope.
20. Formation of pits	(5)	Pitting.
21. Carbonates	(6)	Excess lime.

[1] If the soil has no restrictive features, the rating is *favorable*.
[2] Weighted average to 40 inches.
[3] If depth to the water table is more than 3 feet during the growing season, disregard wetness.
[4] If complex or irregular slopes cause difficulty in design, installation, or functioning of the system, list *complex slope* as a restrictive feature.
[5] If the soil is susceptible to the formation of pits caused by the melting of ground ice when the ground cover is removed, list *pitting* as a restrictive feature.
[6] If the amount of carbonate is so high that plant growth is restricted, list *excess lime* as a restrictive feature.

Terraces and Diversions

Property	Limits	Restrictive feature [1]
1. USDA texture	Ice	Permafrost.
2. Slope (percent)	>8	Slope.
3. Fraction greater than 3 inches (percent by weight) [2]	>25	Large stones.
4. Depth to bedrock (inches)	<40	Depth to rock.
5. Depth to cemented pan (inches)	<40	Cemented pan.
6. Erosion factor K in the upper 40 inches	>.35	Erodes easily.
7. Depth to high water table (feet)	+ <3	Ponding. Wetness.
8. Fragipan (great group)	All Fragi	Rooting depth.
9. USDA texture [3]	COS, S, FS, LS, LCOS, SG	Too sandy.
10. Wind erodibility group	1, 2, 3	Soil blowing.
11. Permeability (in/hr) [3]	<0.2	Percs slowly.
12. Downslope movement	(4)	Slippage.
13. Complex landscape	(5)	Complex slope.
14. Availability of outlets	(6)	Poor outlets.
15. Content of gypsum (percent)	>5	Excess gypsum.

[1] If the soil has no restrictive features, the rating is *favorable*.
[2] Weighted average to 40 inches.
[3] Thickest layer between 10 and 60 inches.
[4] If the soil is susceptible to movement downslope when loaded, excavated, or wet, list *slippage* as a restrictive feature.
[5] If complex or irregular slopes cause difficulty in design, installation, or functioning of the system, list *complex slope* as a restrictive feature.
[6] If good outlets are difficult to find, list *poor outlets* as a restrictive feature.

Grassed Waterways

Property	Limits	Restrictive feature [1]
1. USDA texture	Ice	Permafrost.
2. Moisture regime	Aridic, Torric	Too arid.
3. Fraction greater than 3 inches (percent by weight) [2]	>15	Large stones.
4. Depth to high water table (feet)	<1.5	Wetness.
5. Slope (percent)	>8	Slope.
6. Salinity in the surface layer (mmhos/cm)	>4	Excess salt.
7. Sodium adsorption ratio in the upper 40 inches or great group or phase	>12 (natric, halic, alkali phases)	Excess sodium.
8. Erosion factor K in the upper 40 inches	>.35	Erodes easily.
9. Available water capacity (in/in) [2]	<0.10	Droughty.
10. Depth to bedrock (inches)	<40	Depth to rock.
11. Depth to cemented pan (inches)	<40	Cemented pan.
12. Fragipan (great group)	All Fragi	Rooting depth.
13. Bulk density in the upper 40 inches (g/cc)	>1.7	Rooting depth.
14. Permeability in the upper 40 inches (in/hr)	<0.2	Percs slowly.

[1] If the soil has no restrictive features, the rating is *favorable*.

[2] Weighted average to 40 inches.

Appendix D.—Criteria Used in Rating Soils for Woodland Management

Criteria for Rating Erosion Hazard on Disturbed Forest Land [1]

Slope (percent)	K value			
	<.16	.16-.25	.25-.40	[2] >.40
0 to 9	Slight	Slight	Slight	Slight
9 to 15	Slight	Slight	Slight	Moderate
15 to 30	Slight	Slight	Moderate	Severe
30 to 50	Slight	Moderate	Severe	Severe
50 to 75	Moderate	Severe	Severe	Severe
75+	Severe	Severe	Severe	Severe

[1] Rating only for sheet and rill erosion. Mass movement is a function of slope, geology, mineralogy, depth and type of restrictive layer, and amount and type of disturbance. If the soil or unit has an obvious tendency to slump, this should be mentioned separately in the description. The rating could be described in the following manner: "The hazard of sheet and rill erosion is (slight, moderate, severe) under common management practices." The rating may be adjusted up or down, depending on whether a USLE "C" factor = 0.08 is considered too low or too high for tractor logging. For each increase or decrease of 0.05 in the "C" factor due to harvest methods and/or field observations, raise or lower the rating one slope group.

[2] Includes coarse textured soils over decomposed granite.

Criteria for Rating Equipment Limitations [1]

Rating	Percent slope	Drainage class (wetness)	Stoniness class (surface)	Rockiness class (surface)	Texture
Slight	0 to 30	Excessive, somewhat excessive, well	None (0 to 3 percent)	None (0 to 2 percent)	Coarse textured soils—sands, loamy sands, sandy loams
			Stony (3 to 15 percent)	Rocky (2 to 10 percent)	Medium textured soils—very fine sandy loams, loam, silt loam, silt
Moderate	30 to 50 [2]	Moderately well, somewhat poor	Very stony (15 to 50 percent)	Very rocky (10 to 25 percent)	Moderately fine textured soils—clay loam, sandy clay loam, silty clay loam
Severe	50+	Poor, very poor	Extremely stony (50 to 90 percent) Rubble land (90+ percent)	Extremely rocky (25 to 50 percent) Rock outrop (50 to 90 percent) Rubble land (90 + percent)	Fine textured soils—sandy clay loam, silty clay, clay

[1] Use the most limiting factor when ratings are made. Ratings are made for the principal timber-harvesting equipment, including logging trucks, bulldozers, and rubber-tired skidders. When the rating is severe, other timber-harvesting methods, including cable yarding systems and helicopters, should be given serious consideration or the logging should be postponed. The major factors influencing the ratings are slope, drainage, stoniness, rockiness, and content of clay. A combination of any two moderate ratings could classify as a severe overall rating.

Stone content (surface layer)

NSH	Class	Percent	Cropland	Range	Woodland
1	0	0 to .01	None	None	None
2	1	.01 to 0.1	Stony	None	None
3	2	0.1 to 3	Stony	None	None
4	3	3 to 15	Very stony	Stony	Stony
5	4	15 to 50	Extremely stony	Very stony	Very stony
6	5	50 to 90	Extremely stony	Extremely stony	Extremely stony
7	6	>90 (Rubble land)			

[2] Rate severe if a pickup is used in harvesting firewood.

Key for Rating Soils for Reforestation (Seedling Mortality)

This key was used to rate the soils of the survey area for seedling mortality. The adjectives used in the ratings are:

a) Slight
b) Moderate
c) Severe

The general meanings are as defined in the SCS Woodland Manual Sec. 537.11-2. The species rated in this key are redwood, Douglas-fir, ponderosa pine, and white fir. Other species can be added. Chemical toxicities, imbalances, pH problems, and other problems, such as serpentine, are not included. Any rating may be raised one ot two classes for these problems, depending on their severity. Observations in a soil survey area may be used to modify the rating. Following is a flowchart that may be helpful in fitting other species or critical soil properties into the key.

1. Soil drainage class (if the soil is subject to flooding, use b):
   a) Very poor .... severe
   b) Poor or somewhat poor 2
   c) Moderately well or better 3

2. Species being rated:
   a) Douglas-fir, ponderosa pine, or true fir .... severe
   b) Redwood 3

3. Depth to water table, claypan, or other restrictive layer:
   a) Less than 12 inches .... severe
   b) More than 12 inches 4

4. Species being rated:
   a) Redwood 5
   b) Douglas-fir 13
   c) Ponderosa pine 18
   d) White fir 19

5. Moisture-temperature regime:
   a) Aquic .... severe
   b) Udic 6
   c) Ustic-isomesic 9
   d) Other than a, b, or c .... severe

6. Surface gravel:
   a) Very gravelly (more than 35 percent) 7
   b) Not very gravelly (0 to 35 percent) .... slight

7. Are surface coarse fragments sufficient to hinder reforestation (more than about 75 percent coarse fragments)?
   a) Yes .... severe
   b) No 8

8. Steepness of slope:
   a) Less than 75 percent .... slight
   b) More than 75 percent .... moderate

9. AWC of top 24 inches of profile:
   a) More than 3.5 inches 6
   b) 2.5 to 3.5 inches 10
   c) Less than 2.5 inches .... severe

10. Surface gravel:
    a) Very gravelly (more than 35 percent) 11
    b) Not very gravelly (0 to 35 percent) .... moderate

11. Are surface coarse fragments sufficient to hinder reforestation (more than about 75 percent coarse fragments)?
    a) Yes .... severe
    b) No 12

Key for Rating Soils for Reforestation (Seedling Mortality)—Continued

12. Steepness of slope:
    - a) Less than 75 percent .... moderate
    - b) More than 75 percent .... severe

13. Moisture-temperature regime:
    - a) Xeric-mesic 17
    - b) Ustic 14
    - c) Udic 6
    - d) Other than a, b, or c .... severe

14. Aspect (if direction of slope is not important, use a):
    - a) North or east—azimuth 270-135 degrees 15
    - b) South—azimuth 135-270 degrees 16

15. AWC of top 24 inches of profile:
    - a) More than 2.5 inches 6
    - b) 1.5 to 2.5 inches 10
    - c) Less than 1.5 inches .... severe

16. AWC of top 24 inches of profile:
    - a) More than 3.0 inches 6
    - b) 2.0 to 3.0 inches 10
    - c) Less than 2.0 inches .... severe

17. Aspect (if direction of slope is not important, use a):
    - a) North or east—azimuth 270-135 degrees 16
    - b) South—azimuth 135-270 degrees 9

18. Moisture-temperature regime:
    - a) Xeric-mesic 14
    - b) Xeric-frigid 20

19. Annual precipitation:
    - a) Less than 20 inches .... severe
    - b) More than 20 inches 18b

20. Aspect (if direction of slope is not important, use b):
    - a) North 15
    - b) South 21

21. AWC of top 24 inches of profile:
    - a) More than 2.0 inches 6
    - b) 1.5 to 2.0 inches 10
    - c) Less than 1.5 inches .... severe

Criteria for Rating Plant Competition [1]

Rating	Drainage	Depth	Site class	Total AWC
Slight	Excessive	Less than 10 inches	5, 6	Less than 4 inches
Moderate	Somewhat excessive	10 to 20 inches	3, 4	4 to 7 inches
Severe	Well, moderately well, somewhat poor, poor, very poor	More than 20 inches	1, 2	More than 7 inches

[1] Plant competion refers to the effect of other plants (all kinds) on the growth and survival of desirable tree species—both conifers and broad-leaved trees. In most cases the desirable trees will be conifers. Plant competition is related to soil fertility, depth, available water capacity, and drainage. On wet soils competition from phreatic plants will be severe. On droughty soils plant competition will be minimal. On frigid soils the available water capacity may be one class lower. On oak woodland the rating should be severe because of grass competition.

Criteria for Rating Susceptibility to Burning Damage (Prescribed Burning and Wildfire) [1]

Soil property	Rating guide	Rating guide	Rating guide	Rating assigned
Content of organic matter in the top 4 inches	>1 percent Rating=1	<1 percent Rating=2	---	#___
Content of coarse fragments in the top 4 inches	<35 percent Rating=1	35 to 65 percent Rating=2	>65 percent Rating=5	#___
Texture in the top 4 inches	SCL, CL, SICL, SC, SIC, C Rating=1	L, SIL, SI Rating=2	S, LS, SL Rating=3	#___
Slope (percent)	0 to 30 Rating=1	30 to 50 Rating=2	>50 Rating=3	#___
				Total=___

Total rating	*Susceptibility to burning damage* [2]
4 to 6	Slight
7 to 9	Moderate
10 to 13	Severe

[1] Soil damage can sometimes occur from burning. The risk of damage increases with the intensity of heat. The damage is mainly related to the loss of organic matter. Some soils have characteristics that enable them to withstand this loss better than other soils. These characteristics are used to rate the soils for their susceptibility to damage from burning, as expressed in the table. The rating system is intended to be used as a general guideline. Other factors not mentioned may alter the rating.

[2] Rate soils predominantly on southeast to west aspects (135 to 270 degrees azimuth) one category higher.

Criteria for Rating Soil Compaction Hazard [1]

USDA texture in the top 10 inches	Ochric epipedon		Mollic or umbric epipedon
	Weak or platy structure [2]	Moderate or strong structure	
Volume of coarse fragments >65 percent, all textures, and all ashy, ashy-skeletal, medial, medial-skeletal, and cindery material	Slight	Slight	Slight
Volume of coarse fragments 35 to 65 percent, all very gravelly textures (skeletal soils)	Moderate	Slight	Slight
Volume of coarse fragments < 35 percent:			
S, LS	Slight	Slight	Slight
SCL, SC, FS, LFS, FSL, SL	Severe	Moderate	Moderate
L, SIL, SICL	Severe	Moderate	Slight
C, SIC	Moderate	Slight	Slight

[1] A rating of severe indicates that the soil is easily compacted and compaction is not easily mitigated, moderate indicates that the soil is compacted with moderate effort and compaction is easily mitigated, and slight indicates that considerable effort is needed to compact the soil.

[2] Very coarse prismatic structure is regarded as weak, essentially massive.

Criteria for Rating Difficulty of Revegetating Exposed Subsoil

Subsoil horizons are frequently exposed during forest management activities. This exposure occurs on road cuts and fills and on some skid roads. Land managers may desire to revegetate these areas, and they may be required to do so by law or by regulations of an agency. Revegetation may be for erosion control or for timber production (as on old skid roads planted to trees. Separate ratings are given for revegetation with either grass or trees. The characteristics of the subsoil that influence planting conditions, germination, and the subsequent growth rate are considered in the ratings. These are general ratings; they do not preclude the need for onsite investigation of individual projects.

1. Soil moisture and/or temperature regime:
   Frigid=2; ustic=2; xeric-mesic=4; thermic=6; aquic or udic=0.
   Points: _____
2. General texture:
   Fine (SC, SIC, C)=5; moderately fine or coarser=0.
   Points: _____
3. Drainage class:
   Very poor=25; poor or somewhat poor=15; moderately well or better=0.
   Points: _____
4. Content of coarse fragments:
   0 to 35 percent=0; 35 to 65 percent=5; >65 percent=15.
   Points: _____
5. AWC of total soil profile:
   Very low (<3 inches)=10; low (3 to 6 inches)=5; moderate or higher (>6 inches)=0.
   Points: _____
6. Underlying rock or material:
   Hard bedrock with little fracturing=5; soft rock, unconsolidated material, or highly fractured rock=0.
   Points: _____
7. Original soil depth:
   >40 inches=0; 20 to 40 inches=4; 10 to 20 inches=8; <10 inches=10.
   Points: _____
8. Slope:
   0 to 30 percent=0; 30 to 50 percent=2; 50 to 75 percent=4; >75 percent=6.
   Points: _____
9. Nutrient deficiencies, imbalances, or toxicities:
   Increase rating according to the magnitude of the problem. Serpentinitic parent material is an example of the type of problem.

Add up points for each characteristic to obtain the rating—

For grass revegetation:	*Slight*	0 to 20 points
	Moderate	21 to 29 points
	Severe	30+ points
For tree revegetation:	*Slight*	0 to 13 points
	Moderate	14 to 22 points
	Severe	23+ points

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1961-90 at Marysville, California)

Month	Temperature						Precipitation			
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have-- Maximum temperature higher than--	2 years in 10 will have-- Minimum temperature lower than--	Average number of growing degree days*	Average	2 years in 10 will have-- Less than--	2 years in 10 will have-- More than--	Average number of days with 0.10 inch or more
	°F	°F	°F	°F	°F	Units	In	In	In	
January-----	53.8	36.9	45.4	68	26	175	4.06	1.59	6.13	6
February----	61.5	41.4	51.5	76	29	325	3.15	.98	4.91	5
March-------	66.6	44.0	55.3	83	32	474	3.04	1.23	4.57	6
April-------	73.3	47.4	60.4	92	36	611	1.50	.38	2.39	3
May---------	82.5	53.6	68.0	101	41	868	.39	.07	.77	1
June--------	90.2	58.9	74.6	107	48	1,036	.20	.08	.47	0
July--------	96.0	61.7	78.8	109	51	1,191	.07	.01	.41	0
August------	94.3	60.4	77.3	107	51	1,157	.10	.04	.42	0
September---	88.8	56.8	72.8	103	47	983	.39	.09	.87	0
October-----	79.1	50.8	64.9	97	39	772	1.42	.25	2.48	2
November----	64.1	43.2	53.7	81	31	410	3.29	1.41	5.09	5
December----	54.2	37.7	45.9	69	25	198	3.43	1.55	5.26	6
Yearly:										
Average---	75.4	49.4	62.4	---	---	---	---	---	---	---
Extreme---	113	17	---	110	23	---	---	---	---	---
Total-----	---	---	---	---	---	8,199	21.04	14.65	26.58	34

* A growing degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minumum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1961-90 at Marysville, California)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than--	Jan. 5	Feb. 13	Mar. 16
2 years in 10 later than--	---	Feb. 1	Feb. 25
5 years in 10 later than--	---	Jan. 5	Feb. 5
First freezing temperature in fall:			
1 year in 10 earlier than--	Dec. 28	Dec. 3	Nov. 13
2 years in 10 earlier than--	Jan. 23	Dec. 13	Nov. 20
5 years in 10 earlier than--	---	Jan. 2	Dec. 4

TABLE 3.--GROWING SEASON

(Recorded in the period 1961-90 at Marysville, California)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
9 years in 10	>365	311	265
8 years in 10	>365	326	277
5 years in 10	>365	363	301
2 years in 10	>365	>365	325
1 year in 10	>365	>365	337

TABLE 4.--SOIL TEMPERATURE

Location	Month and Temperature (degrees F)												
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Avg.
Beale AFB--------	50	49	52	59	67	77	85	85	79	70	56	53	65
U.C. Sierra Field Station---------	44	46	52	59	65	74	81	79	72	64	52	50	62
Dobbins----------	46	47	48	52	52	58	63	64	61	59	50	48	54
Challange--------	46	46	46	49	50	54	60	61	58	57	50	47	52
Strawberry Valley	39	37	41	41	44	50	57	61	55	52	42	38	46

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
101	Aiken-Horseshoe complex, 2 to 8 percent slopes	1,255	0.3
102	Argonaut-Auburn complex, 3 to 8 percent slopes	5,065	1.2
103	Argonaut-Auburn complex, 8 to 15 percent slopes	2,120	0.5
104	Argonaut-Auburn complex, 15 to 30 percent slopes	1,885	0.5
105	Argovar silt loam, 0 to 5 percent slopes	470	0.1
106	Auburn loam, 3 to 8 percent slopes	700	0.2
107	Auburn loam, 8 to 15 percent slopes	755	0.2
108	Auburn loam, 15 to 30 percent slopes	1,845	0.4
109	Auburn loam, 30 to 50 percent slopes	570	0.1
110	Auburn-Sobrante complex, 3 to 8 percent slopes	21,431	5.2
111	Auburn-Sobrante complex, 8 to 15 percent slopes	8,985	2.2
112	Auburn-Sobrante complex, 15 to 30 percent slopes	2,535	0.6
113	Auburn-Sobrante complex, gravelly, 3 to 8 percent slopes	2,790	0.7
114	Auburn-Sobrante complex, gravelly, 8 to 15 percent slopes	8,515	2.1
115	Auburn-Sobrante complex, gravelly, 15 to 30 percent slopes	5,545	1.3
116	Auburn-Sobrante complex, gravelly, 30 to 50 percent slopes	2,395	0.6
117	Auburn-Sobrante-Rock outcrop complex, 8 to 15 percent slopes	800	0.2
118	Auburn-Sobrante-Rock outcrop complex, 15 to 30 percent slopes	3,500	0.8
119	Auburn-Sobrante-Rock outcrop complex, 30 to 50 percent slopes	1,450	0.4
120	Auburn-Sobrante-Rock outcrop complex, 50 to 75 percent slopes	2,000	0.5
121	Auburn-Timbuctoo-Argonaut complex, 3 to 8 percent slopes	545	0.1
122	Auburn-Timbuctoo-Argonaut complex, 8 to 15 percent slopes	1,145	0.3
123	Boomer gravelly loam, 8 to 15 percent slopes	415	0.1
124	Boomer gravelly loam, 15 to 30 percent slopes	1,680	0.4
125	Boomer gravelly loam, 30 to 50 percent slopes	775	0.2
126	Boomer-Pendola complex, 50 to 75 percent slopes	170	*
127	Boomer-Pendola-Sites complex, 2 to 30 percent slopes	3,095	0.8
128	Boomer-Pendola-Sites complex, 30 to 50 percent slopes	2,415	0.6
129	Bruella loam, 0 to 1 percent slopes	1,260	0.3
130	Capay clay loam, 0 to 1 percent slopes	1,400	0.3
131	Hollenbeck silty clay loam, 0 to 1 percent slopes	6,380	1.5
132	Hollenbeck silty clay loam, 0 to 1 percent slopes, occasionally flooded	1,730	0.4
133	Hollenbeck clay, 0 to 3 percent slopes	300	0.1
134	Hollenbeck-Urban land complex, 0 to 1 percent slopes	600	0.1
135	Chaix-Chawanakee-Hotaw complex, 30 to 50 percent slopes	2,880	0.7
136	Chawanakee-Chaix-Hotaw complex, 30 to 75 percent slopes	4,720	1.1
137	Columbia fine sandy loam, 0 to 1 percent slopes	3,340	0.8
138	Columbia fine sandy loam, 0 to 1 percent slopes, occasionally flooded	3,320	0.8
139	Columbia fine sandy loam, 0 to 1 percent slopes, frequently flooded	1,570	0.4
140	Columbia-Urban land complex, 0 to 1 percent slopes	880	0.2
141	Conejo loam, 0 to 2 percent slopes	9,695	2.4
142	Conejo loam, 0 to 1 percent slopes, occasionally flooded	2,740	0.7
143	Conejo-Urban land complex, 0 to 1 percent slopes	210	0.1
144	Deadwood-Rock outcrop-Hurlbut complex, 30 to 75 percent slopes	1,820	0.4
145	Dumps, landfills	250	0.1
146	Dumps, mine tailings	6,320	1.5
147	Feather silt loam, 0 to 2 percent slopes, occasionally flooded	1,220	0.3
148	Flanly sandy loam, 3 to 8 percent slopes	980	0.2
149	Flanly sandy loam, 8 to 15 percent slopes	3,865	0.9
150	Flanly sandy loam, 15 to 30 percent slopes	3,165	0.8
151	Flanly sandy loam, 30 to 50 percent slopes	2,055	0.5
152	Flanly-Rock outcrop complex, 50 to 75 percent slopes	805	0.2
153	Flanly-Orose-Verjeles complex, 3 to 8 percent slopes	2,975	0.7
154	Flanly-Orose-Verjeles complex, 8 to 15 percent slopes	1,300	0.3
155	Fluvaquents, 0 to 1 percent slopes	340	0.1
158	Hoda loam, 30 to 50 percent slopes	380	0.1
159	Hoda-Musick complex, 2 to 30 percent slopes	2,835	0.7
160	Hoda-Musick complex, 30 to 50 percent slopes	455	0.1
161	Holillipah loamy sand, 0 to 1 percent slopes	2,520	0.6
162	Holillipah loamy sand, 0 to 1 percent slopes, occasionally flooded	1,280	0.3
163	Holillipah loamy sand, 0 to 1 percent slopes, frequently flooded	1,700	0.4

See footnote at end of table.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
164	Holland sandy loam, 30 to 50 percent slopes	570	0.1
165	Holland-Hoda-Hotaw complex, 2 to 30 percent slopes	2,450	0.6
166	Holland-Hoda-Hotaw complex, 30 to 50 percent slopes	4,490	1.1
167	Holland-Hoda-Hotaw complex, 10 to 40 percent slopes, eroded	1,430	0.3
168	Horseshoe-Aiken complex, 30 to 50 percent slopes	330	0.1
169	Horst sandy loam, 0 to 1 percent slopes	290	0.1
170	Horst silt loam, 0 to 2 percent slopes	1,130	0.3
171	Hotaw sandy loam, 15 to 30 percent slopes	780	0.2
172	Hotaw sandy loam, 30 to 50 percent slopes	495	0.1
173	Hotaw-Chawanakee-Holland complex, 8 to 30 percent slopes	1,100	0.3
174	Hurlbut-Deadwood-Rock outcrop complex, 30 to 75 percent slopes	2,215	0.5
175	Jocal loam, 3 to 8 percent slopes	1,830	0.4
176	Jocal loam, 8 to 15 percent slopes	205	*
177	Jocal loam, 15 to 30 percent slopes	1,390	0.3
178	Jocal loam, cool, 3 to 8 percent slopes	1,420	0.3
179	Jocal loam, cool, 8 to 30 percent slopes	800	0.2
180	Jocal-Sites-Mariposa complex, 2 to 30 percent slopes	1,295	0.3
181	Jocal-Sites-Mariposa complex, 30 to 50 percent slopes	1,225	0.3
182	Kilaga clay loam, 0 to 1 percent slopes	4,395	1.1
183	Kilaga clay loam, hardpan substratum, 0 to 1 percent slopes	3,600	0.9
184	Kilaga clay loam, 0 to 1 percent slopes, occasionally flooded	300	0.1
185	Kimball loam, 0 to 1 percent slopes	7,870	1.9
186	Kimball loam, 0 to 1 percent slopes, occasionally flooded	2,090	0.5
187	Mariposa gravelly loam, 8 to 15 percent slopes	210	0.1
188	Mariposa gravelly loam, 15 to 30 percent slopes	705	0.2
189	Mariposa gravelly loam, 30 to 50 percent slopes	3,270	0.8
190	Mariposa-Jocal complex, 30 to 75 percent slopes	3,095	0.8
191	Mariposa-Rock outcrop complex, 50 to 75 percent slopes	2,950	0.7
192	Marysville loam, 0 to 1 percent slopes	2,570	0.6
193	Mildred cobbly loam, 3 to 8 percent slopes	250	0.1
194	Mildred cobbly loam, 8 to 15 percent slopes	690	0.2
195	Mildred cobbly loam, 15 to 30 percent slopes	2,910	0.7
196	Mildred cobbly loam, 30 to 50 percent slopes	610	0.1
197	Oakdale sandy loam, 0 to 5 percent slopes	1,660	0.4
198	Oakdale-Urban land complex, 0 to 1 percent slopes	290	0.1
199	Orose sandy loam, 8 to 15 percent slopes	440	0.1
200	Orose sandy loam, 15 to 30 percent slopes	205	*
201	Pardee gravelly loam, 3 to 8 percent slopes	3,185	0.8
202	Pardee-Ranchoseco complex, 0 to 3 percent slopes	1,075	0.3
203	Perkins loam, 0 to 2 percent slopes	7,315	1.8
204	Perkins loam, 0 to 1 percent slopes, occasionally flooded	660	0.2
205	Perkins gravelly loam, 15 to 30 percent slopes	565	0.1
206	Pits, sand	160	*
207	Redding gravelly loam, 0 to 3 percent slopes	1,660	0.4
208	Redding gravelly loam, 3 to 8 percent slopes	9,235	2.2
209	Redding-Corning complex, 0 to 3 percent slopes	3,665	0.9
210	Redding-Corning complex, 3 to 8 percent slopes	3,775	0.9
211	Ricecross loam, 0 to 2 percent slopes	1,015	0.2
212	Ricecross loam, 0 to 2 percent slopes, occasionally flooded	340	0.1
213	Riverwash	1,180	0.3
214	San Joaquin loam, 0 to 1 percent slopes	56,285	13.7
215	San Joaquin loam, 1 to 3 percent slopes	2,640	0.6
216	San Joaquin loam, 0 to 1 percent slopes, occasionally flooded	1,670	0.4
217	San Joaquin-Urban land complex, 0 to 1 percent slopes	2,990	0.7
218	Shanghai silt loam, 0 to 1 percent slopes	3,465	0.8
219	Shanghai silt loam, 0 to 1 percent slopes, occasionally flooded	765	0.2
220	Shanghai silt loam, clay substratum, 0 to 1 percent slopes	460	0.1
221	Sites loam, 3 to 8 percent slopes	3,775	0.9
222	Sites loam, 8 to 15 percent slopes	9,455	2.3
223	Sites gravelly loam, 15 to 30 percent slopes	9,130	2.2
224	Sites gravelly loam, 30 to 50 percent slopes	4,665	1.1

See footnote at end of table.

TABLE 5.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
225	Sites gravelly loam, bedrock substratum, 3 to 8 percent slopes	215	0.1
226	Sites gravelly loam, bedrock substratum, 8 to 15 percent slopes	1,460	0.4
227	Sites gravelly loam, bedrock substratum, 15 to 30 percent slopes	1,935	0.5
228	Sites gravelly loam, bedrock substraum, 30 to 50 percent slopes	1,885	0.5
229	Sites loam, cool, 3 to 15 percent slopes	660	0.2
230	Sites-Jocal complex, 2 to 30 percent slopes	3,160	0.8
231	Sites-Jocal-Mariposa complex, 30 to 50 percent slopes	2,450	0.6
232	Slacreek-Rock outcrop complex, 30 to 75 percent slopes	1,700	0.4
235	Sobrante gravelly loam, 3 to 8 percent slopes	765	0.2
236	Sobrante gravelly loam, 8 to 15 percent slopes	3,670	0.9
237	Sobrante gravelly loam, 15 to 30 percent slopes	2,130	0.5
238	Sobrante-Rock outcrop complex, 30 to 50 percent slopes	1,380	0.3
239	Sobrante-Timbuctoo complex, 8 to 15 percent slopes	705	0.2
240	Sobrante-Timbuctoo complex, 15 to 30 percent slopes	6,275	1.5
241	Sobrante-Timbuctoo complex, 30 to 50 percent slopes	5,240	1.3
242	Surnuf loam, 8 to 15 percent slopes	2,870	0.7
243	Surnuf loam, 15 to 30 percent slopes	2,630	0.6
244	Surnuf loam, 30 to 50 percent slopes	835	0.2
245	Surnuf cobbly loam, 8 to 15 percent slopes	1,915	0.5
246	Surnuf cobbly loam, 15 to 30 percent slopes	5,590	1.4
247	Surnuf cobbly loam, 30 to 50 percent slopes	1,640	0.4
248	Trainer loam, 0 to 1 percent slopes, occasionally flooded	2,170	0.5
249	Tujunga sand, 0 to 1 percent slopes	440	0.1
250	Tujunga gravelly sand, 0 to 2 percent slopes	550	0.1
251	Tujunga sand, 0 to 1 percent slopes, occasionally flooded	860	0.2
252	Woodleaf gravelly loam, 3 to 15 percent slopes	360	0.1
253	Woodleaf gravelly loam, 15 to 30 percent slopes	900	0.2
	Water	6,900	1.7
	Total	412,116	100.0

* Less than 0.1 percent.

TABLE 6.--PRIME FARMLAND

(Only the soils considered prime farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
101	Aiken-Horseshoe complex, 2 to 8 percent slopes (where irrigated)
105	Argovar silt loam, 0 to 5 percent slopes (where irrigated and drained)
123	Boomer gravelly loam, 8 to 15 percent slopes (where irrigated)
129	Bruella loam, 0 to 1 percent slopes (where irrigated)
130	Capay clay loam, 0 to 1 percent slopes (where irrigated)
131	Hollenbeck silty clay loam, 0 to 1 percent slopes (where irrigated)
132	Hollenbeck silty clay loam, 0 to 1 percent slopes, occasionally flooded (where irrigated)
133	Hollenbeck clay, 0 to 3 percent slopes (where irrigated)
134	Hollenbeck-Urban land complex, 0 to 1 percent slopes (where irrigated)
137	Columbia fine sandy loam, 0 to 1 percent slopes (where irrigated)
138	Columbia fine sandy loam, 0 to 1 percent slopes, occasionally flooded (where irrigated)
139	Columbia fine sandy loam, 0 to 1 percent slopes, frequently flooded (where irrigated and either protected from flooding or not frequently flooded during the growing season)
140	Columbia-Urban land complex, 0 to 1 percent slopes (where irrigated)
141	Conejo loam, 0 to 2 percent slopes (where irrigated)
142	Conejo loam, 0 to 1 percent slopes, occasionally flooded (where irrigated)
143	Conejo-Urban land complex, 0 to 1 percent slopes (where irrigated)
147	Feather silt loam, 0 to 2 percent slopes, occasionally flooded (where irrigated)
161	Holillipah loamy sand, 0 to 1 percent slopes (where irrigated)
162	Holillipah loamy sand, 0 to 1 percent slopes, occasionally flooded (where irrigated)
163	Holillipah loamy sand, 0 to 1 percent slopes, frequently flooded (where irrigated and either protected from flooding or not frequently flooded during the growing season)
169	Horst sandy loam, 0 to 1 percent slopes (where irrigated)
170	Horst silt loam, 0 to 2 percent slopes (where irrigated)
175	Jocal loam, 3 to 8 percent slopes (where irrigated)
178	Jocal loam, cool, 3 to 8 percent slopes (where irrigated)
182	Kilaga clay loam, 0 to 1 percent slopes (where irrigated)
183	Kilaga clay loam, hardpan substratum, 0 to 1 percent slopes (where irrigated)
184	Kilaga clay loam, 0 to 1 percent slopes, occasionally flooded (where irrigated)
197	Oakdale sandy loam, 0 to 5 percent slopes (where irrigated)
203	Perkins loam, 0 to 2 percent slopes (where irrigated)
204	Perkins loam, 0 to 1 percent slopes, occasionally flooded (where irrigated)
211	Ricecross loam, 0 to 2 percent slopes (where irrigated)
212	Ricecross loam, 0 to 2 percent slopes, occasionally flooded (where irrigated and drained)
218	Shanghai silt loam, 0 to 1 percent slopes (where irrigated)
219	Shanghai silt loam, 0 to 1 percent slopes, occasionally flooded (where irrigated)
220	Shanghai silt loam, clay substratum, 0 to 1 percent slopes (where irrigated)
221	Sites loam, 3 to 8 percent slopes (where irrigated)
225	Sites gravelly loam, bedrock substratum, 3 to 8 percent slopes (where irrigated)
248	Trainer loam, 0 to 1 percent slopes, occasionally flooded (where irrigated)

TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE

(Yields are those that can be expected under a high level of management. Only the soils that are used for crops or pasture are listed. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Almonds	Pasture	Peaches	Pears	Prunes	Rice	Walnuts
	Lbs	AUM*	Tons	Tons	Tons	Tons	Tons
102**, 103**, 104**------- Argonaut-Auburn	---	12	---	---	---	---	---
106, 107, 108------------ Auburn	---	12	---	---	---	---	---
110**, 111**------------- Auburn-Sobrante	---	13	---	---	---	---	---
112**, 113**, 114**, 115**------------------- Auburn-Sobrante	---	12	---	---	---	---	---
121**, 122**------------- Auburn-Timbuctoo-Argonaut	---	13	---	---	---	---	---
123---------------------- Boomer	---	14	---	18	---	---	---
124---------------------- Boomer	---	12	---	18	---	---	---
129---------------------- Bruella	---	12	---	---	---	---	---
130---------------------- Capay	---	---	---	---	---	3	---
131, 132----------------- Hollenbeck	---	12	---	---	---	3	---
137---------------------- Columbia	---	---	15	---	3	---	1.0
138---------------------- Columbia	---	---	15	---	---	---	1.0
139---------------------- Columbia	---	---	14	---	---	---	1.0
141---------------------- Conejo	---	12	---	---	---	---	2.0
142---------------------- Conejo	---	---	---	---	---	3	---
147---------------------- Feather	---	---	15	---	---	---	2.0
148---------------------- Flanly	---	14	---	---	---	---	---
153**-------------------- Flanly-Orose-Verjeles	---	12	---	---	---	---	---

See footnotes at end of table.

TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Almonds	Pasture	Peaches	Pears	Prunes	Rice	Walnuts
	Lbs	AUM*	Tons	Tons	Tons	Tons	Tons
161, 162----------------- Holillipah	---	---	20	---	---	---	1.8
169, 170----------------- Horst	---	---	15	---	---	---	3.0
183---------------------- Kilaga	---	12	15	---	3	3	---
185---------------------- Kimball	---	12	---	---	---	3	---
186---------------------- Kimball	---	---	---	---	---	3	---
187, 188----------------- Mariposa	---	---	---	14	---	---	---
192---------------------- Marysville	---	---	14	---	---	---	---
197---------------------- Oakdale	2,500	---	19	---	---	---	---
199---------------------- Orose	---	10	---	---	---	---	---
203---------------------- Perkins	250	---	---	---	3	3	1.8
204---------------------- Perkins	---	---	---	---	3	3	---
207---------------------- Redding	---	10	---	---	---	---	---
208---------------------- Redding	---	10	---	---	---	---	---
209**, 210**------------- Redding-Corning	---	11	---	---	---	---	---
211---------------------- Ricecross	---	12	---	---	---	---	---
214, 215, 216------------ San Joaquin	---	12	---	---	---	3	---
218---------------------- Shanghai	---	---	15	---	---	---	2.0
220---------------------- Shanghai	---	---	---	---	---	3	---
221, 222, 225, 226-------- Sites	---	---	---	24	---	---	---
227---------------------- Sites	---	---	---	20	---	---	---

See footnotes at end of table.

TABLE 7.--YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Soil name and map symbol	Almonds	Pasture	Peaches	Pears	Prunes	Rice	Walnuts
	Lbs	AUM*	Tons	Tons	Tons	Tons	Tons
235, 236------------------ Sobrante	---	14	---	---	---	---	---
237----------------------- Sobrante	---	12	---	---	---	---	---
239**--------------------- Sobrante-Timbuctoo	---	14	---	---	---	---	---
240**--------------------- Sobrante-Timbuctoo	---	12	---	---	---	---	---
248----------------------- Trainer	---	---	---	---	---	3	---

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--LAND CAPABILITY

Soil name and map symbol	Land capability	
	N	I
101*: Aiken-Horseshoe	IIIe	IIe
102*, 103*, 104*: Argonaut-Auburn	IVe	IVe
105: Argovar	IIIw	IIIw
106, 107, 108: Auburn	IVe	IVe
109: Auburn	VIe	---
110*, 111*:		
Auburn	IVe	IVe
Sobrante	IIIe	IIIe
112*: Auburn-Sobrante	IVe	IVe
113*, 114*:		
Auburn	IVe	IVe
Sobrante	IIIe	IIIe
115*: Auburn-Sobrante	IVe	IVe
116*: Auburn-Sobrante	VIe	---
117*:		
Auburn	IVe	IVe
Sobrante	IIIe	IIIe
Rock outcrop	VIII	---
118*:		
Auburn	IVe	IVe
Sobrante	IVe	IVe
Rock outcrop	VIII	---
119*:		
Auburn	VIe	---
Sobrante	VIe	---
Rock outcrop	VIII	---
120*:		
Auburn	VIIe	---
Sobrante	VIIe	---
Rock outcrop	VIII	---

See footnote at end of table.

TABLE 8.--LAND CAPABILITY--Continued

Soil name and map symbol	Land capability N	Land capability I
121*, 122*:		
Auburn	IVe	IVe
Timbuctoo	IIIe	IIIe
Argonaut	IVe	IVe
123 Boomer	IIIe	IIIe
124 Boomer	IVe	IVe
125 Boomer	VIe	---
126* Boomer-Pendola	VIIe	---
127*:		
Boomer-Pendola-Sites	IVe	IVe
128* Boomer-Pendola-Sites	VIe	---
129 Bruella	IIIc	I
130 Capay	IIIs	IIs
131 Hollenbeck	IIIs	IIs
132 Hollenbeck	IIIw	IIw
133 Hollenbeck	IIIe	IIe
134*:		
Hollenbeck	IIIs	IIs
Urban land.		
135*:		
Chaix	VIe	---
Chawanakee	VIIe	---
Hotaw	VIe	---
136* Chawanakee-Chaix-Hotaw	VIIe	---
137 Columbia	IIIs	IIs
138 Columbia	IIIw	IIw

See footnote at end of table.

TABLE 8.--LAND CAPABILITY--Continued

Soil name and map symbol	Land capability	
	N	I
139------------------------ Columbia	IVw	IVw
140*:		
Columbia------------------	IIIs	IIs
Urban land.		
141------------------------ Conejo	IIIc	I
142------------------------ Conejo	IIIw	IIw
143*:		
Conejo--------------------	IIIc	I
Urban land.		
144*:		
Deadwood------------------	VIIe	---
Rock outcrop--------------	VIII	---
Hurlbut-------------------	VIIe	---
145*---------------------- Dumps, landfills	VIII	---
146*---------------------- Dumps, mine tailings	VIII	---
147------------------------ Feather	IIIw	IIw
148------------------------ Flanly	IIIe	IIIe
149------------------------ Flanly	IVe	IVe
150------------------------ Flanly	VIe	---
151------------------------ Flanly	VIIe	---
152*:		
Flanly--------------------	VIIe	---
Rock outcrop--------------	VIII	---
153*:		
Flanly--------------------	IIIe	IIIe
Orose---------------------	IVe	IVe
Verjeles------------------	IVe	IVe
154*---------------------- Flanly-Orose-Verjeles	IVe	IVe

See footnote at end of table.

TABLE 8.--LAND CAPABILITY--Continued

Soil name and map symbol	Land capability N	Land capability I
155----------------------- Fluvaquents	VIIw	---
158----------------------- Hoda	VIe	---
159*:		
Hoda-Musick--------------	IVe	---
160*---------------------- Hoda-Musick	VIe	---
161, 162------------------ Holillipah	IVs	IIIs
163----------------------- Holillipah	IVw	IVw
164----------------------- Holland	VIe	---
165*:		
Holland------------------	IVe	---
Hoda---------------------	IVe	---
Hotaw--------------------	VIe	---
166*, 167*---------------- Holland-Hoda-Hotaw	VIe	---
168*---------------------- Horseshoe-Aiken	VIe	---
169, 170------------------ Horst	IIIc	I
171, 172------------------ Hotaw	VIe	---
173*:		
Hotaw--------------------	VIe	---
Chawanakee---------------	VIIe	---
Holland------------------	IVe	---
174*:		
Hurlbut------------------	VIIe	---
Deadwood-----------------	VIIe	---
Rock outcrop-------------	VIII	---
175----------------------- Jocal	IIIe	IIe
176----------------------- Jocal	IIIe	IIIe

See footnote at end of table.

TABLE 8.--LAND CAPABILITY--Continued

Soil name and map symbol	Land capability N	Land capability I
177------------------------ Jocal	IVe	IVe
178, 179------------------ Jocal	IVe	---
180*---------------------- Jocal-Sites-Mariposa	IVe	IVe
181*---------------------- Jocal-Sites-Mariposa	VIe	---
182----------------------- Kilaga	IIIs	IIs
183----------------------- Kilaga	IIIs	IIs
184----------------------- Kilaga	IIIw	IIw
185----------------------- Kimball	IIIs	IIIs
186----------------------- Kimball	IIIw	IIIw
187, 188------------------ Mariposa	IVe	IVe
189----------------------- Mariposa	VIe	---
190*---------------------- Mariposa-Jocal	VIIe	---
191*:		
Mariposa-----------------	VIIe	---
Rock outcrop-------------	VIII	---
192----------------------- Marysville	IIIs	IIIs
193, 194------------------ Mildred	IVe	IVe
195----------------------- Mildred	VIe	---
196----------------------- Mildred	VIIe	---
197----------------------- Oakdale	IIIe	IIe
198*:		
Oakdale------------------	IIIc	I
Urban land.		

See footnote at end of table.

TABLE 8.--LAND CAPABILITY--Continued

Soil name and map symbol	Land capability	
	N	I
199----------------------- Orose	IVe	IVe
200----------------------- Orose	VIe	---
201----------------------- Pardee	VIe	---
202*:		
Pardee--------------------	VIs	---
Ranchoseco----------------	VIIs	---
203----------------------- Perkins	IIIc	I
204----------------------- Perkins	IIIw	IIw
205----------------------- Perkins	IVe	---
206*---------------------- Pits, sand	VIII	---
207----------------------- Redding	IVs	IVs
208----------------------- Redding	IVe	IVe
209*:		
Redding-Corning----------	IVs	IVs
210*---------------------- Redding-Corning	IVe	IVe
211----------------------- Ricecross	IIIc	I
212----------------------- Ricecross	IIIw	IIw
213*---------------------- Riverwash	VIII	---
214----------------------- San Joaquin	IVs	IVs
215----------------------- San Joaquin	IVe	IVe
216----------------------- San Joaquin	IVw	IVw
217*:		
San Joaquin--------------	IVs	IVs
Urban land.		

See footnote at end of table.

TABLE 8.--LAND CAPABILITY--Continued

Soil name and map symbol	Land capability N	Land capability I
218----------------------- Shanghai	IIIc	I
219----------------------- Shanghai	IIIw	IIw
220----------------------- Shanghai	IIIw	IIIw
221----------------------- Sites	IIIe	IIe
222----------------------- Sites	IIIe	IIIe
223----------------------- Sites	IVe	---
224----------------------- Sites	VIe	---
225----------------------- Sites	IIIe	IIe
226----------------------- Sites	IIIe	IIIe
227----------------------- Sites	IVe	---
228----------------------- Sites	VIe	---
229----------------------- Sites	IVe	---
230*---------------------- Sites-Jocal	IVe	---
231*---------------------- Sites-Jocal-Mariposa	VIe	---
232*:		
Slacreek-----------------	VIIe	---
Rock outcrop-------------	VIII	---
235, 236----------------- Sobrante	IIIe	IIIe
237----------------------- Sobrante	IVe	IVe
238*:		
Sobrante-----------------	VIe	---
Rock outcrop-------------	VIII	---
239*---------------------- Sobrante-Timbuctoo	IIIe	IIIe

See footnote at end of table.

TABLE 8.--LAND CAPABILITY--Continued

Soil name and map symbol	Land capability	
	N	I
240*: Sobrante-Timbuctoo	IVe	IVe
241*: Sobrante-Timbuctoo	VIe	---
242: Surnuf	IIIe	IIIe
243: Surnuf	IVe	IVe
244: Surnuf	VIe	---
245, 246: Surnuf	IVe	IVe
247: Surnuf	VIe	---
248: Trainer	IIIw	IIw
249: Tujunga	VIe	IVs
250: Tujunga	VIs	IVs
251: Tujunga	VIw	IIIw
252, 253: Woodleaf	VIIe	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--STORIE INDEX RATING

(Absence of an entry indicates that the soil was not rated)

Map symbol	Map unit	Rating factors A	B	C	X	Index	Grade	Limitation in X factor
101	Aiken-Horseshoe complex, 2 to 8 percent slopes					53*	3	
	Aiken	75	100	90	70			Fertility.
	Horseshoe	95	100	90	70			Fertility.
102	Argonaut-Auburn complex, 3 to 8 percent slopes					32*	4	
	Argonaut	38	85	90	95			Fertility.
	Auburn	45	95	90	95			Fertility.
103	Argonaut-Auburn complex, 8 to 15 percent slopes					30*	4	
	Argonaut	38	85	85	95			Fertility.
	Auburn	45	95	85	95			Fertility.
104	Argonaut-Auburn complex, 15 to 30 percent slopes					26*	4	
	Argonaut	38	85	75	95			Fertility.
	Auburn	45	95	75	95			Fertility.
105	Argovar silt loam, 0 to 5 percent slopes	62	100	95	40x95	22	4	Drainage, fertility.
106	Auburn loam, 3 to 8 percent slopes	45	95	90	95	37	4	Fertility.
107	Auburn loam, 8 to 15 percent slopes	45	95	85	95	35	4	Fertility.
108	Auburn loam, 15 to 30 percent slopes	45	90	75	95	29	4	Fertility.
109	Auburn loam, 30 to 50 percent slopes	45	90	40	95	15	5	Fertility.
110	Auburn-Sobrante complex, 3 to 8 percent slopes					42*	3	
	Auburn	45	95	85	95			Fertility.
	Sobrante	57	95	95	95			Fertility.
111	Auburn-Sobrante complex, 8 to 15 percent slopes					39*	4	
	Auburn	45	95	80	95			Fertility.
	Sobrante	57	95	90	95			Fertility.
112	Auburn-Sobrante complex, 15 to 30 percent slopes					34*	4	
	Auburn	45	95	70	95			Fertility.
	Sobrante	57	95	80	95			Fertility.
113	Auburn-Sobrante complex, gravelly, 3 to 8 percent slopes					32*	4	
	Auburn	45	70	85	95			Fertility.
	Sobrante	63	70	95	95			Fertility.
114	Auburn-Sobrante complex, gravelly, 8 to 15 percent slopes					31*	4	
	Auburn	45	70	80	95			Fertility.
	Sobrante	63	70	90	95			Fertility.

See footnotes at end of table.

TABLE 9.--STORIE INDEX RATING--Continued

Map symbol	Map unit	Rating factors A	B	C	X	Index	Grade	Limitation in X factor
115	Auburn-Sobrante complex, gravelly, 15 to 30 percent slopes					27*	4	
	Auburn	45	70	70	95			Fertility.
	Sobrante	63	70	80	95			Fertility.
116	Auburn-Sobrante complex, gravelly, 30 to 50 percent slopes					11*	5	
	Auburn	45	65	30	95			Fertility.
	Sobrante	63	65	45	95			Fertility.
117	Auburn-Sobrante-Rock outcrop complex, 8 to 15 percent slopes					25*	4	
	Auburn	45	70	80	95			Fertility.
	Sobrante	63	70	90	95			Fertility.
	Rock outcrop	---	---	---	---			---
118	Auburn-Sobrante-Rock outcrop complex, 15 to 30 percent slopes					21*	4	
	Auburn	45	70	70	95			Fertility.
	Sobrante	63	70	80	95			Fertility.
	Rock outcrop	---	---	---	---			---
119	Auburn-Sobrante-Rock outcrop complex, 30 to 50 percent slopes					10*	5	
	Auburn	45	70	30	95			Fertility.
	Sobrante	63	70	45	95			Fertility.
	Rock outcrop	---	---	---	---			---
120	Auburn-Sobrante-Rock outcrop complex, 50 to 75 percent slopes					5*	6	
	Auburn	45	70	10	95			Fertility.
	Sobrante	63	70	25	95			Fertility.
	Rock outcrop	---	---	---	---			---
121	Auburn-Timbuctoo-Argonaut complex, 3 to 8 percent slopes					25*	4	
	Auburn	45	65	90	95			Fertility.
	Timbuctoo	54	65	90	95			Fertility.
	Argonaut	34	65	90	95			Fertility.
122	Auburn-Timbuctoo-Argonaut complex, 8 to 15 percent slopes					24*	4	
	Auburn	45	65	85	95			Fertility.
	Sobrante	54	65	85	95			Fertility.
	Argonaut	34	65	85	95			Fertility.
123	Boomer gravelly loam, 8 to 15 percent slopes	70	70	85	90	37	4	Fertility.
124	Boomer gravelly loam, 15 to 30 percent slopes	70	70	75	90	33	4	Fertility.
125	Boomer gravelly loam, 30 to 50 percent slopes	70	70	40	90	18	5	Fertility.
126	Boomer-Pendola complex, 50 to 75 percent slopes					10*	5	
	Boomer	72	95	20	90			Fertility.
	Pendola	60	50	20	90			Fertility.

See footnotes at end of table.

TABLE 9.--STORIE INDEX RATING--Continued

Map symbol	Map unit	Rating factors A	B	C	X	Index	Grade	Limitation in X factor
127	Boomer-Pendola-Sites complex, 2 to 30 percent slopes					37*	4	
	Boomer	72	95	75	90			Fertility.
	Pendola	60	50	70	90			Fertility.
	Sites	62	85	75	70			Fertility.
128	Boomer-Pendola-Sites complex, 30 to 50 percent slopes					17*	5	
	Boomer	72	95	35	90			Fertility.
	Pendola	60	50	35	90			Fertility.
	Sites	62	85	35	70			Fertility.
129	Bruella loam, 0 to 1 percent slopes	85	100	100	95x95	77	2	Fertility, rare flooding.
130	Capay clay loam, 0 to 1 percent slopes	80	85	100	95	65	2	Rare flooding.
131	Hollenbeck silty clay loam, 0 to 1 percent slopes	70	90	100	95	60	2	Rare flooding.
132	Hollenbeck silty clay loam, 0 to 1 percent slopes, occasionally flooded	70	90	100	80	50	3	Occasional flooding.
133	Hollenbeck clay, 0 to 3 percent slopes	80	55	95	100	42	3	None.
134	Hollenbeck-Urban land complex, 0 to 1 percent slopes					<10**	6	
	Hollenbeck	70	90	100	95			Rare flooding.
	Urban land	---	---	---	---			---
135	Chaix-Chawanakee-Hotaw complex, 30 to 50 percent slopes					16*	5	
	Chaix	60	80	40	90			Fertility.
	Chawanakee	35	80	40	90			Fertility.
	Hotaw	60	100	40	90			Fertility.
136	Chawanakee-Chaix-Hotaw complex, 30 to 75 percent slopes					7*	6	
	Chawanakee	35	80	20	90			Fertility.
	Chaix	60	80	20	90			Fertility.
	Hotaw	60	100	20	90			Fertility.
137	Columbia fine sandy loam, 0 to 1 percent slopes	90	100	100	95	85	1	Rare flooding.
138	Columbia fine sandy loam, 0 to 1 percent slopes, occasionally flooded	90	100	100	60x80	43	3	Drainage, occasional flooding.
139	Columbia fine sandy loam, 0 to 1 percent slopes, frequently flooded	90	100	100	60x20	11	5	Drainage, frequent flooding.
140	Columbia-Urban land complex, 0 to 1 percent slopes					<10**	6	
	Columbia	90	100	100	95			Rare flooding.
	Urban land	---	---	---	---			---
141	Conejo loam, 0 to 2 percent slopes	95	100	100	95	90	1	Rare flooding.
142	Conejo loam, 0 to 1 percent slopes, occasionally flooded	95	100	100	80	76	2	Occasional flooding.

See footnotes at end of table.

TABLE 9.--STORIE INDEX RATING--Continued

Map symbol	Map unit	Rating factors A	B	C	X	Index	Grade	Limitation in X factor
143	Conejo-Urban land complex, 0 to 1 percent slopes					<10**	6	
	Conejo	95	100	100	95			Rare flooding.
	Urban land	---	---	---	---			---
144	Deadwood-Rock outcrop-Hurlbut complex, 30 to 75 percent slopes					4*	6	
	Deadwood	35	60	20	90			Fertility.
	Rock outcrop	---	---	---	---			---
	Hurlbut	50	80	20	95			Fertility.
145	Dumps, landfills	---	---	---	---	0	6	---
146	Dumps, mine tailings	---	---	---	---	0	6	---
147	Feather silt loam, 0 to 2 percent slopes, occasionally flooded	100	100	100	80	80	1	Occasional flooding.
148	Flanly sandy loam, 3 to 8 percent slopes	63	95	90	80	43	3	Fertility.
149	Flanly sandy loam, 8 to 15 percent slopes	63	95	85	80	41	3	Fertility.
150	Flanly sandy loam, 15 to 30 percent slopes	63	95	75	80	36	4	Fertility.
151	Flanly sandy loam, 30 to 50 percent slopes	63	95	40	80	19	5	Fertility.
152	Flanly-Rock outcrop complex, 50 to 75 percent slopes					5*	6	
	Flanly	45	95	20	80			Fertility.
	Rock outcrop	---	---	---	---			---
153	Flanly-Orose-Verjeles complex, 3 to 8 percent slopes					34*	4	
	Flanly	63	95	90	80			Fertility.
	Orose	38	95	85	90			Fertility.
	Verjeles	38	96	95	90x90			Drainage, fertility.
154	Flanly-Orose-Verjeles complex, 8 to 15 percent slopes					32*	4	
	Flanly	63	95	85	80			Fertility.
	Orose	38	95	80	90			Fertility.
	Verjeles	38	95	90	90x90			Drainage, fertility.
155	Fluvaquents, 0 to 1 percent slopes	100	100	100	20x80	16	5	Drainage, occasional flooding.
158	Hoda loam, 30 to 50 percent slopes	70	100	40	95	27	4	Fertility.
159	Hoda-Musick complex, 2 to 30 percent slopes					55*	3	
	Hoda	70	100	75	95			Fertility.
	Musick	85	100	75	95			Fertility.
160	Hoda-Musick complex, 30 to 50 percent slopes					29*	4	
	Hoda	70	100	40	95			Fertility.
	Musick	85	100	40	95			Fertility.

See footnotes at end of table.

TABLE 9.--STORIE INDEX RATING--Continued

Map symbol	Map unit	Rating factors A	B	C	X	Index	Grade	Limitation in X factor
161	Holillipah loamy sand, 0 to 1 percent slopes	85	80	100	95x90	58	3	Rare flooding, fertility.
162	Holillipah loamy sand, 0 to 1 percent slopes, occacionally flooded	85	80	100	80x90	49	3	Occasional flooding, fertility.
163	Holillipah loamy sand, 0 to 1 percent slopes, frequently flooded	85	80	100	20x90	12	5	Frequent flooding, fertility.
164	Holland sandy loam, 30 to 50 percent slopes	85	95	40	95	31	4	Fertility.
165	Holland-Hoda-Hotaw complex, 2 to 30 percent slopes					52*	3	
	Holland	80	100	75	95			Fertility.
	Hoda	70	100	75	95			Fertility.
	Hotaw	60	100	75	95			Fertility.
166	Holland-Hoda-Hotaw complex, 30 to 50 percent slopes					28*	4	
	Holland	80	100	40	95			Fertility.
	Hoda	70	100	40	95			Fertility.
	Hotaw	60	100	40	95			Fertility.
167	Holland-Hoda-Hotaw complex, 10 to 40 percent slopes, eroded					23*	4	
	Holland	80	90	45	95x85			Fertility, erosion.
	Hoda	70	100	45	95x85			Fertility, erosion.
	Hotaw	38	100	45	95x85			Fertility, erosion.
168	Horseshoe-Aiken complex, 30 to 50 percent slopes					24*	4	
	Horseshoe	95	100	40	70			Fertility.
	Aiken	75	100	40	70			Fertility.
169	Horst sandy loam, 0 to 1 percent slopes	95	95	100	95x95	81	1	Fertility, rare flooding.
170	Horst silt loam, 0 to 2 percent slopes	100	100	100	95	95	1	Rare flooding.
171	Hotaw sandy loam, 15 to 30 percent slopes	42	95	75	95	28	4	Fertility.
172	Hotaw sandy loam, 30 to 50 percent slopes	42	95	40	95	15	5	Fertility.
173	Hotaw-Chawanakee-Holland complex, 8 to 30 percent slopes					42*	3	
	Hotaw	60	100	80	95			Fertility.
	Chawanakee	35	80	80	90			Fertility.
	Holland	80	100	80	95			Fertility.
174	Hurlbut-Deadwood-Rock outcrop complex, 30 to 75 percent slopes					5*	6	
	Hurlbut	50	80	20	95			Fertility.
	Deadwood	35	60	20	90			Fertility.
	Rock outcrop	---	---	---	---			---

See footnotes at end of table.

TABLE 9.--STORIE INDEX RATING--Continued

Map symbol	Map unit	Rating factors A	B	C	X	Index	Grade	Limitation in X factor
175	Jocal loam, 3 to 8 percent slopes	85	100	90	70	54	3	Fertility.
176	Jocal loam, 8 to 15 percent slopes	85	100	85	70	51	3	Fertility.
177	Jocal loam, 15 to 30 percent slopes	85	100	75	70	45	3	Fertility.
178	Jocal loam, cool, 3 to 8 percent slopes	85	100	90	70	54	3	Fertility.
179	Jocal loam, cool, 8 to 30 percent slopes	85	100	80	70	48	3	Fertility.
180	Jocal-Sites-Mariposa complex, 2 to 30 percent slopes					34*	4	
	Jocal	85	90	75	70			Fertility.
	Sites	62	85	75	70			Fertility.
	Mariposa	55	80	75	70			Fertility.
181	Jocal-Sites-Mariposa complex, 30 to 50 percent slopes					18*	5	
	Jocal	85	90	40	70			Fertility.
	Sites	62	85	40	70			Fertility.
	Mariposa	55	80	40	70			Fertility.
182	Kilaga clay loam, 0 to 1 percent slopes	65	85	100	95	52	3	Rare flooding.
183	Kilaga clay loam, hardpan substratum, 0 to 1 percent slopes	55	85	100	95	44	3	Rare flooding.
184	Kilaga clay loam, 0 to 1 percent slopes, occasionally flooded	65	85	100	80	44	3	Occasional flooding.
185	Kimball loam, 0 to 1 percent slopes	45	100	100	95x95	41	3	Fertility, rare flooding.
186	Kimball loam, 0 to 1 percent slopes, occasionally flooded	45	100	100	95x90	38	4	Fertility, occasional flooding.
187	Mariposa gravelly loam, 8 to 15 percent slopes	45	80	85	70	21	4	Fertility.
188	Mariposa gravelly loam, 15 to 30 percent slopes	45	80	75	70	19	5	Fertility.
189	Mariposa gravelly loam, 30 to 50 percent slopes	45	80	40	70	10	5	Fertility.
190	Mariposa-Jocal complex, 30 to 75 percent slopes					8*	6	
	Mariposa	55	80	20	70			Fertility.
	Jocal	85	90	20	70			Fertility.
191	Mariposa-Rock outcrop complex, 50 to 75 percent slopes					4*	6	
	Mariposa	55	70	20	70			Fertility.
	Rock outcrop	---	---	---	---			---
192	Marysville loam, 0 to 1 percent slopes	70	100	100	95	66	2	Rare flooding.
193	Mildred cobbly loam, 3 to 8 percent slopes	20	65	90	70	8	6	Fertility.
194	Mildred cobbly loam, 8 to 15 percent slopes	20	65	85	70	8	6	Fertility.

See footnotes at end of table.

TABLE 9.--STORIE INDEX RATING--Continued

Map symbol	Map unit	Rating factors A	B	C	X	Index	Grade	Limitation in X factor
195	Mildred cobbly loam, 15 to 30 percent slopes	20	65	75	70	7	6	Fertility.
196	Mildred cobbly loam, 30 to 50 percent slopes	20	65	40	70	4	6	Fertility.
197	Oakdale sandy loam, 0 to 5 percent slopes	95	95	90	95	77	2	Fertility.
198	Oakdale-Urban land complex, 0 to 1 percent slopes					<10**	6	
	Oakdale	95	95	100	95			Fertility.
	Urban land	---	---	---	---			---
199	Orose sandy loam, 8 to 15 percent slopes	38	95	85	90	28	4	Fertility.
200	Orose sandy loam, 15 to 30 percent slopes	38	95	75	90	24	4	Fertility.
201	Pardee gravelly loam, 3 to 8 percent slopes	38	65	90	95x85	18	5	Fertility, mound microrelief.
202	Pardee-Ranchoseco complex, 0 to 3 percent slopes					16*	5	
	Pardee	38	65	95	95x85			Fertility, mound mocrorelief.
	Ranchoseco	25	60	95	95x85			Fertility, mound microrelief.
203	Perkins loam, 0 to 2 percent slopes	85	100	100	95	81	1	Rare flooding.
204	Perkins loam, 0 to 1 percent slopes, occasionally flooded	85	100	100	80	68	2	Occasional flooding.
205	Perkins gravelly loam, 15 to 30 percent slopes	85	80	75	100	51	3	None.
206	Pits, sand	---	---	---	---	0	6	---
207	Redding gravelly loam, 0 to 3 percent slopes	22	80	95	95	16	5	Fertility.
208	Redding gravelly loam, 3 to 8 percent slopes	22	80	90	95x95	14	5	Fertility, mound mocrorelief.
209	Redding-Corning complex, 0 to 3 percent slopes					26*	4	
	Redding	22	80	95	95x90			Fertility, mound microrelief.
	Corning	60	80	95	95x90			Fertility, mound mocrorelief.
210	Redding-Corning complex, 3 to 8 percent slopes					25*	4	
	Redding	22	80	90	95x90			Fertility, mound microrelief.
	Corning	60	80	90	95x90			Fertility, mound mocrorelief.
211	Ricecross loam, 0 to 2 percent slopes	85	100	100	95x95	77	2	Fertility, rare flooding.

See footnotes at end of table.

TABLE 9.--STORIE INDEX RATING--Continued

Map symbol	Map unit	Rating factors A	B	C	X	Index	Grade	Limitation in X factor
212	Ricecross loam, 0 to 2 percent slopes, occasionally flooded	85	100	100	60x95x80	39	4	Drainage, fertility, occasional flooding.
213	Riverwash	---	---	---	---	0	6	---
214	San Joaquin loam, 0 to 1 percent slopes	25	100	100	95x95	23	4	Fertility, mound microrelief.
215	San Joaquin loam, 1 to 3 percent slopes	25	100	95	95x90	20	4	Fertility, mound microrelief.
216	San Joaquin loam, 0 to 1 percent slopes, occasionally flooded	25	100	100	95x95x80	18	5	Fertility, mound microrelief, occasional flooding.
217	San Joaquin-Urban land complex, 0 to 1 percent slopes					<10**	6	
	San Joaquin	25	100	100	95			Fertility.
	Urban land	---	---	---	---			---
218	Shanghai silt loam, 0 to 1 percent slopes	100	100	100	95	95	1	Rare flooding.
219	Shanghai silt loam, 0 to 1 percent slopes, occasionally flooded	100	100	100	60x80	48	3	Drainage, occasional flooding.
220	Shanghai silt loam, clay substratum, 0 to 1 percent slopes	80	100	100	90x95	68	2	Drainage, rare flooding.
221	Sites loam, 3 to 8 percent slopes	72	100	90	70	45	3	Fertility.
222	Sites loam, 8 to 15 percent slopes	72	100	85	70	43	3	Fertility.
223	Sites gravelly loam, 15 to 30 percent slopes	72	75	75	70	28	4	Fertility.
224	Sites gravelly loam, 30 to 50 percent slopes	72	75	40	70	15	5	Fertility.
225	Sites gravelly loam, bedrock substratum, 3 to 8 percent slopes	68	75	90	70	32	4	Fertility.
226	Sites gravelly loam, bedrock substratum, 8 to 15 percent slopes	68	75	85	70	30	4	Fertility.
227	Sites gravelly loam, bedrock substratum, 15 to 30 percent slopes	68	75	75	70	27	4	Fertility.
228	Sites gravelly loam, bedrock substratum, 30 to 50 percent slopes	68	75	40	70	14	5	Fertility.
229	Sites loam, cool, 3 to 15 percent slopes	72	100	85	70	43	3	Fertility.
230	Sites-Jocal complex, 2 to 30 percent slopes					33*	4	
	Sites	62	85	75	70			Fertility.
	Jocal	85	90	75	70			Fertility.

See footnotes at end of table.

TABLE 9.--STORIE INDEX RATING--Continued

Map symbol	Map unit	Rating factors A	B	C	X	Index	Grade	Limitation in X factor
231	Sites-Jocal-Mariposa complex, 30 to 50 percent slopes					16*	5	
	Sites	62	85	40	70			Fertility.
	Jocal	85	90	40	70			Fertility.
	Mariposa	55	80	40	70			Fertility.
232	Slacreek-Rock outcrop complex, 30 to 75 percent slopes					6*	6	
	Slacreek part	56	80	20	90			Fertility.
	Rock outcrop	---	---	---	---			---
235	Sobrante gravelly loam, 3 to 8 percent slopes	63	70	90	95	38	4	Fertility.
236	Sobrante gravelly loam, 8 to 15 percent slopes	63	70	85	95	36	4	Fertility.
237	Sobrante gravelly loam, 15 to 30 percent slopes	63	70	75	95	31	4	Fertility.
238	Sobrante-Rock outcrop complex, 30 to 50 percent slopes					12*	5	
	Sobrante	63	70	40	95			Fertility.
	Rock outcrop	---	---	---	---			---
239	Sobrante-Timbuctoo complex, 8 to 15 percent slopes					33*	4	
	Sobrante	63	70	85	95			Fertility.
	Timbuctoo	54	70	85	95			Fertility.
240	Sobrante-Timbuctoo complex, 15 to 30 percent slopes					29*	4	
	Sobrante	63	70	75	95			Fertility.
	Timbuctoo	54	70	75	95			Fertility.
241	Sobrante-Timbuctoo complex, 30 to 50 percent slopes					16*	5	
	Sobrante	63	70	40	95			Fertility.
	Timbuctoo	54	70	40	95			Fertility.
242	Surnuf loam, 8 to 15 percent slopes	80	100	85	90	61	2	Fertility.
243	Surnuf loam, 15 to 30 percent slopes	80	100	75	90	54	3	Fertility.
244	Surnuf loam, 30 to 50 percent slopes	80	100	40	90	29	4	Fertility.
245	Surnuf cobbly loam, 8 to 15 percent slopes	65	70	85	90	35	4	Fertility.
246	Surnuf cobbly loam, 15 to 30 percent slopes	65	70	75	90	31	4	Fertility.
247	Surnuf cobbly loam, 30 to 50 percent slopes	65	70	40	90	16	5	Fertility.
248	Trainer loam, 0 to 1 percent slopes, occasionally flooded	100	100	100	60x80	48	3	Drainage, occasional flooding.
249	Tujunga sand, 0 to 1 percent slopes	90	60	100	95x95	49	3	Fertility, rare flooding.

See footnotes at end of table.

TABLE 9.--STORIE INDEX RATING--Continued

Map symbol	Map unit	Rating factors A	B	C	X	Index	Grade	Limitation in X factor
250	Tujunga gravelly sand, 0 to 2 percent slopes	90	40	100	95x95	32	4	Fertility, rare flooding.
251	Tujunga sand, 0 to 1 percent slopes, occasionally flooded	90	60	100	95x80	41	3	Fertility, occasional flooding.
252	Woodleaf gravelly loam, 3 to 15 percent slopes	36	80	85	70	17	5	Fertility.
253	Woodleaf gravelly loam, 15 to 30 percent slopes	36	80	75	70	15	5	Fertility.
	Water	---	---	---	---	0	6	---

* Index value is a weighted average of the component part ratings.
** Rated nonagricultural because of Urban land.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
101*: Aiken, Horseshoe	Loam Mountains	Favorable	---	Trees:		
	Douglas-fir/Common Snowberry	Normal	---	Douglas-fir	---	50
	(022DB004CA)	Unfavorable	---	White fir	---	35
				Incense cedar	---	20
				California black oak	---	25
				Tanoak	---	30
				Ponderosa pine	---	20
				Sugar pine	---	20
				Shrubs:		
				Common snowberry	---	T**
				Poison oak	---	T**
				Other shrubs	---	T**
				Grasses or grasslike plants	T**	---
				Forbs	T**	---
102*, 103*, 104*: Argonaut, Auburn	Shallow Loam Foothills	Favorable	2,000	Trees:		
	Blue Oak/Soft Chess	Normal	1,500	Blue oak	---	50
	(018DB008CA)	Unfavorable	1,000			
				Grasses or grasslike plants:		
				Soft chess	40	---
				Dogtail	25	---
				Ripgut brome	10	---
				Wild oat	10	---
				Foxtail fescue	5	---
				Medusahead	5	---
				Silver hairgrass	5	---
				Forbs:		
				Rose clover	5	---
				Filaree	5	---
105: Argovar	Silt Loam Foothills	Favorable	6,000	Grasses or grasslike plants:		
	Carex - Rush	Unfavorable	5,000	Carex	20	---
	(018DY016CA)	Normal	3,000	Perennial ryegrass	20	---
				Rush	10	---
				Bentgrass	10	---
				Common velvetgrass	5	---
				Deergrass	5	---
				Forbs:		
				Plantain	10	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
106, 107, 108------- Auburn	Shallow Loam Foothills Blue Oak/Soft Chess (018DB046CA)	Favorable	2,000	Trees:		
		Normal	1,500	Blue oak-------------------	---	50
		Unfavorable	1,000			
				Grasses or grasslike plants:		
				Soft chess-----------------	40	---
				Dogtail--------------------	25	---
				Ripgut brome---------------	10	---
				Wild oat-------------------	10	---
				Foxtail fescue-------------	5	---
				Medusahead-----------------	5	---
				Silver hairgrass-----------	5	---
				Forbs:		
				Rose clover----------------	---	5
				Filaree--------------------	---	5
109----------------- Auburn	Shallow Loam Foothills Steep Blue Oak/Soft Chess (018DC0046CA)	Favorable	2,000	Trees:	---	
		Normal	1,500	Blue oak-------------------	---	50
		Unfavorable	1,000			
				Grasses or grasslike plants:		
				Soft chess-----------------	40	---
				Dogtail--------------------	25	---
				Ripgut brome---------------	10	---
				Wild oat-------------------	10	---
				Foxtail fescue-------------	5	---
				Medusahead-----------------	5	---
				Silver hairgrass-----------	5	---
				Forbs:		
				Rose clover----------------	5	---
				Filaree--------------------	5	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
110*, 111*, 112*:						
Auburn	Shallow Loam Foothills	Favorable	2,000	Trees:		
	Blue Oak/Soft Chess	Normal	1,500	Blue oak	---	50
	(018DB046CA)	Unfavorable	1,000			
				Grasses or grasslike plants:		
				Soft chess	40	---
				Dogtail	25	---
				Ripgut brome	10	---
				Wild oat	10	---
				Foxtail fescue	5	---
				Medusahead	5	---
				Silver hairgrass	5	---
				Forbs:		
				Rose clover	5	---
				Filaree	5	---
Sobrante	Loam Foothills	Favorable	2,500	Trees:		
	Blue Oak/Buckbrush/Soft Chess	Normal	2,000	Blue oak	---	50
	(018DC006CA)	Unfavorable	1,500	Interior live oak	---	5
				Digger pine	---	5
				Shrubs:		
				Buckbrush		5
				Poison oak		5
				Grasses or grasslike plants:		
				Soft chess	40	---
				Mediterranean barley	5	---
				Ripgut brome	5	---
				Foxtail fescue	5	---
				Wild oat	5	---
				Forbs:		
				Rose clover	5	---
				Filaree	5	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
113*, 114*, 115*, 117*, 118*:						
Auburn	Shallow Gravelly Loam Foothills Blue Oak/Buckbrush/Soft Chess (018DD046CA)	Favorable	2,000	Trees:		
		Normal	1,500	Blue oak	---	50
		Unfavorable	1,000	Interior live oak	---	5
				Digger pine	---	5
				Shrubs:		
				Buckbrush	---	5
				Poison oak	---	5
				Grasses or grasslike plants:		
				Soft chess	40	---
				Wild oat	10	---
				Dogtail	10	---
				Ripgut brome	5	---
				Foxtail fescue	5	---
				Forbs:		
				Rose clover	5	---
				Filaree	5	---
Sobrante	Gravelly Loam Foothills Blue Oak - Interior Live Oak/ Poison Oak (018DD006CA)	Favorable	2,500	Trees:		
		Normal	2,000	Blue oak	---	50
		Unfavorable	1,500	Interior live oak	---	20
				Digger pine	---	5
				Shrubs:		
				Poison oak	---	15
				Buckbrush	---	5
				California buckeye	---	5
				Grasses or grasslike plants:		
				Soft chess	40	---
				Wild oat	15	---
				Ripgut brome	10	---
				Squirreltail	5	---
				Dogtail	5	---
				Silver hairgrass	5	---
				Forbs:		
				Clover	5	---
				Filaree	5	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
116*, 119*, 120*:						
Auburn	Shallow Gravelly Loam Foothills Steep Blue Oak/Buckbrush/Soft Chess (018DE046CA)	Favorable	2,000	Trees:		
		Normal	1,500	Blue oak	---	50
		Unfavorable	1,000	Interior live oak	---	5
				Digger pine	---	5
				Shrubs:		
				Buckbrush	---	5
				Poison oak	---	5
				Grasses or grasslike plants:		
				Soft chess	40	---
				Wild oat	10	---
				Dogtail	10	---
				Ripgut brome	5	---
				Foxtail fescue	5	---
				Forbs:		
				Rose clover	5	---
				Filaree	5	---
Sobrante	Gravelly Loam Foothills Steep Blue Oak - Interior Live Oak/ Poison Oak (018DE006CA)	Favorable	2,500	Trees:		
		Normal	2,000	Blue oak	---	50
		Unfavorable	1,500	Interior live oak	---	20
				Digger pine	---	5
				Shrubs:	---	
				Poison oak	---	15
				Buckbrush	---	5
				California buckeye	---	5
				Grasses or grasslike plants:		
				Soft chess	40	---
				Wild oat	15	---
				Ripgut brome	10	---
				Squirreltail	5	---
				Dogtail	5	---
				Silver hairgrass	5	---
				Forbs:		
				Clover	5	---
				Filaree	5	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
121*, 122*:						
Auburn, Argonaut	Shallow Gravelly Loam Foothills	Favorable	2,000	Trees:		
	Blue Oak/Buckbrush/Soft Chess	Normal	1,500	Blue oak	---	50
	(018DD046CA)	Unfavorable	1,000	Interior live oak	---	5
				Digger pine	---	5
				Shrubs:	---	
				Buckbrush	---	5
				Poison oak	---	5
				Grasses or grasslike plants:		
				Soft chess	40	---
				Wild oat	10	---
				Dogtail	10	---
				Ripgut brome	5	---
				Foxtail fescue	5	---
				Forbs:		
				Rose clover	5	---
				Filaree	5	---
Timbuctoo	Gravelly Loam Foothills	Favorable	1,000	Trees:		
	Ponderosa Pine/Deerbrush/	Normal	500	Ponderosa pine	---	50
	Blue Wildrye	Unfavorable	300	California black oak	---	10
	(018DD035CA)			Interior live oak	---	10
				Shrubs:		
				Poison oak	---	10
				Deerbrush		10
				California scrub oak	---	5
				California buckthorn	---	5
				Other shrubs	---	T**
				Grasses or grasslike plants:		
				Blue wildrye	20	---
				Mountain brome	15	---
				Squirreltail	15	---
				California melicgrass	5	---
				Forbs:		
				Yarrow	5	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Compo-sition weight	Compo-sition canopy
			Lbs/acre		Pct	Pct
123, 124------------	Loam Mountains	Favorable	---	Trees:		
Boomer	Ponderosa Pine - California	Normal	---	Ponderosa pine-------------	---	50
	Black Oak/Poison Oak	Unfavorable	---	California black oak-------	---	10
	(022CD013CA)			Incense cedar--------------	---	10
				Pacific madrone------------	---	10
				Interior live oak----------	---	5
				Tanoak---------------------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Poison oak-----------------	---	10
				California scrub oak-------	---	T**
				Other shrubs---------------	---	T**
				Grasses or grasslike plants:		
				Blue wildrye---------------	---	5
				Mountain brome-------------	---	5
				Forbs:		
				Bedstraw-------------------	---	5
125-----------------	Loam Mountains Steep	Favorable	---	Trees:		
Boomer	Ponderosa Pine - California	Normal	---	Ponderosa pine-------------	---	50
	Black Oak/Poison Oak	Unfavorable	---	California black oak-------	---	10
	(022CE001CA)			Incense cedar--------------	---	10
				Pacific madrone------------	---	10
				Interior live oak----------	---	5
				Tanoak---------------------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Poison oak-----------------	---	10
				Other shrubs---------------	---	T**
				Grasses or grasslike plants:		
				Blue wildrye---------------	---	5
				Mountain brome-------------	---	5

				Forbs----------------------	---	15

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
126*:						
Boomer, Pendola----	Loam Mountains Steep	Favorable	---	Trees:		
	Ponderosa Pine - California	Normal	---	Ponderosa pine-------------	---	50
	Black Oak/Poison Oak	Unfavorable	---	California black oak-------	---	10
	(022CC019CA)			Incense cedar--------------	---	10
				Pacific madrone------------	---	10
				Interior live oak----------	---	5
				Tanoak---------------------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Poison oak-----------------	---	10
				Other shrubs---------------	---	T**
				Grasses or grasslike plants:		
				Blue wildrye---------------	---	5
				Mountain brome-------------	---	5
				Forbs-----------------------	---	15
127*:						
Boomer, Pendola----	Loam Mountains	Favorable	---	Trees:		
	Ponderosa Pine - California	Normal	---	Ponderosa pine-------------	---	50
	Black Oak/Poison Oak	Unfavorable	---	California black oak-------	---	10
	(022CD013CA)			Incense cedar--------------	---	10
				Pacific madrone------------	---	10
				Interior live oak----------	---	5
				Tanoak---------------------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Poison oak-----------------	---	10
				California scrub oak-------	---	T**
				Other shrubs---------------	---	T**
				Grasses or grasslike plants:		
				Blue wildrye---------------	---	5
				Mountain brome-------------	---	5
				Forbs-----------------------	---	15

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
127*:						
Sites	Loam Mountains Douglas-fir/Common Snowberry (022CB009CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	50
		Unfavorable	---	White fir	---	35
				Incense cedar	---	20
				California black oak	---	25
				Tanoak	---	30
				Ponderosa pine	---	20
				Sugar pine	---	20
				Shrubs:		
				Common snowberry	---	T**
				Other shrubs	---	T**
				Grasses or grasslike plants	---	T**
				Forbs	---	T**
128*:						
Boomer, Pendola	Loam Mountains Steep Ponderosa Pine - California Black Oak/Poison Oak (022CE013CA)	Favorable	---	Trees:		
		Normal	---	Ponderosa pine	---	50
		Unfavorable	---	California black oak	---	10
				Incense cedar	---	10
				Pacific madrone	---	10
				Interior live oak	---	5
				Tanoak	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Poison oak	---	10
				Other shrubs	---	T**
				Grasses or grasslike plants:		
				Blue wildrye	---	5
				Mountain brome	---	5
				Forbs	---	15

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
128*:						
Sites	Loam Mountains Steep Douglas-fir/Common Snowberry (022CC009CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	50
		Unfavorable	---	White fir	---	35
				Incense cedar	---	20
				California black oak	---	25
				Tanoak	---	30
				Ponderosa pine	---	20
				Sugar pine	---	20
				Shrubs:		
				Common snowberry	---	T**
				Other shrubs	---	T**
				Grasses or grasslike plants:		
				Blue wildrye	---	T**
				Forbs	---	T**
133 Hollenbeck	Clay Uplands Italian Ryegrass - Filaree (017DY002CA)	Favorable	3,500	Grasses or grasslike plants:		
		Normal	2,500	Italian ryegrass	30	---
		Unfavorable	1,500	Soft chess	10	---
				Big quakinggrass	5	---
				Forbs:		
				Filaree	15	---
				Clover	5	---
135*:						
Chaix, Chawanakee	Shallow Sandy Loam Mountains Steep California Black Oak - Canyon Live Oak/Sticky Whiteleaf Manzanita (022CB021CA)	Favorable	---	Trees:		
		Normal	---	Canyon live oak	---	50
		Unfavorable	---	California black oak	---	30
				Ponderosa pine	---	5
				Pacific madrone	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	20
				Poison oak	---	5
				Deerbrush	---	5
				Mountain misery	---	5
				Grasses or grasslike plants:		
				Carex	---	3
				Forbs:		
				Bedstraw	---	4

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
135*:						
Hotaw	Moderately Deep Loam Mountains	Favorable	---	Trees:		
	Steep	Normal	---	Douglas-fir	---	40
	Douglas-fir/Mountain Misery	Unfavorable	---	White fir	---	30
	(022CD001CA)			Ponderosa pine	---	20
				Sugar pine	---	15
				California black oak	---	15
				Tanoak	---	10
				Incense cedar	---	5
				Shrubs:		
				Mountain misery	---	10
				Deerbrush	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry	---	5
				Poison oak	---	2
				Grasses or grasslike plants:		
				Carex	---	5
				Forbs:		
				Western princes pine	---	5
				Broadleaf starflower	---	5
				Brackenfern	---	5
				Bedstraw	---	5
				Iris	---	5
				Sweetroot	---	5
136*:						
Chawanakee, Chaix	Shallow Sandy Loam Mountains	Favorable	---	Trees:		
	Steep	Normal	---	Canyon live oak	---	50
	California Black Oak - Canyon	Unfavorable	---	California black oak	---	30
	Live Oak/Sticky Whiteleaf			Ponderosa pine	---	5
	Manzanita			Pacific madrone	---	5
	(022CB029CA)			Shrubs:		
				Sticky whiteleaf manzanita	---	20
				Poison oak	---	5
				Deerbrush	---	5
				Mountain misery	---	5
				Grasses or grasslike plants:		
				Carex	---	3
				Forbs:		
				Bedstraw	---	4

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
136*:						
Hotaw	Moderately Deep Loam Mountains	Favorable	---	Trees:		
	Steep	Normal	---	Douglas-fir	---	40
	Douglas-fir/Mountain Misery	Unfavorable	---	White fir	---	30
	(022CD001CA)			Ponderosa pine	---	20
				Sugar pine	---	15
				California black oak	---	15
				Tanoak	---	10
				Incense cedar	---	5
				Shrubs:		
				Mountain misery	---	10
				Deerbrush	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry	---	5
				Grasses or grasslike plants:		
				Carex	---	5
				Forbs:		
				Western princes pine	---	5
				Broadleaf starflower	---	5
				Brackenfern	---	5
				Bedstraw	---	5
				Iris	---	5
				Sweetroot	---	5
141	Loam Stream Terrace	Favorable	4,000	Trees:		
Conejo	Soft Chess - Wild Oat	Normal	3,000	California white oak	---	5
	(017DY052CA)	Unfavorable	2,000			
				Grasses or grasslike plants:		
				Soft chess	40	---
				Wild oat	20	---
				Ripgut brome	15	---
				Medusahead	15	---
				Other grasses	T**	---
				Forbs:		
				Filaree	10	---
				Burclover	5	---
				Clover	5	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
144*:						
Deadwood, Hurlbut--	Shallow Sandy Loam Mountains	Favorable	---	Trees:		
	Steep	Normal	---	Canyon live oak------------	---	50
	California Black Oak - Canyon	Unfavorable	---	California black oak-------	---	30
	Live Oak/Sticky Whiteleaf			Ponderosa pine-------------	---	5
	Manzanita			Pacific madrone------------	---	5
	(022CB022CA)					
				Shrubs:	---	
				Sticky whiteleaf manzanita	---	20
				Poison oak-----------------	---	5
				Deerbrush------------------	---	5
				Mountain misery------------	---	5
				Grasses or grasslike plants--	---	T**
				Forbs-----------------------	---	T**
148, 149, 150-------	Sandy Loam Foothills	Favorable	1,500	Trees:		
Flanly	Interior Live Oak - Blue Oak/	Normal	1,000	Interior live oak----------	---	40
	Sticky Whiteleaf Manzanita	Unfavorable	500	Blue oak-------------------	---	20
	(018DF006CA)			Digger pine----------------	---	5
				California black oak-------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	15
				Buckbrush------------------	---	5
				Poison oak-----------------	---	5
				California buckthorn-------	---	5
				Toyon----------------------	---	5
				Grasses or grasslike plants:		
				Dogtail--------------------	15	---
				Wild oat-------------------	15	---
				Ripgut brome---------------	15	---
				Blue wildrye---------------	10	---
				California melicgrass------	5	---
				Forbs-----------------------	15	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production		Potential natural vegetation	Compo- sition weight	Compo- sition canopy
		Kind of year	Dry weight			
			Lbs/acre		Pct	Pct
151, 152*: Flanly	Sandy Loam Foothills Steep Interior Live Oak/Toyon/Phlox (018DB018CA)	Favorable	500	Trees:		
		Normal	300	Interior live oak	---	40
		Unfavorable	100	Digger pine	---	3
				Other trees	---	T**
				Shrubs:		
				Toyon	---	5
				Grasses or grasslike plants:		
				Wild oat	25	---
				Needlegrass	15	---
				Forbs:		
				Phlox	20	---
153*, 154*: Flanly	Sandy Loam Foothills Interior Live Oak - Blue Oak/ Sticky Whiteleaf Manzanita (018DF006CA)	Favorable	1,500	Trees:		
		Normal	1,000	Interior live oak	---	40
		Unfavorable	500	Blue oak	---	20
				Digger pine	---	5
				California black oak	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	15
				Buckbrush	---	5
				Poison oak	---	5
				California buckthorn	---	5
				Toyon	---	5
				Grasses or grasslike plants:		
				Dogtail	15	---
				Wild oat	15	---
				Ripgut brome	15	---
				Blue wildrye	10	---
				California melicgrass	5	---
				Forbs	T**	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
153*, 154*:						
Orose, Verjeles----	Shallow Sandy Loam Foothills Interior Live Oak - Blue Oak/ Sticky Whiteleaf Manzanita (018DY007CA)	Favorable	500	Trees:		
		Normal	300	Interior live oak----------	---	30
		Unfavorable	100	Blue oak------------------	---	10
				Digger pine----------------	---	5
				California black oak-------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Toyon----------------------	---	5
				Poison oak-----------------	---	5
				Grasses or grasslike plants:		
				Soft chess-----------------	25	---
				Ripgut brome---------------	15	---
				Squirreltail---------------	15	---
				Blue wildrye---------------	15	---
158----------------- Hoda	Loam Mountains Douglas-fir/Common Snowberry (022CB015CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir----------------	---	50
		Unfavorable	---	White fir------------------	---	35
				Incense cedar--------------	---	20
				California black oak-------	---	25
				Tanoak---------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	20
				Shrubs:		
				Common snowberry-----------	---	T**
				Poison oak-----------------	---	T**
				Other shrubs---------------	---	T**
				Grasses or grasslike plants--	---	T**
				Forbs----------------------	---	T**

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
159*: Hoda, Musick	Loam Mountains Douglas-fir/Common Snowberry (022CB015CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	50
		Unfavorable	---	White fir	---	35
				Incense cedar	---	20
				California black oak	---	25
				Tanoak	---	30
				Ponderosa pine	---	20
				Sugar pine	---	20
				Shrubs:		
				Common snowberry	---	T**
				Poison oak	---	T**
				Other shrubs	---	T**
				Grasses or grasslike plants		T**
				Forbs		T**
164: Holland	Loam Mountains Steep Ponderosa Pine - California Black Oak/Poison Oak (022CC014CA)	Favorable	---	Trees:		
		Normal	---	Ponderosa pine	---	50
		Unfavorable	---	California black oak	---	10
				Incense cedar	---	10
				Pacific madrone	---	10
				Interior live oak	---	5
				Tanoak	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Poison oak	---	10
				Other shrubs	---	T**
				Grasses or grasslike plants:		
				Blue wildrye	---	5
				Mountain brome	---	5
				Forbs	---	15

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Compo-sition weight	Compo-sition canopy
			Lbs/acre		Pct	Pct
165*, 167*:						
Holland	Loam Mountains Dry Douglas-fir/Common Snowberry (022CE014CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	50
		Unfavorable	---	White fir	---	35
				Incense cedar	---	20
				California black oak	---	25
				Tanoak	---	30
				Ponderosa pine	---	20
				Sugar pine	---	20
				Shrubs:		
				Common snowberry	---	T**
				Other shrubs	---	T**
				Grasses or grasslike plants	---	T**
				Forbs	---	T**
Hoda	Loam Mountains Douglas-fir/Common Snowberry (022CB015CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	50
		Unfavorable	---	White fir	---	35
				Incense cedar	---	20
				California black oak	---	25
				Tanoak	---	30
				Ponderosa pine	---	20
				Sugar pine	---	20
				Shrubs:		
				Common snowberry	---	T**
				Poison oak	---	T**
				Other shrubs	---	T**
				Grasses or grasslike plants	---	T**
				Forbs		T**

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
165*, 167*:						
Hotaw	Moderately Deep Loam Mountains Douglas-fir/Mountain Misery (022CC021CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	40
		Unfavorable	---	White fir	---	30
				Ponderosa pine	---	20
				Sugar pine	---	15
				California black oak	---	15
				Tanoak	---	10
				Incense cedar	---	5
				Shrubs:		
				Mountain misery	---	10
				Deerbrush	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry	---	5
				Grasses or grasslike plants:		
				Carex	---	5
				Forbs:		
				Western princes pine	---	5
				Broadleaf starflower	---	5
				Brackenfern	---	5
				Bedstraw	---	5
				Iris	---	5
				Sweetroot	---	5
166*:						
Holland	Loam Mountains Steep Dry Douglas-fir/Common Snowberry (022CE014CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	50
		Unfavorable	---	White fir	---	35
				Incense cedar	---	20
				California black oak	---	25
				Tanoak	---	30
				Ponderosa pine	---	20
				Sugar pine	---	20
				Shrubs:		
				Common snowberry	---	T**
				Other shrubs	---	T**
				Grasses or grasslike plants	---	T**
				Forbs	---	T**

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
166*:						
Hoda	Loam Mountains Steep Douglas-fir/Common Snowberry (022CC015CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	50
		Unfavorable	---	White fir	---	35
				Incense cedar	---	20
				California black oak	---	25
				Tanoak	---	30
				Ponderosa pine	---	20
				Sugar pine	---	20
				Shrubs:		
				Common snowberry	---	T**
				Poison oak	---	T**
				Other shrubs	---	T**
				Grasses or grasslike plants	---	T**
				Forbs	---	T**
Hotaw	Moderately Deep Loam Mountains Steep Douglas-fir/Mountain Misery (022CD001CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	40
		Unfavorable	---	White fir	---	30
				Ponderosa pine	---	20
				Sugar pine	---	15
				California black oak	---	15
				Tanoak	---	10
				Incense cedar	---	5
				Shrubs:		
				Mountain misery	---	10
				Deerbrush	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry	---	5
				Grasses or grasslike plants:		
				Carex	---	5
				Forbs:		
				Western princes pine	---	5
				Broadleaf starflower	---	5
				Brackenfern	---	5
				Bedstraw	---	5
				Iris	---	5
				Sweetroot	---	5

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
168*: Horseshoe, Aiken	Loam Mountains Steep Douglas-fir/Common Snowberry (022CC013CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	50
		Unfavorable	---	White fir	---	35
				Incense cedar	---	20
				California black oak	---	25
				Tanoak	---	30
				Ponderosa pine	---	20
				Sugar pine	---	20
				Shrubs:	---	
				Common snowberry	---	T**
				Other shrubs	---	T**
				Grasses or grasslike plants	---	T**
				Forbs	---	T**
171: Hotaw	Moderately Deep Loam Mountains Douglas-fir/Mountain Misery (022CC021CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	40
		Unfavorable	---	White fir	---	30
				Ponderosa pine	---	20
				Sugar pine	---	15
				California black oak	---	15
				Tanoak	---	10
				Incense cedar	---	5
				Shrubs:		
				Mountain misery	---	10
				Deerbrush	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry	---	5
				Grasses or grasslike plants:		
				Carex	---	5
				Forbs:		
				Western princes pine	---	5
				Broadleaf starflower	---	5
				Brackenfern	---	5
				Bedstraw	---	5
				Iris	---	5
				Sweetroot	---	5

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
172 Hotaw	Moderately Deep Loam Mountains Steep Douglas-fir/Mountain Misery (022CD021CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	40
		Unfavorable	---	White fir	---	30
				Ponderosa pine	---	20
				Sugar pine	---	15
				California black oak	---	15
				Tanoak	---	10
				Incense cedar	---	5
				Shrubs:		
				Mountain misery	---	10
				Deerbrush	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry	---	5
				Grasses or grasslike plants:		
				Carex	---	5
				Forbs:		
				Western princes pine	---	5
				Broadleaf starflower	---	5
				Brackenfern	---	5
				Bedstraw	---	5
				Iris	---	5
				Sweetroot	---	5
173*: Hotaw, Chawanakee	Shallow Sandy Loam Mountains California Black Oak - Canyon Live Oak/Sticky Whiteleaf Manzanita (022CF001CA)	Favorable	---	Trees:		
		Normal	---	Canyon live oak	---	50
		Unfavorable	---	California black oak	---	30
				Ponderosa pine	---	5
				Pacific madrone	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	20
				Poison oak	---	5
				Deerbrush	---	5
				Mountain misery	---	5
				Grasses or grasslike plants	---	T**
				Forbs	---	T**

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
173*:						
Holland------------	Loam Mountains	Favorable	---	Trees:		
	Ponderosa Pine - California	Normal	---	Ponderosa pine------------	---	50
	Black Oak/Poison Oak	Unfavorable	---	California black oak-------	---	10
	(022CB014CA)			Incense cedar-------------	---	10
				Pacific madrone------------	---	10
				Interior live oak----------	---	5
				Tanoak--------------------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Poison oak----------------	---	10
				Other shrubs--------------	---	T**
				Grasses or grasslike plants--	---	T**
				Forbs---------------------	---	T**
174*----------------	Shallow Sandy Loam Mountains	Favorable	---	Trees:		
Hurlbut, Deadwood	Steep	Normal	---	Canyon live oak-----------	---	50
	California Black Oak - Canyon	Unfavorable	---	California black oak-------	---	30
	Live Oak/Sticky Whiteleaf			Ponderosa pine------------	---	5
	Manzanita			Pacific madrone------------	---	5
	(022CB022CA)			Shrubs:		
				Sticky whiteleaf manzanita	---	20
				Poison oak----------------	---	5
				Deerbrush-----------------	---	5
				Mountain misery-----------	---	5
				Grasses or grasslike plants--	---	T**
				Forbs---------------------	---	T**

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
175, 176, 177------- Jocal	Loam Mountains Douglas-fir/Common Snowberry (022CB013CA)	Favorable Normal Unfavorable	--- --- ---	Trees:		
				Douglas-fir----------------	---	50
				White fir-----------------	---	35
				Incense cedar--------------	---	20
				California black oak-------	---	25
				Tanoak---------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	20
				Shrubs:		
				Common snowberry-----------	---	T**
				Other shrubs---------------	---	T**
				Grasses or grasslike plants--	---	T**
				Forbs----------------------	---	T**
178, 179------------ Jocal, cool	Loam Mountains White Fir/Pacific Dogwood (022CF013CA)	Favorable Normal Unfavorable	--- --- ---	Trees:		
				White fir-----------------	---	50
				Douglas-fir----------------	---	45
				Sugar pine-----------------	---	5
				California black oak-------	---	5
				Shrubs:		
				Pacific dogwood------------	---	15
				Whitethorn ceanothus-------	---	10
				California hazel-----------	---	5
				Tanoak---------------------	---	5
				Sierra gooseberry----------	---	5
				Deerbrush------------------	---	5
				Greenleaf manzanita--------	---	5
				Woods rose-----------------	---	5
				Forbs:		
				Broadleaf starflower-------	---	5
				Heartleaf arnica-----------	---	5
				Western princes pine-------	---	5
				False Solomons seal--------	---	5
				Wintergreen----------------	---	5

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Compo- sition weight	Compo- sition canopy
			Lbs/acre		Pct	Pct
180*:						
Jocal, Sites	Loam Mountains	Favorable	---	Trees:		
	Douglas-fir/Common Snowberry	Normal	---	Douglas-fir	---	50
	(022CB013CA)	Unfavorable	---	White fir	---	35
				Incense cedar	---	20
				California black oak	---	25
				Tanoak	---	30
				Ponderosa pine	---	20
				Sugar pine	---	20
				Shrubs:		
				Common snowberry	---	T**
				Other shrubs	---	T**
				Grasses or grasslike plants	---	T**
				Forbs	---	T**
Mariposa	Moderately Deep Loam Mountains	Favorable	---	Trees:		
	Douglas-fir/Mountain Misery	Normal	---	Douglas-fir	---	40
	(022CC001CA)	Unfavorable	---	White fir	---	30
				Ponderosa pine	---	20
				Sugar pine	---	15
				California black oak	---	15
				Tanoak	---	10
				Incense cedar	---	5
				Shrubs:		
				Mountain misery	---	10
				Deerbrush	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry	---	5
				Grasses or grasslike plants:		
				Carex	---	5
				Forbs:		
				Western princes pine	---	5
				Broadleaf starflower	---	5
				Brackenfern	---	5
				Bedstraw	---	5
				Iris	---	5
				Sweetroot	---	5

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
181*:						
Jocal, Sites-------	Loam Mountains Steep	Favorable	---	Trees:		
	Douglas-fir/Common Snowberry	Normal	---	Douglas-fir----------------	---	50
	(022CC013CA)	Unfavorable	---	White fir------------------	---	35
				Incense cedar--------------	---	20
				California black oak-------	---	25
				Tanoak---------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	20
				Shrubs:		
				Common snowberry-----------	---	T**
				Other shrubs---------------	---	T**
				Grasses or grasslike plants--	---	T**
				Forbs----------------------	---	T**
Mariposa-----------	Moderately Deep Loam Mountains Steep	Favorable	---	Trees:		
	Douglas-fir/Mountain Misery	Normal	---	Douglas-fir----------------	---	40
	(022CD001CA)	Unfavorable	---	White fir------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	15
				California black oak-------	---	15
				Tanoak---------------------	---	10
				Incense cedar--------------	---	5
				Shrubs:		
				Mountain misery------------	---	10
				Deerbrush------------------	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry-----------	---	5
				Grasses or grasslike plants:		
				Carex----------------------	---	5
				Forbs:		
				Western princes pine-------	---	5
				Broadleaf starflower-------	---	5
				Brackenfern----------------	---	5
				Bedstraw-------------------	---	5
				Iris-----------------------	---	5
				Sweetroot------------------	---	5

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production		Potential natural vegetation	Composition weight	Composition canopy
		Kind of year	Dry weight			
			Lbs/acre		Pct	Pct
187, 188 Mariposa	Moderately Deep Loam Mountains Douglas-fir/Mountain Misery (022CC001CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir	---	40
		Unfavorable	---	White fir	---	30
				Ponderosa pine	---	20
				Sugar pine	---	15
				California black oak	---	15
				Tanoak	---	10
				Incense cedar	---	5
				Shrubs:		
				Mountain misery	---	10
				Deerbrush	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry	---	5
				Grasses or grasslike plants:		
				Carex	---	5
				Forbs:		
				Western princes pine	---	5
				Broadleaf starflower	---	5
				Brackenfern	---	5
				Bedstraw	---	5
				Iris	---	5
				Sweetroot	---	5

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
189, 191*----------- Mariposa	Moderately Deep Loam Mountains Steep Douglas-fir/Mountain Misery (022CD021CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir----------------	---	40
		Unfavorable	---	White fir------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	15
				California black oak-------	---	15
				Tanoak---------------------	---	10
				Incense cedar--------------	---	5
				Shrubs:		
				Mountain misery------------	---	10
				Deerbrush------------------	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry-----------	---	5
				Grasses or grasslike plants:		
				Carex----------------------	---	5
				Forbs:		
				Western princes pine-------	---	5
				Broadleaf starflower-------	---	5
				Brackenfern----------------	---	5
				Bedstraw-------------------	---	5
				Iris-----------------------	---	5
				Sweetroot------------------	---	5

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
190*:						
Mariposa-----------	Moderately Deep Loam Mountains	Favorable	---	Trees:		
	Steep	Normal	---	Douglas-fir----------------	---	40
	Douglas-fir/Mountain Misery	Unfavorable	---	White fir------------------	---	30
	(022CD001CA)			Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	15
				California black oak-------	---	15
				Tanoak---------------------	---	10
				Incense cedar--------------	---	5
				Shrubs:		
				Mountain misery------------	---	10
				Deerbrush------------------	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry-----------	---	5
				Grasses or grasslike plants:		
				Carex----------------------	---	5
				Forbs:		
				Western princes pine-------	---	5
				Broadleaf starflower-------	---	5
				Brackenfern----------------	---	5
				Bedstraw-------------------	---	5
				Iris-----------------------	---	5
				Sweetroot------------------	---	5
Jocal--------------	Loam Mountains Steep	Favorable	---	Trees:		
	Douglas-fir/Common Snowberry	Normal	---	Douglas-fir----------------	---	50
	(022CC013CA)	Unfavorable	---	White fir------------------	---	35
				Incense cedar--------------	---	20
				California black oak-------	---	25
				Tanoak---------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	20
				Shrubs:		
				Common snowberry-----------	---	T**
				Other shrubs---------------	---	T**
				Grasses or grasslike plants--	---	T**
				Forbs----------------------	---	T**

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
193, 194, 195, 196--Mildred	Rocky Loam Mountains Sticky Whiteleaf Manzanita-Creeping Sage (022CY0023CA)	Favorable	---	Trees:		
		Normal	---	California black oak-------	---	5
		Unfavorable	---	Ponderosa pine-------------	---	5
				Interior live oak----------	---	5
				MacNab cypress-------------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	40
				Creeping sage--------------	---	20
				California scrub oak-------	---	10
				Redbud---------------------	---	5
				Deerbrush------------------	---	5
				Poison oak-----------------	---	5
				Grasses or grasslike plants:		
				Squirreltail---------------	---	10
				California melicgrass------	---	5
199, 200------------Orose	Shallow Sandy Loam Foothills Interior Live Oak - Blue Oak/ Sticky Whiteleaf Manzanita (018DG046CA)	Favorable	500	Trees:		
		Normal	300	Interior live oak----------	---	30
		Unfavorable	100	Blue oak-------------------	---	10
				Digger pine----------------	---	5
				California black oak-------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Toyon----------------------	---	5
				Poison oak-----------------	---	5
				Other shrubs---------------	---	T**

				Grasses or grasslike plants:		
				Soft chess-----------------	25	---
				Ripgut brome---------------	15	---
				Squirreltail---------------	15	---
				Blue wildrye---------------	15	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
201, 202*-----------	Shallow Gravelly Loam Terrace	Favorable	1,500	Grasses or grasslike plants:		
Pardee	Soft Chess - Filaree	Normal	1,000	Soft chess-----------------	40	---
	(017DY076CA)	Unfavorable	500	Mouse barley---------------	15	---
				Medusahead-----------------	10	---
				Ripgut brome---------------	5	---
				Wild oat-------------------	5	---
				Other grasses--------------	T**	---
				Forbs:		
				Filaree--------------------	30	---
				Clover---------------------	10	---
				Brodiaea-------------------	10	---
				Smooth catsear-------------	5	---
202*:						
Ranchoseco---------	Very Shallow Very Cobbly Loam Terrace	Favorable	1,200	Grasses or grasslike plants:		
		Normal	800	Soft chess-----------------	40	---
	Soft Chess - Filaree	Unfavorable	500	Mouse barley---------------	10	---
	(017DY077CA)			Medusahead-----------------	10	---
				Silver hairgrass-----------	5	---
				Forbs:		
				Filaree--------------------	30	---
				Clover---------------------	10	---
203-----------------	Loam Stream Terrace	Favorable	4,000	Trees:		
Perkins	Soft Chess - Wild Oat	Normal	3,000	California white oak-------		5
	(017DY052CA)	Unfavorable	2,000			---
				Grasses or grasslike plants:		
				Soft chess-----------------	40	---
				Wild oat-------------------	20	---
				Ripgut brome---------------	15	---
				Medusahead-----------------	15	---
				Other grasses--------------	T**	---
				Forbs:		
				Filaree--------------------	10	---
				Burclover------------------	5	---
				Clover---------------------	5	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
205----------------- Perkins	Gravelly Loam Foothills Blue Oak - Interior Live Oak/ Poison Oak (018DY025CA)	Favorable	2,500	Trees:		
		Normal	2,000	Blue oak-------------------	---	50
		Unfavorable	1,500	Interior live oak----------	---	20
				Digger pine----------------	---	5
				Shrubs:		
				Poison oak-----------------	---	15
				Buckbrush------------------	---	5
				California buckeye---------	---	5
				Grasses or grasslike plants:		
				Soft chess-----------------	40	---
				Wild oat-------------------	15	---
				Ripgut brome---------------	10	---
				Squirreltail---------------	5	---
				Dogtail--------------------	5	---
				Silver hairgrass-----------	5	---
				Other grasses--------------	T**	---
				Forbs:		
				Clover---------------------	5	---
				Filaree--------------------	5	---
				Other forbs----------------	T**	---
207, 208------------ Redding	Claypan Terrace Soft Chess - Filaree (017DY065CA)	Favorable	2,000	Grasses or grasslike plants:		
		Normal	1,400	Soft chess-----------------	40	---
		Unfavorable	800	Wild oat-------------------	10	---
				Foxtail fescue-------------	10	---
				Medusahead-----------------	10	---
				Silver hairgrass-----------	5	---
				Forbs:		
				Filaree--------------------	15	---
				Clover---------------------	5	---
				Annual lupine--------------	5	---
				Brodiaea-------------------	T**	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
209*, 210*:						
Redding, Corning	Claypan Terrace Soft Chess - Filaree (017DY065CA)	Favorable	2,000	Grasses or grasslike plants:		
		Normal	1,400	Soft chess	40	---
		Unfavorable	800	Wild oat	10	---
				Foxtail fescue	10	---
				Medusahead	10	---
				Silver hairgrass	5	---
				Forbs:		
				Filaree	15	---
				Clover	5	---
				Annual lupine	5	---
				Brodiaea	T**	---
211, 212: Ricecross	Loam Stream Terrace Soft Chess - Wild Oat (017DY052CA)	Favorable	4,000	Trees:		
		Normal	3,000	California white oak	---	5
		Unfavorable	2,000			
				Grasses or grasslike plants:		
				Soft chess	40	---
				Wild oat	20	---
				Ripgut brome	15	---
				Medusahead	15	---
				Other grasses	T**	---
				Forbs:		
				Filaree	10	---
				Burclover	5	---
				Clover	5	---
214, 215: San Joaquin	Claypan Terrace Soft Chess - Filaree (017DY064CA)	Favorable	2,000	Grasses or grasslike plants:		
		Normal	1,400	Soft chess	40	---
		Unfavorable	800	Wild oat	10	---
				Foxtail fescue	10	---
				Medusahead	10	---
				Silver hairgrass	5	---
				Forbs:		
				Filaree	15	---
				Clover	5	---
				Annual lupine	5	---
				Brodiaea	T**	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
221, 222, 223, 225, 226, 227, 229------ Sites	Loam Mountains Douglas-fir/Common Snowberry (022CB016CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir----------------	---	50
		Unfavorable	---	White fir------------------	---	35
				Incense cedar--------------	---	20
				California black oak-------	---	25
				Tanoak---------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	20
				Shrubs---------------------	---	T**
				Grasses or grasslike plants--	---	T**
				Forbs----------------------	---	T**
224, 228------------ Sites	Loam Mountains Steep Douglas-fir/Common Snowberry (022CC016CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir----------------	---	50
		Unfavorable	---	White fir------------------	---	35
				Incense cedar--------------	---	20
				California black oak-------	---	25
				Tanoak---------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	20
				Shrubs:		
				Common snowberry-----------		T**
				Other shrubs---------------		T**
				Grasses or grasslike plants--	---	T**
				Forbs----------------------	---	T**

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production		Potential natural vegetation	Composition weight	Composition canopy
		Kind of year	Dry weight			
			Lbs/acre		Pct	Pct
230*:						
Sites, Jocal-------	Loam Mountains	Favorable	---	Trees:		
	Douglas-fir/Common Snowberry	Normal	---	Douglas-fir----------------	---	50
	(022CB009CA)	Unfavorable	---	White fir------------------	---	35
				Incense cedar--------------	---	20
				California black oak-------	---	25
				Tanoak---------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	20
				Shrubs:		
				Common snowberry-----------	---	T**
				Other shrubs---------------	---	T**
				Grasses or grasslike plants--	---	T**
				Forbs----------------------	---	T**
231*:						
Sites, Jocal-------	Loam Mountains Steep	Favorable	---	Trees:		
	Douglas-fir/Common Snowberry	Normal	---	Douglas-fir----------------	---	50
	(022CC009CA)	Unfavorable	---	White fir------------------	---	35
				Incense cedar--------------	---	20
				California black oak-------	---	25
				Tanoak---------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	20
				Shrubs:		
				Common snowberry-----------	---	T**
				Other shrubs---------------	---	T**
				Grasses or grasslike plants--	---	T**
				Forbs----------------------	---	T**

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
231*:						
Mariposa-----------	Moderately Deep Loam Mountains Steep Douglas-fir/Mountain Misery (022CD001CA)	Favorable	---	Trees:		
		Normal	---	Douglas-fir----------------	---	40
		Unfavorable	---	White fir------------------	---	30
				Ponderosa pine-------------	---	20
				Sugar pine-----------------	---	15
				California black oak-------	---	15
				Tanoak---------------------	---	10
				Incense cedar--------------	---	5
				Shrubs:		
				Mountain misery------------		10
				Deerbrush------------------	---	10
				Sticky whiteleaf manzanita	---	5
				Common snowberry-----------	---	5
				Poison oak-----------------	---	2
				Grasses or grasslike plants:		
				Carex----------------------	---	5
				Forbs:		
				Western princes pine-------	---	5
				Broadleaf starflower-------	---	5
				Brackenfern----------------	---	5
				Bedstraw-------------------	---	5
				Iris-----------------------	---	5
				Sweetroot------------------	---	5
232*---------------- Slacreek	Moderately Deep Gravelly Loam Mountains Steep Douglas-fir/Pacific Dogwood (022CE021CA)	Favorable	---	Trees:		
		Normal	---	White Fir------------------	---	20
		Unfavorable	---	Douglas-fir----------------	---	20
				Sugar pine-----------------	---	10
				California black oak-------	---	10
				Incense cedar--------------	---	5
				California dogwood---------	---	5
				Bigleaf maple--------------	---	5
				Other trees----------------	---	T**
				Shrubs:		
				Pacific dogwood------------	---	30
				Tanoak---------------------	---	30
				Deerbrush------------------	---	10
				California hazel-----------	---	5
				Other shrubs---------------	---	T**
				Forbs----------------------	---	T**

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
235, 236, 237-------Sobrante	Gravelly Loam Foothills Blue Oak - Interior Live Oak/ Poison Oak (018DD006CA)	Favorable	2,500	Trees:		
		Normal	2,000	Blue oak------------------	---	50
		Unfavorable	1,500	Interior live oak----------	---	20
				Digger pine----------------	---	5
				Shrubs:		
				Poison oak-----------------	---	15
				Buckbrush------------------	---	5
				California buckeye---------	---	5
				Grasses or grasslike plants:		
				Soft chess-----------------	40	---
				Wild oat-------------------	15	---
				Ripgut brome---------------	10	---
				Squirreltail---------------	5	---
				Dogtail--------------------	5	---
				Silver hairgrass-----------	5	---
				Other grasses--------------	T**	---
				Forbs:		
				Clover---------------------	5	---
				Filaree--------------------	5	---
				Other forbs----------------	T**	---
238*----------------Sobrante	Gravelly Loam Foothills Steep Blue Oak - Interior Live Oak/ Poison Oak (018DE006CA)	Favorable	2,500	Trees:		
		Normal	2,000	Blue oak------------------	---	50
		Unfavorable	1,500	Interior live oak----------	---	20
				Digger pine----------------	---	5
				Shrubs:		
				Poison oak-----------------	---	15
				Buckbrush------------------	---	5
				California buckeye---------	---	5
				Grasses or grasslike plants:		
				Soft chess-----------------	40	---
				Wild oat-------------------	15	---
				Ripgut brome---------------	10	---
				Squirreltail---------------	5	---
				Dogtail--------------------	5	---
				Silver hairgrass-----------	5	---
				Other grasses--------------	T**	---
				Forbs:		
				Clover---------------------	5	---
				Filaree--------------------	5	---
				Other forbs----------------	T**	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
239*, 240*:						
Sobrante----------	Gravelly Loam Foothills	Favorable	2,500	Trees:		
	Blue Oak - Interior Live Oak/	Normal	2,000	Blue oak-------------------	---	50
	Poison Oak	Unfavorable	1,500	Interior live oak----------	---	20
	(018DD006CA)			Digger pine----------------	---	5
				Shrubs:		
				Poison oak-----------------	---	15
				Buckbrush------------------	---	5
				California buckeye---------	---	5
				Grasses or grasslike plants:		
				Soft chess-----------------	40	---
				Wild oat-------------------	15	---
				Ripgut brome---------------	10	---
				Squirreltail---------------	5	---
				Dogtail--------------------	5	---
				Silver hairgrass-----------	5	---
				California melicgrass------	T**	---
				Other grasses--------------	T**	---
				Forbs:		
				Clover---------------------	5	---
				Filaree--------------------	5	---
				Other forbs----------------	T**	---
Timbuctoo----------	Gravelly Loam Foothills	Favorable	1,000	Trees:		
	Ponderosa Pine/Deerbrush/	Normal	500	Ponderosa pine-------------	---	50
	Blue Wildrye	Unfavorable	300	California black oak-------	---	10
	(018DD035CA)			Interior live oak----------	---	10
				Shrubs:		
				Poison oak-----------------	---	10
				Deerbrush------------------	---	10
				California scrub oak-------	---	5
				California buckthorn-------	---	5
				Other shrubs---------------	---	T**
				Grasses or grasslike plants:		
				Blue wildrye---------------	20	---
				Mountain brome-------------	15	---
				Squirreltail---------------	15	---
				California melicgrass------	5	---

				Forbs:		
				Yarrow---------------------	5	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
241*:						
Sobrante	Gravelly Loam Foothills Steep Blue Oak - Interior Live Oak/ Poison Oak (018DE006CA)	Favorable	2,500	Trees:		
		Normal	2,000	Blue oak	---	50
		Unfavorable	1,500	Interior live oak	---	20
				Digger pine	---	5

				Shrubs:		
				Poison oak	---	15
				Buckbrush	---	5
				California buckeye	---	5
				Grasses or grasslike plants:		
				Soft chess	40	---
				Wild oat	15	---
				Ripgut brome	10	---
				Squirreltail	5	---
				Dogtail	5	---
				Silver hairgrass	5	---
				Other grasses	T**	---
				Forbs:		
				Clover	5	---
				Filaree	5	---
				Other forbs	T**	---
Timbuctoo	Gravelly Loam Foothills Steep Ponderosa Pine/Deerbrush/ Blue Wildrye (018DE035CA)	Favorable	1,000	Trees:		
		Normal	500	Ponderosa pine	---	50
		Unfavorable	300	California black oak	---	10
				Interior live oak	---	10
				Shrubs:		
				Poison oak	---	10
				Deerbrush	---	10
				California scrub oak	---	5
				California buckthorn	---	5
				Other shrubs	---	T**
				Grasses or grasslike plants:		
				Blue wildrye	20	---
				Mountain brome	15	---
				Squirreltail	15	---
				California melicgrass	5	---
				Forbs:		
				Yarrow	5	---

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production		Potential natural vegetation	Composition weight	Composition canopy
		Kind of year	Dry weight			
			Lbs/acre		Pct	Pct
242, 243, 245, 246--Surnuf	Loam Mountains Ponderosa Pine - California Black Oak/Poison Oak (022CD015CA)	Favorable	---	Trees:		
		Normal	---	Ponderosa pine-------------	---	50
		Unfavorable	---	California black oak-------	---	10
				Incense cedar--------------	---	10
				Pacific madrone------------	---	10
				Interior live oak----------	---	5
				Tanoak---------------------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Poison oak-----------------	---	10
				Other shrubs---------------	---	T**
				Grasses or grasslike plants:		
				Blue wildrye---------------	---	5
				Mountain brome-------------	---	5
				Forbs-----------------------	---	15
244, 247------------Surnuf	Loam Mountains Steep Ponderosa Pine - California Black Oak/Poison Oak (022CE015CA)	Favorable	---	Trees:		
		Normal	---	Ponderosa pine-------------	---	50
		Unfavorable	---	California black oak-------	---	10
				Incense cedar--------------	---	10
				Pacific madrone------------	---	10
				Interior live oak----------	---	5
				Tanoak---------------------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	10
				Poison oak-----------------	---	10
				Other shrubs---------------	---	T**

				Grasses or grasslike plants:		
				Blue wildrye---------------	---	5
				Mountain brome-------------	---	5
				Forbs-----------------------	---	15

See footnotes at end of table.

TABLE 10.--ECOLOGICAL SITE PRODUCTIVITY AND POTENTIAL NATURAL PLANT COMMUNITIES--Continued

Soil name and map symbol	Site name	Herbaceous production: Kind of year	Herbaceous production: Dry weight	Potential natural vegetation	Composition weight	Composition canopy
			Lbs/acre		Pct	Pct
252, 253------------ Woodleaf	Rocky Loam Serpentine Mountains Ponderosa Pine/Sticky Whiteleaf Manzanita (022CD009CA)	Favorable	---	Trees:		
		Normal	---	Ponderosa pine-------------	---	25
		Unfavorable	---	Incense cedar--------------	---	25
				Douglas-fir----------------	---	5
				Shrubs:		
				Sticky whiteleaf manzanita	---	15
				Jepson ceanothus-----------	---	5
				Squawcarpet----------------	---	5
				Common snowberry-----------	---	5
				Leather oak----------------	---	5
				Grasses or grasslike plants:		
				Squirreltail---------------	---	5
				Blue wildrye---------------	---	5
				Forbs:		
				Broadleaf starflower-------	---	5

* See description of the map unit for composition and behavior characteristics of the map unit.
** Trace.

TABLE 11.--WOODLAND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available)

Map symbol and soil name	Ordination symbol	Potential productivity: Commonly grown trees	Potential productivity: Site index*
101**:			
Aiken	15A	Ponderosa pine	149
	15A	Douglas-fir	150
Horseshoe	14A	Ponderosa pine	147
102**, 103**, 104**:			
Argonaut	1D	Blue oak	---
Auburn	1D	Blue oak	---
106 Auburn	1D	Blue oak	---
107 Auburn	1D	Blue oak	---
108 Auburn	1D	Blue oak	---
109 Auburn	1D	Blue oak	---
110**, 111**, 112**:			
Auburn	1D	Blue oak	---
Sobrante	1A	Blue oak	---
113**, 114**, 115**:			
Auburn	1D	Blue oak	---
		Interior live oak	---
Sobrante	1A	Blue oak	---
		Interior live oak	---
116**:			
Auburn	1R	Blue oak	---
		Interior live oak	---
Sobrante	1R	Blue oak	---
		Interior live oak	---
117**, 118**:			
Auburn	1D	Blue oak	---
		Interior live oak	---
Sobrante	1A	Blue oak	---
		Interior live oak	---
Rock outcrop.			
119**, 120**:			
Auburn	1R	Blue oak	---
		Interior live oak	---
Sobrante	1R	Blue oak	---
		Interior live oak	---

See footnotes at end of table.

TABLE 11.--WOODLAND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Potential productivity: Commonly grown trees	Site index*
119**, 120**:			
Rock outcrop.			
121**:			
Auburn	1D	Blue oak	---
		Interior live oak	---
Timbuctoo	1A	Blue oak	---
		Interior live oak	---
		Ponderosa pine	112
Argonaut	1D	Blue oak	---
		Interior live oak	---
122**:			
Auburn	1D	Blue oak	---
		Interior live oak	---
Timbuctoo	1A	Blue oak	---
		Interior live oak	---
		Ponderosa pine	112
Argonaut	1D	Blue oak	---
		Interior live oak	---
123, 124	7A	Ponderosa pine	100
Boomer			
125	7R	Ponderosa pine	100
Boomer			
126**:			
Boomer	11R	Ponderosa pine	125
Pendola	11R	Ponderosa pine	125
127**:			
Boomer	11A	Ponderosa pine	125
Pendola	11X	Ponderosa pine	125
Sites	16A	Ponderosa pine	145
		Douglas-fir	140
128**:			
Boomer	11R	Ponderosa pine	125
Pendola	11R	Ponderosa pine	125
Sites	16A	Ponderosa pine	145
		Douglas-fir	140
135**:			
Chaix	6R	Ponderosa pine	87
		Douglas-fir	119
Chawankakee	5R	Ponderosa pine	81
		Douglas-fir	115
Hotaw	7R	Ponderosa pine	102
		Douglas-fir	130

See footnotes at end of table.

TABLE 11.--WOODLAND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Potential productivity: Commonly grown trees	Site index*
136**:			
Chawankakee	5R	Ponderosa pine	81
		Douglas-fir	115
Chaix	6R	Ponderosa pine	87
		Douglas-fir	119
Hotaw	7R	Ponderosa pine	102
		Douglas-fir	130
144**:			
Deadwood	5R	Ponderosa pine	84
Rock outcrop.			
Hurlbut	7R	Ponderosa pine	100
148, 149, 150 Flanly	1A	Interior live oak	---
		Blue oak	---
151 Flanly	1R	Interior live oak	---
		Blue oak	---
152**:			
Flanly	1R	Interior live oak	---
		Blue oak	---
Rock outcrop.			
153**, 154**:			
Flanly	1A	Interior live oak	---
		Blue oak	---
Orose	1D	Interior live oak	---
		Blue oak	---
Verjeles	1A	Interior live oak	---
		Blue oak	---
158 Hoda	13R	Ponderosa pine	141
		Douglas-fir	140
159**:			
Hoda	13A	Ponderosa pine	141
		Douglas-fir	140
Musick	17A	Ponderosa pine	164
		Douglas-fir	121
160**:			
Hoda	13R	Ponderosa pine	141
		Douglas-fir	140
Musick	17R	Ponderosa pine	164
		Douglas-fir	121
164 Holland	8R	Ponderosa pine	110

See footnotes at end of table.

TABLE 11.--WOODLAND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Potential productivity: Commonly grown trees	Site index*
165**:			
Holland	8A	Ponderosa pine	105
		Douglas-fir	112
Hoda	13A	Ponderosa pine	141
		Douglas-fir	140
Hotaw	7D	Ponderosa pine	102
		Douglas-fir	130
166**:			
Holland	8R	Ponderosa pine	105
		Douglas-fir	112
Hoda	13R	Ponderosa pine	141
		Douglas-fir	140
Hotaw	7R	Ponderosa pine	102
		Douglas-fir	132
167**:			
Holland	8A	Ponderosa pine	105
		Douglas-fir	112
Hoda	13A	Ponderosa pine	141
		Douglas-fir	140
Hotaw	7D	Ponderosa pine	102
		Douglas-fir	130
168**:			
Horseshoe	15R	Ponderosa pine	149
Aiken	14R	Ponderosa pine	147
171 Hotaw	7A	Ponderosa pine	102
		White fir	66
		Sugar pine	156
172 Hotaw	7R	Ponderosa pine	102
		White fir	66
		Sugar pine	156
173**:			
Hotaw	7A	Ponderosa pine	102
Chawankakee	5D	Ponderosa pine	81
Holland	8A	Ponderosa pine	110
174**:			
Hurlbut	7R	Ponderosa pine	100
Deadwood	5R	Ponderosa pine	84
Rock outcrop.			
175, 176, 177 Jocal	14A	Ponderosa pine	145
		Douglas-fir	147
		White fir	97

See footnotes at end of table.

TABLE 11.--WOODLAND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Potential productivity: Commonly grown trees	Potential productivity: Site index*
178, 179	15A	White fir	86
Jocal, cool		Douglas-fir	124
180**:			
Jocal	14A	Ponderosa pine	145
		Douglas-fir	147
Sites	14A	Ponderosa pine	145
		Douglas-fir	140
Mariposa	8D	Ponderosa pine	105
		Douglas-fir	110
181**:			
Jocal	14R	Ponderosa pine	145
		Douglas-fir	147
Sites	14R	Ponderosa pine	145
		Douglas-fir	140
Mariposa	8R	Ponderosa pine	105
		Douglas-fir	110
187, 188	8D	Ponderosa pine	105
Mariposa		Douglas-fir	110
189	8R	Ponderosa pine	105
Mariposa		Douglas-fir	110
190**:			
Mariposa	8R	Ponderosa pine	105
		Douglas-fir	110
Jocal	14R	Ponderosa pine	145
		Douglas-fir	147
191**:			
Mariposa	8R	Ponderosa pine	105
		Douglas-fir	110
Rock outcrop.			
199	1D	Interior live oak	---
Orose		Blue oak	---
200	1R	Interior live oak	---
Orose		Blue oak	---
221, 222, 223, 224	16A	Ponderosa pine	160
Sites		Douglas-fir	140
		White fir	98
225, 226, 227	14A	Ponderosa pine	145
Sites		Douglas-fir	140
228	14R	Ponderosa pine	145
Sites		Douglas-fir	140
229	13A	White fir	78
Sites, cool		Douglas-fir	144

See footnotes at end of table.

TABLE 11.--WOODLAND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Potential productivity: Commonly grown trees	Potential productivity: Site index*
230**:			
Sites	14A	Ponderosa pine	145
		Douglas-fir	140
Jocal	14A	Ponderosa pine	145
		Douglas-fir	147
231**:			
Sites	14R	Ponderosa pine	145
		Douglas-fir	140
Jocal	14R	Ponderosa pine	145
		Douglas-fir	147
Mariposa	8R	Ponderosa pine	105
		Douglas-fir	110
232**:			
Slacreek	14A	White fir	84
		Douglas-fir	95
Rock outcrop.			
235, 236, 237 Sobrante	1A	Blue oak	---
		Interior live oak	---
238**:			
Sobrante	1R	Blue oak	---
		Interior live oak	---
Rock outcrop.			
239**, 240**, 241**:			
Sobrante	1A	Blue oak	---
		Interior live oak	---
Timbuctoo	1A	Blue oak	---
		Interior live oak	---
		Ponderosa pine	112
242, 243, 244, 245, 246 Surnuf	10A	Ponderosa pine	118
247 Surnuf	10R	Ponderosa pine	118
252, 253 Woodleaf	5T	Ponderosa pine	79

* Site index based on site curves by Meyer for ponderosa pine, McArdle for Douglas-fir, and Schumachler for white fir.

** See description of the map unit for the composition and behavior characteristics of the map unit.

TABLE 12.--WOODLAND MANAGEMENT CONCERNS

(See Appendix D for the criteria used in determining management ratings. See text for definitions of "slight," "moderate," and "severe." Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available)

Map symbol and soil name	Seedling mortality*	Plant competition	Limitation for revegetating exposed subsoil with--: Grasses	Limitation for revegetating exposed subsoil with--: Trees	Equipment limitation	Hazard of soil damage from--: Fire	Hazard of soil damage from--: Compaction	Hazard of sheet and rill erosion: Bare areas	Hazard of sheet and rill erosion: When logs are yarded by--: Tractor	Hazard of sheet and rill erosion: When logs are yarded by--: Skyline systems
101**:										
Aiken	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Slight	Slight	---
Horseshoe	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Slight	Slight	---
102**:										
Argonaut	Severe	Severe	Slight	Severe	Slight	Slight	Moderate	Slight	Slight	---
Auburn	Severe	Severe	Moderate	Severe	Slight	Slight	Moderate	Slight	Slight	---
103**:										
Argonaut	Severe	Severe	Slight	Severe	Slight	Slight	Moderate	Moderate	Slight	---
Auburn	Severe	Severe	Moderate	Severe	Slight	Slight	Moderate	Moderate	Slight	---
104**:										
Argonaut	Severe	Severe	Slight	Severe	Moderate	Slight	Moderate	Severe	Moderate	---
Auburn	Severe	Severe	Moderate	Severe	Moderate	Slight	Moderate	Severe	Moderate	---
106 Auburn	Severe	Severe	Moderate	Severe	Slight	Slight	Moderate	Slight	Slight	---
107 Auburn	Severe	Severe	Moderate	Severe	Slight	Slight	Moderate	Moderate	Slight	---
108 Auburn	Severe	Severe	Moderate	Severe	Moderate	Slight	Moderate	Severe	Slight	---
109 Auburn	Severe	Severe	Severe	Severe	Severe	Slight	Moderate	Severe	Moderate	---
110**:										
Auburn	Severe	Severe	Moderate	Severe	Slight	Severe	Moderate	Slight	Slight	---
Sobrante	Severe	Severe	Slight	Severe	Slight	Severe	Moderate	Slight	Slight	---
111**:										
Auburn	Severe	Severe	Moderate	Severe	Slight	Severe	Moderate	Moderate	Slight	---
Sobrante	Severe	Severe	Slight	Severe	Slight	Severe	Moderate	Moderate	Slight	---

See footnotes at end of table.

TABLE 12.--WOODLAND MANAGEMENT CONCERNS--Continued

Map symbol and soil name	Seedling mortality*	Plant competition	Limitation for revegetating exposed subsoil with--		Equipment limitation	Hazard of soil damage from--		Hazard of sheet and rill erosion		
								Bare areas	When logs are yarded by--	
			Grasses	Trees		Fire	Compaction		Tractor	Skyline systems
112**:										
Auburn	Severe	Severe	Moderate	Severe	Moderate	Severe	Moderate	Severe	Moderate	---
Sobrante	Severe	Severe	Slight	Severe	Moderate	Severe	Moderate	Severe	Moderate	---
113**:										
Auburn	Severe	Severe	Moderate	Severe	Slight	Slight	Moderate	Slight	Slight	---
Sobrante	Severe	Severe	Slight	Severe	Slight	Slight	Moderate	Slight	Slight	---
114**:										
Auburn	Severe	Severe	Moderate	Severe	Slight	Slight	Moderate	Moderate	Slight	---
Sobrante	Severe	Severe	Slight	Severe	Slight	Slight	Moderate	Moderate	Slight	---
115**:										
Auburn	Severe	Severe	Moderate	Severe	Moderate	Severe	Moderate	Severe	Slight	---
Sobrante	Severe	Severe	Slight	Severe	Moderate	Severe	Moderate	Severe	Slight	---
116**:										
Auburn	Severe	Severe	Severe	Severe	Severe	Severe	Moderate	Severe	Moderate	---
Sobrante	Severe	Severe	Slight	Severe	Severe	Severe	Moderate	Severe	Moderate	---
117**:										
Auburn	Severe	Severe	Moderate	Severe	Slight	Severe	Moderate	Moderate	Slight	---
Sobrante	Severe	Severe	Slight	Severe	Slight	Severe	Moderate	Moderate	Slight	---
Rock outcrop.										
118**:										
Auburn	Severe	Severe	Moderate	Severe	Moderate	Slight	Moderate	Severe	Slight	---
Sobrante	Severe	Severe	Slight	Severe	Moderate	Slight	Moderate	Severe	Slight	---
Rock outcrop.										
119**:										
Auburn	Severe	Severe	Severe	Severe	Severe	Slight	Moderate	Severe	Moderate	---
Sobrante	Severe	Severe	Moderate	Severe	Severe	Slight	Moderate	Severe	Moderate	---
Rock outcrop.										

See footnotes at end of table.

TABLE 12.--WOODLAND MANAGEMENT CONCERNS--Continued

Map symbol and soil name	Seedling mortality*	Plant competition	Limitation for revegetating exposed subsoil with--		Equipment limitation	Hazard of soil damage from--		Hazard of sheet and rill erosion		
								Bare areas	When logs are yarded by--	
			Grasses	Trees		Fire	Compaction		Tractor	Skyline systems
120**:										
Auburn	Severe	Severe	Severe	Severe	Severe	Moderate	Moderate	Severe	Severe	---
Sobrante	Severe	Severe	Severe	Severe	Severe	Moderate	Moderate	Severe	Severe	---
Rock outcrop.										
121**:										
Auburn	Severe	Severe	Moderate	Severe	Slight	Slight	Moderate	Slight	Slight	---
Timbuctoo	Severe	Severe	Slight	Moderate	Slight	Slight	Moderate	Slight	Slight	---
Argonaut	Severe	Severe	Slight	Severe	Sligth	Slight	Moderate	Slight	Slight	---
122**:										
Auburn	Severe	Severe	Moderate	Severe	Slight	Slight	Moderate	Moderate	Slight	---
Timbuctoo	Severe	Severe	Slight	Moderate	Slight	Slight	Moderate	Moderate	Slight	---
Argonaut	Severe	Severe	Slight	Severe	Sligth	Slight	Moderate	Moderate	Slight	---
123 Boomer	Slight	Severe	Slight	Slight	Sligth	Slight	Moderate	Moderate	Slight	---
124 Boomer	Slight	Severe	Slight	Slight	Sligth	Slight	Moderate	Severe	Slight	---
125 Boomer	Slight	Severe	Slight	Slight	Moderate	Slight	Moderate	Severe	Slight	---
126**:										
Boomer	Slight	Severe	Slight	Slight	Severe	Moderate	Moderate	Severe	Severe	Slight.
Pendola	Moderate	Severe	Slight	Slight	Severe	Moderate	Moderate	Severe	Severe	Slight.
127**:										
Boomer	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Slight	---
Pendola	Moderate	Severe	Slight	Slight	Slight	Moderate	Moderate	Moderate	Slight	---
Sites	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Slight	---
128**:										
Boomer	Slight	Severe	Slight	Slight	Moderate	Moderate	Moderate	Severe	Moderate	Slight.
Pendola	Moderate	Severe	Slight	Slight	Moderate	Moderate	Moderate	Severe	Moderate	Slight.

See footnotes at end of table.

TABLE 12.--WOODLAND MANAGEMENT CONCERNS--Continued

Map symbol and soil name	Seedling mortality*	Plant competition	Limitation for revegetating exposed subsoil with--		Equipment limitation	Hazard of soil damage from--		Hazard of sheet and rill erosion		
								Bare areas	When logs are yarded by--	
			Grasses	Trees		Fire	Compaction		Tractor	Skyline systems
128**:										
Sites	Slight	Severe	Slight	Slight	Moderate	Slight	Moderate	Severe	Severe	Slight.
135**:										
Chaix	Moderate	Severe	Slight	Moderate	Moderate	Severe	Severe	Severe	Moderate	Slight.
Chawankakee	Severe	Moderate	Moderate	Severe	Moderate	Severe	Severe	Severe	Moderate	Slight.
Hotaw	Moderate	Severe	Slight	Moderate	Moderate	Severe	Moderate	Severe	Severe	Slight.
136**:										
Chawankakee	Severe	Moderate	Moderate	Severe	Severe	Severe	Severe	Severe	Severe	Slight.
Chaix	Moderate	Severe	Moderate	Severe	Severe	Severe	Severe	Severe	Severe	Slight.
Hotaw	Moderate	Severe	Slight	Moderate	Severe	Severe	Moderate	Severe	Severe	Slight.
144**:										
Deadwood	Severe	Moderate	Severe	Severe	Severe	Severe	Moderate	Severe	Moderate	Slight.
Rock outcrop.										
Hurlbut	Moderate	Severe	Slight	Moderate	Severe	Severe	Severe	Severe	Severe	Slight.
148 Flanly	Severe	Severe	Slight	Severe	Slight	Slight	Moderate	Slight	Slight	---
149 Flanly	Severe	Severe	Slight	Severe	Slight	Slight	Moderate	Moderate	Slight	---
150 Flanly	Severe	Severe	Slight	Severe	Moderate	Slight	Moderate	Severe	Moderate	---
151 Flanly	Severe	Severe	Slight	Severe	Severe	Severe	Moderate	Severe	Severe	---
152**:										
Flanly	Severe	Severe	Slight	Severe	Severe	Severe	Moderate	Severe	Severe	---
Rock outcrop.										
153**:										
Flanly	Severe	Severe	Slight	Severe	Slight	Slight	Moderate	Slight	Slight	---

See footnotes at end of table.

TABLE 12.--WOODLAND MANAGEMENT CONCERNS--Continued

Map symbol and soil name	Seedling mortality*	Plant competition	Limitation for revegetating exposed subsoil with--		Equipment limitation	Hazard of soil damage from--		Hazard of sheet and rill erosion		
								Bare areas	When logs are yarded by--	
			Grasses	Trees		Fire	Compaction		Tractor	Skyline systems
153**:										
Orose	Severe	Severe	Slight	Moderate	Slight	Slight	Severe	Slight	Slight	---
Verjeles	Severe	Severe	Slight	Moderate	Slight	Slight	Severe	Slight	Slight	---
154**:										
Flanly	Severe	Severe	Slight	Severe	Slight	Slight	Moderate	Moderate	Slight	---
Orose	Severe	Severe	Slight	Moderate	Slight	Slight	Severe	Moderate	Slight	---
Verjeles	Severe	Severe	Slight	Moderate	Slight	Slight	Severe	Moderate	Slight	---
158 Hoda	Slight	Severe	Slight	Slight	Moderate	Slight	Moderate	Severe	Moderate	---
159**:										
Hoda	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Moderate	---
Musick	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Slight	---
160**:										
Hoda	Slight	Severe	Slight	Slight	Moderate	Slight	Moderate	Severe	Severe	Slight.
Musick	Slight	Severe	Slight	Slight	Moderate	Slight	Moderate	Severe	Severe	Slight.
164 Holland	Slight	Severe	Slight	Slight	Moderate	Moderate	Moderate	Severe	Severe	Slight.
165**:										
Holland	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Moderate	---
Hoda	Slight	Severe	Slight	Slight	Slight	Slightte	Moderate	Moderate	Moderate	---
Hotaw	Slight	Severe	Slight	Moderate	Slight	Slight	Moderate	Moderate	Moderate	---
166**:										
Holland	Slight	Severe	Slight	Slight	Moderate	Moderate	Moderate	Severe	Severe	Slight.
Hoda	Slight	Severe	Slight	Slight	Moderate	Moderate	Moderate	Severe	Severe	Slight.
Hotaw	Slight	Severe	Slight	Moderate	Moderate	Moderate	Moderate	Severe	Severe	Slight.
167**:										
Holland	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Severe	Severe	---
Hoda	Slight	Severe	Slight	Slight	Slight	Slightte	Moderate	Severe	Severe	---

See footnotes at end of table.

TABLE 12.--WOODLAND MANAGEMENT CONCERNS--Continued

Map symbol and soil name	Seedling mortality*	Plant competition	Limitation for revegetating exposed subsoil with-- Grasses	Limitation for revegetating exposed subsoil with-- Trees	Equipment limitation	Hazard of soil damage from-- Fire	Hazard of soil damage from-- Compaction	Hazard of sheet and rill erosion: Bare areas	Hazard of sheet and rill erosion: When logs are yarded by-- Tractor	Hazard of sheet and rill erosion: When logs are yarded by-- Skyline systems
167**:										
Hotaw	Slight	Severe	Slight	Moderate	Slight	Slight	Moderate	Severe	Severe	---
168**:										
Horseshoe	Slight	Severe	Slight	Slight	Moderate	Slight	Moderate	Severe	Moderate	Slight.
Aiken	Slight	Severe	Slight	Slight	Moderate	Slight	Moderate	Severe	Moderate	Slight.
171 Hotaw	Slight	Severe	Slight	Moderate	Slight	Slight	Moderate	Moderate	Slight	---
172 Hotaw	Slight	Severe	Slight	Moderate	Moderate	Moderate	Moderate	Severe	Moderate	Slight.
173**:										
Hotaw	Moderate	Severe	Slight	Moderate	Slight	Slight	Moderate	Moderate	Moderate	---
Chawankakee	Severe	Moderate	Moderate	Severe	Moderate	Moderate	Severe	Moderate	Moderate	---
Holland	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Moderate	---
174**:										
Hurlbut	Moderate	Severe	Slight	Moderate	Severe	Severe	Severe	Severe	Severe	Slight.
Deadwood	Severe	Moderate	Severe	Severe	Severe	Severe	Moderate	Severe	Severe	Slight.
Rock outcrop.										
175 Jocal	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Slight	Slight	---
176 Jocal	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Slight	---
177 Jocal	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Severe	Moderate	---
178 Jocal, cool	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Slight	Slight	---
179 Jocal, cool	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Severe	Moderate	---
180**:										
Jocal	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Moderate	---

See footnotes at end of table.

TABLE 12.--WOODLAND MANAGEMENT CONCERNS--Continued

Map symbol and soil name	Seedling mortality*	Plant competition	Limitation for revegetating exposed subsoil with-- Grasses	Trees	Equipment limitation	Hazard of soil damage from-- Fire	Compaction	Hazard of sheet and rill erosion: Bare areas	When logs are yarded by-- Tractor	Skyline systems
180**:										
Sites	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Moderate	---
Mariposa	Moderate	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Slight	---
181**:										
Jocal	Slight	Severe	Slight	Slight	Moderate	Slight	Moderate	Severe	Severe	Slight.
Sites	Slight	Severe	Slight	Slight	Moderate	Slight	Moderate	Severe	Severe	Slight.
Mariposa	Moderate	Severe	Slight	Moderate	Moderate	Slight	Moderate	Severe	Moderate	Slight.
187 Mariposa	Moderate	Severe	Slight	Moderate	Slight	Slight	Moderate	Moderate	Slight	---
188 Mariposa	Moderate	Severe	Slight	Moderate	Slight	Slight	Moderate	Severe	Slight	---
189 Mariposa	Moderate	Severe	Slight	Moderate	Moderate	Slight	Moderate	Severe	Moderate	Slight.
190**:										
Mariposa	Moderate	Severe	Moderate	Moderate	Severe	Modetate	Moderate	Severe	Severe	Slight.
Jocal	Slight	Severe	Slight	Moderate	Severe	Moderate	Moderate	Severe	Severe	Slight.
191**:										
Mariposa	Moderate	Severe	Moderate	Moderate	Severe	Moderate	Moderate	Severe	Severe	Slight.
Rock outcrop.										
199 Orose	Severe	Severe	Slight	Severe	Slight	Slight	Severe	Moderate	Slight	---
200 Orose	Severe	Severe	Slight	Severe	Moderate	Slight	Severe	Severe	Slight	---
221 Sites	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Slight	Slight	---
222 Sites	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Slight	---
223 Sites	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Severe	Slight	---

See footnotes at end of table.

TABLE 12.--WOODLAND MANAGEMENT CONCERNS--Continued

Map symbol and soil name	Seedling mortality*	Plant competition	Limitation for revegetating exposed subsoil with-- Grasses	Trees	Equipment limitation	Hazard of soil damage from-- Fire	Compaction	Hazard of sheet and rill erosion: Bare areas	When logs are yarded by-- Tractor	Skyline systems
224------------------ Sites	Slight---	Severe-----	Slight---	Slight----	Moderate---	Slight---	Moderate--	Severe---	Moderate----	Slight.
225------------------ Sites	Slight---	Severe-----	Slight---	Slight----	Slight-----	Slight---	Moderate--	Slight---	Slight------	---
226------------------ Sites	Slight---	Severe-----	Slight---	Slight----	Slight-----	Slight---	Moderate--	Moderate	Slight------	---
227------------------ Sites	Slight---	Severe-----	Slight---	Slight----	Slight-----	Slight---	Moderate--	Severe---	Slight------	---
228------------------ Sites	Slight---	Severe-----	Slight---	Slight----	Moderate---	Slight---	Moderate--	Severe---	Slight------	Slight.
229------------------ Sites, cool	Slight---	Severe-----	Slight---	Slight----	Slight-----	Slight---	Moderate--	Moderate	Slight------	---
230**:										
Sites---------------	Slight---	Severe-----	Slight---	Slight----	Slight-----	Slight---	Moderate--	Moderate	Moderate----	---
Jocal---------------	Slight---	Severe-----	Slight---	Slight----	Slight-----	Slight---	Moderate--	Moderate	Moderate----	---
231**:										
Sites---------------	Slight---	Severe-----	Slight---	Slight----	Moderate---	Slight---	Moderate--	Severe---	Severe------	Slight.
Jocal---------------	Slight---	Severe-----	Slight---	Slight----	Moderate---	Slight---	Moderate--	Severe---	Severe------	Slight.
Mariposa------------	Severe---	Severe-----	Slight---	Moderate--	Moderate---	Slight---	Moderate--	Severe---	Moderate----	Slight.
232**:										
Slacreek------------	Slight---	Moderate---	Slight---	Moderate--	Severe-----	Moderate	Severe----	Severe---	Moderate----	Slight.
Rock outcrop.										
235------------------ Sobrante	Severe---	Severe-----	Slight---	Severe----	Slight-----	Slight---	Moderate--	Slight---	Slight------	---
236------------------ Sobrante	Severe---	Severe-----	Slight---	Severe----	Slight-----	Slight---	Moderate--	Moderate	Slight------	---
237------------------ Sobrante	Severe---	Severe-----	Slight---	Severe----	Moderate---	Moderate	Moderate--	Severe---	Slight------	---
238**:										
Sobrante------------	Severe---	Severe-----	Slight---	Severe----	Severe-----	Slight---	Moderate--	Severe---	Moderate----	---

See footnotes at end of table.

TABLE 12.--WOODLAND MANAGEMENT CONCERNS--Continued

Map symbol and soil name	Seedling mortality*	Plant competition	Limitation for revegetating exposed subsoil with-- Grasses	Trees	Equipment limitation	Hazard of soil damage from-- Fire	Compaction	Hazard of sheet and rill erosion: Bare areas	When logs are yarded by-- Tractor	Skyline systems
238**:										
Rock outcrop.										
239**:										
Sobrante	Severe	Severe	Slight	Severe	Slight	Slight	Moderate	Moderate	Slight	---
Timbuctoo	Severe	Severe	Slight	Moderate	Slight	Slight	Moderate	Moderate	Slight	---
240**:										
Sobrante	Severe	Severe	Slight	Severe	Moderate	Slight	Moderate	Severe	Slight	---
Timbuctoo	Severe	Severe	Slight	Moderate	Moderate	Slight	Moderate	Severe	Slight	---
241**:										
Sobrante	Severe	Severe	Slight	Severe	Severe	Moderate	Moderate	Severe	Moderate	---
Timbuctoo	Severe	Severe	Slight	Moderate	Severe	Slight	Moderate	Severe	Moderate	---
242 Surnuf	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Slight	---
243 Surnuf	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Severe	Moderate	---
244 Surnuf	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Severe	Severe	Slight.
245 Surnuf	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Moderate	Slight	---
246 Surnuf	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Severe	Moderate	---
247 Surnuf	Slight	Severe	Slight	Slight	Slight	Slight	Moderate	Severe	Severe	Slight.
252 Woodleaf	Severe	Severe	Severe	Severe	Slight	Slight	Moderate	Slight	Slight	---
253 Woodleaf	Severe	Severe	Severe	Severe	Slight	Slight	Moderate	Moderate	Slight	---

* Seedling mortality ratings are for first tree species listed in table 11.
** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
101*:					
Aiken	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Moderate: dusty.	Slight.
Horseshoe	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Moderate: dusty.	Moderate: large stones.
102*:					
Argonaut	Moderate: percs slowly, dusty.	Moderate: percs slowly, dusty.	Moderate: slope, small stones, depth to rock.	Moderate: dusty.	Moderate: depth to rock.
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Moderate: dusty.	Severe: depth to rock.
103*:					
Argonaut	Moderate: slope, percs slowly, dusty.	Moderate: slope, percs slowly, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope, depth to rock.
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Moderate: dusty.	Severe: depth to rock.
104*:					
Argonaut	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
Auburn	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope, dusty.	Severe: slope, depth to rock.
105 Argovar	Severe: percs slowly.	Severe: percs slowly.	Severe: percs slowly.	Slight	Slight.
106 Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Moderate: dusty.	Severe: depth to rock.
107 Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Moderate: dusty.	Severe: depth to rock.
108 Auburn	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope, dusty.	Severe: slope, depth to rock.
109 Auburn	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
110*:					
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Moderate: dusty.	Severe: depth to rock.
Sobrante	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Moderate: dusty.	Moderate: depth to rock.
111*:					
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Moderate: dusty.	Severe: depth to rock.
Sobrante	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope, depth to rock.
112*:					
Auburn	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope, dusty.	Severe: slope, depth to rock.
Sobrante	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
113*:					
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Moderate: dusty.	Severe: depth to rock.
Sobrante	Moderate: small stones, dusty.	Moderate: small stones, dusty.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, depth to rock.
114*:					
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: dusty.	Severe: depth to rock.
Sobrante	Moderate: slope, small stones, dusty.	Moderate: slope, small stones, dusty.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, slope, depth to rock.
115*:					
Auburn	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.	Severe: slope, depth to rock.
Sobrante	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: slope.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
116*:					
Auburn	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Sobrante	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
117*:					
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: dusty.	Severe: depth to rock.
Sobrante	Moderate: slope, small stones, dusty.	Moderate: slope, small stones, dusty.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, slope, depth to rock.
Rock outcrop	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: slope.
118*:					
Auburn	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.	Severe: slope, depth to rock.
Sobrante	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
119*, 120*:					
Auburn	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Sobrante	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
121*:					
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Moderate: dusty.	Severe: depth to rock.
Timbuctoo	Moderate: small stones, dusty.	Moderate: small stones, dusty.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, large stones.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
121*:					
Argonaut	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, large stones.
122*:					
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: dusty.	Severe: depth to rock.
Timbuctoo	Moderate: slope, small stones, dusty.	Moderate: slope, small stones, dusty.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, large stones, slope.
Argonaut	Moderate: slope, small stones, percs slowly.	Moderate: slope, small stones, percs slowly.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, large stones, slope.
123 Boomer	Moderate: slope, small stones, dusty.	Moderate: slope, small stones, dusty.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, slope.
124 Boomer	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: slope.
125 Boomer	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
126*:					
Boomer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pendola	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
127*:					
Boomer	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Pendola	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: slope.
Sites	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
128*:					
Boomer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
128*:					
Pendola	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Sites	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
129 Bruella	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
130 Capay	Severe: flooding.	Slight	Slight	Slight	Slight.
131 Hollenbeck	Severe: flooding.	Slight	Slight	Slight	Slight.
132 Hollenbeck	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
133 Hollenbeck	Moderate: too clayey.	Moderate: too clayey.	Moderate: small stones, too clayey.	Moderate: too clayey.	Severe: too clayey.
134*:					
Hollenbeck	Severe: flooding.	Slight	Slight	Slight	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable.
135*:					
Chaix	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Chawanakee	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Hotaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
136*:					
Chawanakee	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Chaix	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hotaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
137 Columbia	Severe: flooding.	Slight	Slight	Slight	Moderate: droughty.
138 Columbia	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: droughty, flooding.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
139 Columbia	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
140*:					
Columbia	Severe: flooding.	Slight	Slight	Slight	Moderate: droughty.
Urban land	Variable	Variable	Variable	Variable	Variable.
141 Conejo	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
142 Conejo	Severe: flooding.	Moderate: dusty.	Moderate: flooding, dusty.	Moderate: dusty.	Moderate: flooding.
143*:					
Conejo	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable.
144*:					
Deadwood	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, droughty, slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hurlbut	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
145* Dumps, landfills	Variable	Variable	Variable	Variable	Variable.
146* Dumps, mine tailings	Variable	Variable	Variable	Variable	Variable.
147 Feather	Severe: flooding.	Moderate: dusty.	Moderate: flooding, dusty.	Moderate: dusty.	Moderate: flooding.
148 Flanly	Slight	Slight	Moderate: slope, small stones, depth to rock.	Slight	Moderate: large stones, depth to rock.
149 Flanly	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope, depth to rock.
150 Flanly	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
151 Flanly	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
152*:					
Flanly	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
153*:					
Flanly	Slight	Slight	Moderate: slope, small stones, depth to rock.	Slight	Moderate: large stones, depth to rock.
Orose	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Slight	Severe: depth to rock.
Verjeles	Moderate: percs slowly.	Moderate: percs slowly.	Moderate: slope, small stones, depth to rock.	Slight	Moderate: large stones, depth to rock.
154*:					
Flanly	Moderate: slope.	Moderate: slope.	Severe: slope.	Slight	Moderate: large stones, slope, depth to rock.
Orose	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
Verjeles	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: large stones, slope, depth to rock.
155 Fluvaquents	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
158 Hoda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
159*:					
Hoda	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
Musick	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
160*:					
Hoda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Musick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
161 Holillipah	Severe: flooding.	Slight	Slight	Slight	Moderate: droughty.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
162 Holillipah	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: droughty, flooding.
163 Holillipah	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
164 Holland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
165*:					
Holland	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
Hoda	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
Hotaw	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
166*, 167*:					
Holland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hoda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hotaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
168*:					
Horseshoe	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Aiken	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
169 Horst	Severe: flooding.	Slight	Moderate: small stones.	Slight	Slight.
170 Horst	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
171 Hotaw	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
172 Hotaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
173*:					
Hotaw	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
Chawanakee	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
173*:					
Holland	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
174*:					
Hurlbut	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Deadwood	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope, small stones.	Severe: small stones, droughty, slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
175 Jocal	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Moderate: dusty.	Slight.
176 Jocal	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope.
177 Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
178 Jocal	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Moderate: dusty.	Slight.
179 Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
180*:					
Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
Sites	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.	Severe: slope, depth to rock.
181*:					
Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Sites	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
181*:					
Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
182, 183 Kilaga	Severe: flooding.	Slight	Slight	Slight	Slight.
184 Kilaga	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
185 Kimball	Moderate: percs slowly, dusty.	Moderate: percs slowly, dusty.	Moderate: small stones, percs slowly.	Moderate: dusty.	Slight.
186 Kimball	Severe: flooding.	Moderate: percs slowly, dusty.	Moderate: small stones, flooding, percs slowly.	Moderate: dusty.	Moderate: flooding.
187 Mariposa	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: dusty.	Severe: depth to rock.
188 Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Moderate: slope, dusty.	Severe: slope, depth to rock.
189 Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
190*:					
Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
191*:					
Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
192 Marysville	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Moderate: depth to rock.
193 Mildred	Moderate: large stones, small stones.	Moderate: large stones, small stones.	Severe: large stones, small stones.	Severe: erodes easily.	Severe: large stones.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
194 Mildred	Moderate: slope, large stones, small stones.	Moderate: slope, large stones, small stones.	Severe: large stones, slope, small stones.	Severe: erodes easily.	Severe: large stones.
195 Mildred	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: erodes easily.	Severe: large stones, slope.
196 Mildred	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope, erodes easily.	Severe: large stones, slope.
197 Oakdale	Slight	Slight	Moderate: slope.	Slight	Slight.
198*:					
Oakdale	Slight	Slight	Slight	Slight	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable.
199 Orose	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Slight	Severe: depth to rock.
200 Orose	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Moderate: slope.	Severe: slope, depth to rock.
201 Pardee	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Moderate: dusty.	Severe: depth to rock.
202*:					
Pardee	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, depth to rock.	Moderate: dusty.	Severe: depth to rock.
Ranchoseco	Severe: small stones, depth to rock.	Severe: small stones, depth to rock.	Severe: large stones, small stones.	Moderate: large stones.	Severe: small stones, large stones, depth to rock.
203 Perkins	Severe: flooding.	Moderate: dusty.	Moderate: small stones, dusty.	Moderate: dusty.	Slight.
204 Perkins	Severe: flooding.	Moderate: dusty.	Moderate: small stones, flooding.	Moderate: dusty.	Moderate: flooding.
205 Perkins	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: slope.
206* Pits, sand	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
207, 208: Redding	Moderate: small stones, percs slowly, dusty.	Moderate: small stones, percs slowly, dusty.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, large stones, droughty.
209*, 210*:					
Redding	Moderate: small stones, percs slowly, dusty.	Moderate: small stones, percs slowly, dusty.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, large stones, droughty.
Corning	Moderate: small stones, percs slowly.	Moderate: small stones, percs slowly.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, droughty.
211: Ricecross	Severe: flooding.	Moderate: dusty.	Moderate: small stones, dusty.	Moderate: dusty.	Slight.
212: Ricecross	Severe: flooding.	Moderate: wetness, dusty.	Moderate: small stones, wetness, flooding.	Moderate: dusty.	Moderate: flooding.
213*: Riverwash	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: small stones, too sandy.	Severe: wetness, too sandy.	Severe: wetness, droughty, flooding.
214: San Joaquin	Severe: flooding.	Moderate: percs slowly, dusty.	Moderate: percs slowly.	Severe: erodes easily.	Moderate: cemented pan.
215: San Joaquin	Moderate: percs slowly.	Moderate: percs slowly, dusty.	Moderate: slope, cemented pan, percs slowly.	Severe: erodes easily.	Moderate: cemented pan.
216: San Joaquin	Severe: flooding.	Moderate: percs slowly, dusty.	Moderate: flooding, percs slowly, dusty.	Moderate: dusty.	Moderate: flooding, cemented pan.
217*:					
San Joaquin	Severe: flooding.	Moderate: percs slowly, dusty.	Moderate: percs slowly.	Severe: erodes easily.	Moderate: cemented pan.
Urban land	Variable	Variable	Variable	Variable	Variable.
218: Shanghai	Severe: flooding.	Moderate: dusty.	Moderate: dusty.	Moderate: dusty.	Slight.
219: Shanghai	Severe: flooding.	Moderate: dusty.	Moderate: flooding.	Severe: erodes easily.	Moderate: flooding.
220: Shanghai	Severe: flooding.	Moderate: dusty.	Slight	Moderate: dusty.	Slight.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
221: Sites	Moderate: dusty.	Moderate: dusty.	Moderate: slope, small stones, dusty.	Moderate: dusty.	Slight.
222: Sites	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope.
223: Sites	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: slope.
224: Sites	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
225: Sites	Moderate: small stones.	Moderate: small stones.	Severe: small stones.	Moderate: dusty.	Moderate: small stones.
226: Sites	Moderate: slope, small stones.	Moderate: slope, small stones.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, slope.
227: Sites	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: slope.
228: Sites	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
229: Sites	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope.
230*:					
Sites	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.
231*:					
Sites	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Mariposa	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
232*:					
Slacreek	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
232*:					
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
235 Sobrante	Moderate: small stones, dusty.	Moderate: small stones, dusty.	Severe: small stones.	Moderate: dusty.	Moderate: small stones, depth to rock.
236 Sobrante	Moderate: slope, small stones, dusty.	Moderate: slope, small stones, dusty.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, slope, depth to rock.
237 Sobrante	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: slope.
238*:					
Sobrante	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
239*:					
Sobrante	Moderate: slope, small stones, dusty.	Moderate: slope, small stones, dusty.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, slope, depth to rock.
Timbuctoo	Moderate: slope, small stones, dusty.	Moderate: slope, small stones, dusty.	Severe: slope, small stones.	Moderate: dusty.	Moderate: small stones, large stones, slope.
240*:					
Sobrante	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: slope.
Timbuctoo	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope, dusty.	Severe: slope.
241*:					
Sobrante	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Timbuctoo	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
242 Surnuf	Moderate: slope, dusty.	Moderate: slope, dusty.	Severe: slope.	Moderate: dusty.	Moderate: slope.
243 Surnuf	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope, dusty.	Severe: slope.

See footnote at end of table.

TABLE 13.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
244 Surnuf	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
245, 246 Surnuf	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: slope.
247 Surnuf	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
248 Trainer	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.
249 Tujunga	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, too sandy.
250 Tujunga	Severe: flooding, too sandy.	Severe: too sandy.	Severe: small stones, too sandy.	Severe: too sandy.	Severe: droughty.
251 Tujunga	Severe: flooding, too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: droughty, flooding.
252 Woodleaf	Moderate: slope, small stones, dusty.	Moderate: slope, small stones, dusty.	Severe: slope, small stones.	Moderate: large stones, dusty.	Moderate: small stones, large stones, slope.
253 Woodleaf	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: large stones, slope, dusty.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
101*:						
Aiken	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
Horseshoe	Severe: cutbanks cave.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: large stones.
102*:						
Argonaut	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: depth to rock.
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
103*:						
Argonaut	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: slope, depth to rock.
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
104*:						
Argonaut	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: slope.
Auburn	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
105 Argovar	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
106 Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
107 Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
108, 109 Auburn	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
110*:						
Auburn-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Sobrante---------	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Moderate: depth to rock, shrink-swell.	Moderate: depth to rock.
111*:						
Auburn-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Sobrante---------	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, shrink-swell, slope.	Moderate: slope, depth to rock.
112*:						
Auburn-----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Sobrante---------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
113*:						
Auburn-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Sobrante---------	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Moderate: depth to rock, shrink-swell.	Moderate: small stones, depth to rock.
114*:						
Auburn-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Sobrante---------	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, shrink-swell, slope.	Moderate: small stones, slope, depth to rock.
115*, 116*:						
Auburn-----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Sobrante---------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
117*:						
Auburn-----------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
117*:						
Sobrante	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, shrink-swell, slope.	Moderate: small stones, slope, depth to rock.
Rock outcrop	Moderate: slope.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.
118*, 119*, 120*:						
Auburn	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Sobrante	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
121*:						
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Timbuctoo	Moderate: depth to rock, too clayey.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Moderate: small stones, large stones.
Argonaut	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: small stones, large stones.
122*:						
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
Timbuctoo	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: small stones, large stones, slope.
Argonaut	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: small stones, large stones, slope.
123 Boomer	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: small stones, slope.
124, 125 Boomer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
126*:						
Boomer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
126*:						
Pendola	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.
127*, 128*:						
Boomer	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Pendola	Severe: large stones, slope.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope.
Sites	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
129 Bruella	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: shrink-swell, flooding.	Slight.
130 Capay	Severe: cutbanks cave.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength.	Slight.
131 Hollenbeck	Severe: cutbanks cave.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength.	Slight.
132 Hollenbeck	Severe: cutbanks cave.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength, flooding.	Moderate: flooding.
133 Hollenbeck	Severe: cutbanks cave.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Severe: too clayey.
134*:						
Hollenbeck	Severe: cutbanks cave.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength.	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
135*:						
Chaix	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Chawanakee	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
Hotaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
136*:						
Chawanakee	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
136*:						
Chaix------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hotaw------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
137--------------- Columbia	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
138--------------- Columbia	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
139--------------- Columbia	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
140*:						
Columbia---------	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.
Urban land-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
141--------------- Conejo	Slight---------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Slight---------	Slight.
142--------------- Conejo	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
143*:						
Conejo-----------	Slight---------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Slight---------	Slight.
Urban land-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
144*:						
Deadwood---------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, droughty, slope.
Rock outcrop-----	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hurlbut----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
145*------------- Dumps, landfills	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
146*------------- Dumps, mine tailings	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
147--------------- Feather	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
148--------------- Flanly	Moderate: depth to rock.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Moderate: large stones, depth to rock.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
149 Flanly	Moderate: depth to rock, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: large stones, slope, depth to rock.
150, 151 Flanly	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
152*:						
Flanly	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
153*:						
Flanly	Moderate: depth to rock.	Moderate: shrink-swell.	Moderate: depth to rock, shrink-swell.	Moderate: shrink-swell, slope.	Moderate: shrink-swell, low strength.	Moderate: large stones, depth to rock.
Orose	Severe: depth to rock.	Moderate: depth to rock.	Severe: depth to rock.	Moderate: slope, depth to rock.	Moderate: depth to rock.	Severe: depth to rock.
Verjeles	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: large stones, depth to rock.
154*:						
Flanly	Moderate: depth to rock, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: large stones, slope, depth to rock.
Orose	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Severe: depth to rock.
Verjeles	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Moderate: large stones, slope, depth to rock.
155 Fluvaquents	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: ponding.
158 Hoda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
159*, 160*:						
Hoda	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Musick	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
161 Holillipah	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
162---------------- Holillipah	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
163---------------- Holillipah	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
164---------------- Holland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
165*, 166*, 167*:						
Holland----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hoda--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Hotaw-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
168*:						
Horseshoe---------	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Aiken-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
169---------------- Horst	Slight----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
170---------------- Horst	Slight----------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding.	Slight.
171, 172----------- Hotaw	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
173*:						
Hotaw-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Chawanakee--------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
Holland-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
174*:						
Hurlbut-----------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Deadwood----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: small stones, droughty, slope.
Rock outcrop------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
175 Jocal	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
176 Jocal	Moderate: slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
177 Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
178 Jocal	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
179 Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
180*, 181*:						
Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Sites	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Mariposa	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
182 Kilaga	Moderate: too clayey.	Severe: flooding.	Severe: flooding, shrink-swell.	Severe: flooding.	Severe: low strength.	Slight.
183 Kilaga	Moderate: too clayey.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength.	Slight.
184 Kilaga	Moderate: too clayey, flooding.	Severe: flooding.	Severe: flooding, shrink-swell.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
185 Kimball	Moderate: too clayey.	Severe: shrink-swell.	Moderate: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
186 Kimball	Moderate: too clayey, flooding.	Severe: flooding, shrink-swell.	Severe: flooding.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength, flooding.	Moderate: flooding.
187 Mariposa	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: slope, depth to rock.	Severe: depth to rock.	Severe: depth to rock.
188, 189 Mariposa	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
190*:						
Mariposa	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Jocal	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
191*:						
Mariposa	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
192 Marysville	Moderate: depth to rock.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Moderate: depth to rock.
193 Mildred	Moderate: depth to rock, too clayey.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Severe: large stones.
194 Mildred	Moderate: depth to rock, too clayey, slope.	Severe: shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength.	Severe: large stones.
195, 196 Mildred	Severe: slope.	Severe: shrink-swell, slope.	Severe: slope, shrink-swell.	Severe: shrink-swell, slope.	Severe: shrink-swell, low strength, slope.	Severe: large stones, slope.
197 Oakdale	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Slight.
198*:						
Oakdale	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Slight.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
199 Orose	Severe: depth to rock.	Moderate: slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, slope.	Severe: depth to rock.
200 Orose	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope, depth to rock.
201 Pardee	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.
202*:						
Pardee	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
202*:						
Ranchoseco	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: small stones, large stones, depth to rock.
203 Perkins	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: shrink-swell, low strength.	Slight.
204 Perkins	Moderate: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
205 Perkins	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
206* Pits, sand	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
207 Redding	Severe: cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Moderate: cemented pan.	Moderate: cemented pan.	Moderate: small stones, large stones, droughty.
208 Redding	Severe: cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Moderate: slope, cemented pan.	Moderate: cemented pan.	Moderate: small stones, large stones, droughty.
209*:						
Redding	Severe: cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Moderate: cemented pan.	Moderate: cemented pan.	Moderate: small stones, large stones, droughty.
Corning	Moderate: too clayey.	Severe: shrink-swell.	Slight	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: small stones, droughty.
210*:						
Redding	Severe: cemented pan.	Moderate: cemented pan.	Severe: cemented pan.	Moderate: slope, cemented pan.	Moderate: cemented pan.	Moderate: small stones, large stones, droughty.
Corning	Moderate: too clayey.	Severe: shrink-swell.	Slight	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: small stones, droughty.
211 Ricecross	Slight	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: shrink-swell, low strength, flooding.	Slight.
212 Ricecross	Severe: wetness.	Severe: flooding.	Severe: flooding, wetness.	Severe: flooding.	Severe: flooding.	Moderate: flooding.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
213*---------------- Riverwash	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, droughty, flooding.
214---------------- San Joaquin	Severe: cemented pan.	Severe: flooding, shrink-swell.	Severe: flooding, cemented pan, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: cemented pan.
215---------------- San Joaquin	Severe: cemented pan.	Severe: shrink-swell.	Severe: cemented pan, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: cemented pan.
216---------------- San Joaquin	Severe: cemented pan.	Severe: flooding, shrink-swell.	Severe: flooding, cemented pan, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength, flooding.	Moderate: flooding, cemented pan.
217*:						
San Joaquin------	Severe: cemented pan.	Severe: flooding, shrink-swell.	Severe: flooding, cemented pan, shrink-swell.	Severe: flooding, shrink-swell.	Severe: shrink-swell, low strength.	Moderate: cemented pan.
Urban land-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
218---------------- Shanghai	Slight---------	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
219---------------- Shanghai	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
220---------------- Shanghai	Moderate: too clayey, wetness.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength.	Slight.
221---------------- Sites	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
222---------------- Sites	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
223, 224---------- Sites	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
225---------------- Sites	Moderate: too clayey.	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Moderate: small stones.
226---------------- Sites	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: small stones, slope.
227, 228---------- Sites	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
229---------------- Sites	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
230*:						
Sites-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Jocal-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
231*:						
Sites-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Jocal-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Mariposa----------	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
232*:						
Slacreek----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
235---------------- Sobrante	Severe: depth to rock.	Moderate: shrink-swell, depth to rock.	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Moderate: depth to rock, shrink-swell.	Moderate: small stones, depth to rock.
236---------------- Sobrante	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, shrink-swell, slope.	Moderate: small stones, slope, depth to rock.
237---------------- Sobrante	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
238*:						
Sobrante----------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
239*:						
Sobrante----------	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, shrink-swell, slope.	Moderate: small stones, slope, depth to rock.

See footnote at end of table.

TABLE 14.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
239*:						
Timbuctoo--------	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Moderate: shrink-swell, low strength, slope.	Moderate: small stones, large stones, slope.
240*, 241*:						
Sobrante---------	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Timbuctoo--------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
242--------------- Surnuf	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
243, 244, 245, 246, 247--------- Surnuf	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
248--------------- Trainer	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.
249--------------- Tujunga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Moderate: droughty, too sandy.
250--------------- Tujunga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: flooding.	Severe: droughty.
251--------------- Tujunga	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: droughty, flooding.
252--------------- Woodleaf	Severe: depth to rock.	Moderate: shrink-swell, slope, depth to rock.	Severe: depth to rock.	Severe: slope.	Moderate: depth to rock, shrink-swell, slope.	Moderate: small stones, large stones, slope.
253--------------- Woodleaf	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
101*:					
Aiken	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
Horseshoe	Moderate: depth to rock, percs slowly.	Severe: seepage.	Severe: depth to rock, seepage.	Slight	Fair: too clayey, small stones.
102*:					
Argonaut	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
103*:					
Argonaut	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
Auburn	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
104*:					
Argonaut	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Auburn	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
105 Argovar	Severe: wetness, percs slowly.	Moderate: seepage, slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, hard to pack.
106 Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
107 Auburn	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
108, 109 Auburn	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
110*:					
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Sobrante	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
111*:					
Auburn	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Sobrante	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
112*:					
Auburn	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Sobrante	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
113*:					
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Sobrante	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
114*:					
Auburn	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Sobrante	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
115*, 116*:					
Auburn	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Sobrante	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
117*:					
Auburn	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Sobrante	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Rock outcrop	Moderate: slope.	Severe: slope.	Moderate: slope.	Moderate: slope.	Fair: slope.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
118*, 119*, 120*:					
Auburn	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Sobrante	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
121*:					
Auburn	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Timbuctoo	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, small stones.
Argonaut	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
122*:					
Auburn	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Timbuctoo	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, small stones.
Argonaut	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
123 Boomer	Severe: percs slowly.	Severe: slope.	Severe: depth to rock.	Moderate: depth to rock, slope.	Fair: depth to rock, too clayey, slope.
124, 125 Boomer	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
126*:					
Boomer	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Pendola	Severe: slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: large stones, slope.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
127*, 128*:					
Boomer	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Pendola	Severe: slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: large stones, slope.
Sites	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
129 Bruella	Severe: percs slowly.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
130 Capay	Severe: percs slowly.	Slight	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
131 Hollenbeck	Severe: percs slowly.	Moderate: cemented pan.	Severe: cemented pan, too clayey.	Moderate: flooding, cemented pan.	Poor: too clayey, hard to pack.
132 Hollenbeck	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, cemented pan, too clayey.	Severe: flooding.	Poor: too clayey, hard to pack.
133 Hollenbeck	Severe: percs slowly.	Severe: wetness.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
134*:					
Hollenbeck	Severe: percs slowly.	Moderate: cemented pan.	Severe: cemented pan, too clayey.	Moderate: flooding, cemented pan.	Poor: too clayey, hard to pack.
Urban land	Variable	Variable	Variable	Variable	Variable.
135*:					
Chaix	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Chawanakee	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Hotaw	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
136*:					
Chawanakee	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Chaix	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Hotaw	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
137 Columbia	Moderate: flooding, percs slowly.	Severe: seepage.	Moderate: flooding.	Severe: seepage.	Good.
138, 139 Columbia	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
140*:					
Columbia	Moderate: flooding, percs slowly.	Severe: seepage.	Moderate: flooding.	Severe: seepage.	Good.
Urban land	Variable	Variable	Variable	Variable	Variable.
141 Conejo	Severe: percs slowly.	Moderate: seepage.	Moderate: flooding.	Moderate: flooding.	Good.
142 Conejo	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
143*:					
Conejo	Severe: percs slowly.	Moderate: seepage.	Moderate: flooding.	Moderate: flooding.	Good.
Urban land	Variable	Variable	Variable	Variable	Variable.
144*:					
Deadwood	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, seepage, small stones.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Hurlbut	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
145* Dumps, landfills	Variable	Variable	Variable	Variable	Variable.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
146*. Dumps, mine tailings	Variable	Variable	Variable	Variable	Variable.
147. Feather	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Good.
148. Flanly	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
149. Flanly	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
150, 151. Flanly	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
152*:					
Flanly	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
153*:					
Flanly	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Orose	Severe: depth to rock.	Severe: seepage, depth to rock.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock.
Verjeles	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
154*:					
Flanly	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Orose	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock.
Verjeles	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
155. Fluvaquents	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
158----------------- Hoda	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
159*, 160*:					
Hoda----------------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Musick--------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
161----------------- Holillipah	Moderate: flooding.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
162, 163------------ Holillipah	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: too sandy.
164----------------- Holland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
165*, 166*, 167*:					
Holland-------------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Hoda----------------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
Hotaw---------------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
168*:					
Horseshoe-----------	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: slope.	Poor: slope.
Aiken---------------	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
169----------------- Horst	Moderate: flooding, percs slowly.	Severe: seepage.	Moderate: flooding.	Moderate: flooding.	Good.
170----------------- Horst	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding.	Moderate: flooding.	Good.
171, 172------------ Hotaw	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
173*:					
Hotaw	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, slope.
Chawanakee	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Holland	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
174*:					
Hurlbut	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Deadwood	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, seepage, small stones.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
175 Jocal	Moderate: depth to rock, percs slowly.	Moderate: seepage, slope.	Severe: depth to rock.	Slight	Fair: too clayey.
176 Jocal	Moderate: depth to rock, percs slowly, slope.	Severe: slope.	Severe: depth to rock.	Moderate: slope.	Fair: too clayey, slope.
177 Jocal	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
178 Jocal	Moderate: depth to rock, percs slowly.	Moderate: seepage, slope.	Severe: depth to rock.	Slight	Fair: too clayey.
179 Jocal	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
180*, 181*:					
Jocal	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Sites	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Mariposa	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
182----------------- Kilaga	Severe: percs slowly.	Slight-----------	Severe: too clayey.	Moderate: flooding.	Poor: too clayey, hard to pack.
183----------------- Kilaga	Severe: percs slowly.	Moderate: cemented pan.	Severe: depth to rock, too clayey.	Moderate: flooding, cemented pan.	Poor: too clayey, hard to pack.
184----------------- Kilaga	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding, too clayey.	Severe: flooding.	Poor: too clayey, hard to pack.
185----------------- Kimball	Severe: percs slowly.	Moderate: seepage.	Moderate: too clayey.	Slight-----------	Fair: too clayey.
186----------------- Kimball	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey.
187----------------- Mariposa	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
188, 189------------ Mariposa	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
190*:					
Mariposa-----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Jocal--------------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
191*:					
Mariposa-----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Rock outcrop-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
192----------------- Marysville	Severe: depth to rock, percs slowly.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
193----------------- Mildred	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
194----------------- Mildred	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
195, 196------------ Mildred	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
197---------------- Oakdale	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
198*:					
Oakdale------------	Slight----------	Severe: seepage.	Severe: seepage.	Severe: seepage.	Good.
Urban land---------	Variable---------	Variable---------	Variable---------	Variable---------	Variable.
199---------------- Orose	Severe: depth to rock.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage.	Severe: depth to rock.	Poor: depth to rock.
200---------------- Orose	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
201---------------- Pardee	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
202*:					
Pardee------------	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock, small stones.
Ranchoseco---------	Severe: depth to rock.	Severe: depth to rock, large stones.	Severe: depth to rock, large stones.	Severe: depth to rock.	Poor: depth to rock.
203---------------- Perkins	Severe: percs slowly.	Slight----------	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey, small stones.
204---------------- Perkins	Severe: flooding, percs slowly.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Fair: too clayey, small stones.
205---------------- Perkins	Severe: percs slowly, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
206*--------------- Pits, sand	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
207, 208----------- Redding	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: cemented pan, small stones.
209*, 210*:					
Redding-----------	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Severe: cemented pan.	Poor: cemented pan, small stones.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
209*, 210*:					
Corning	Severe: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Poor: small stones.
211 Ricecross	Severe: percs slowly.	Slight	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
212 Ricecross	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: small stones, wetness.
213* Riverwash	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: too sandy, small stones, wetness.
214, 215 San Joaquin	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Severe: cemented pan, too clayey.	Severe: cemented pan.	Poor: cemented pan, too clayey.
216 San Joaquin	Severe: flooding, cemented pan, percs slowly.	Severe: cemented pan, flooding.	Severe: flooding, cemented pan, too clayey.	Severe: flooding, cemented pan.	Poor: cemented pan, too clayey.
217*:					
San Joaquin	Severe: cemented pan, percs slowly.	Severe: cemented pan.	Severe: cemented pan, too clayey.	Severe: cemented pan.	Poor: cemented pan, too clayey.
Urban land	Variable	Variable	Variable	Variable	Variable.
218 Shanghai	Moderate: flooding, percs slowly.	Moderate: seepage.	Moderate: flooding, too clayey.	Moderate: flooding.	Fair: too clayey.
219 Shanghai	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
220 Shanghai	Severe: percs slowly.	Moderate: seepage.	Severe: wetness.	Moderate: flooding, wetness.	Fair: too clayey, thin layer.
221 Sites	Severe: percs slowly.	Moderate: seepage, slope.	Severe: depth to rock, too clayey.	Slight	Poor: too clayey, hard to pack.
222 Sites	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
223, 224 Sites	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
225 Sites	Severe: percs slowly.	Moderate: depth to rock, slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock.	Poor: too clayey, hard to pack.
226 Sites	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
227, 228 Sites	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
229 Sites	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
230*:					
Sites	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Jocal	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
231*:					
Sites	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
Jocal	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
Mariposa	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
232*:					
Slacreek	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Rock outcrop	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
235 Sobrante	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
236 Sobrante	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
237 Sobrante	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
238*:					
Sobrante-----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Rock outcrop-------	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
239*:					
Sobrante-----------	Severe: depth to rock.	Severe: depth to rock, slope.	Severe: depth to rock.	Severe: depth to rock.	Poor: depth to rock.
Timbuctoo----------	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, small stones.
240*, 241*:					
Sobrante-----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Timbuctoo----------	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, small stones.
242----------------- Surnuf	Severe: percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: slope.	Poor: too clayey, hard to pack.
243, 244------------ Surnuf	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
245, 246, 247------- Surnuf	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, large stones.
248----------------- Trainer	Severe: flooding, wetness.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Fair: wetness.
249----------------- Tujunga	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
250----------------- Tujunga	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
251----------------- Tujunga	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, too sandy.	Severe: flooding, seepage.	Poor: seepage, too sandy.

See footnote at end of table.

TABLE 15.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
252----------------- Woodleaf	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, small stones.
253----------------- Woodleaf	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, small stones.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
101*:				
Aiken	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Horseshoe	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
102*, 103*:				
Argonaut	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
104*:				
Argonaut	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
105 Argovar	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
106, 107 Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
108 Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
109 Auburn	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
110*, 111*:				
Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Sobrante	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
112*:				
Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Sobrante	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
113*, 114*:				
Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Sobrante	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
115*:				
Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Sobrante	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
116*:				
Auburn	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Sobrante	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
117*:				
Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Sobrante	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Rock outcrop	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: slope.
118*:				
Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Sobrante	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
119*, 120*:				
Auburn	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Sobrante	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
121*, 122*:				
Auburn	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Timbuctoo	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
Argonaut	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
123 Boomer	Fair: depth to rock, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
124 Boomer	Fair: depth to rock, shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
125 Boomer	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
126*:				
Boomer	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pendola	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
127*:				
Boomer	Fair: depth to rock, shrink-swell, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pendola	Poor: large stones.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
127*:				
Sites	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
128*:				
Boomer	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Pendola	Poor: large stones, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: large stones, area reclaim, slope.
Sites	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
129 Bruella	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Good.
130 Capay	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
131, 132 Hollenbeck	Poor: cemented pan, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey
133 Hollenbeck	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
134*:				
Hollenbeck	Poor: cemented pan, low strength, shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
Urban land	Variable	Variable	Variable	Variable.
135*:				
Chaix	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Chawanakee	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Hotaw	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
136*:				
Chawanakee	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Chaix	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Hotaw	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
137, 138, 139 Columbia	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
140*:				
Columbia	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
Urban land	Variable	Variable	Variable	Variable.
141, 142 Conejo	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
143*:				
Conejo	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Urban land	Variable	Variable	Variable	Variable.
144*:				
Deadwood	Poor: depth to rock, slope.	Improbable: small stones.	Improbable: thin layer.	Poor: depth to rock, small stones, slope.
Rock outcrop	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Hurlbut	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
145* Dumps, landfills	Variable	Variable	Variable	Variable.
146* Dumps, mine tailings	Variable	Variable	Variable	Variable.
147 Feather	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
148, 149 Flanly	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
150 Flanly	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
151 Flanly	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
152*:				
Flanly	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
153*, 154*:				
Flanly	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Orose	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Verjeles	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey, small stones.
155 Fluvaquents	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
158 Hoda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
159*:				
Hoda	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Musick	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
160*:				
Hoda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Musick	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
161, 162, 163 Holillipah	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
164 Holland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
165*:				
Holland	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Hoda	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
165*:				
Hotaw	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
166*, 167*:				
Holland	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Hoda	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Hotaw	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
168*:				
Horseshoe	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Aiken	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
169 Horst	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
170 Horst	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
171 Hotaw	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
172 Hotaw	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
173*:				
Hotaw	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Chawanakee	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Holland	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
174*:				
Hurlbut	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Deadwood	Poor: depth to rock, slope.	Improbable: small stones.	Improbable: thin layer.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
174*:				
Rock outcrop	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
175 Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
176 Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, slope.
177 Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
178 Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
179 Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
180*:				
Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Sites	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Mariposa	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
181*:				
Jocal	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Sites	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Mariposa	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
182 Kilaga	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
183 Kilaga	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.
184 Kilaga	Fair: shrink-swell.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, thin layer.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
185, 186 Kimball	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
187 Mariposa	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
188 Mariposa	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
189 Mariposa	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
190*:				
Mariposa	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Jocal	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
191*:				
Mariposa	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
Rock outcrop	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
192 Marysville	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: depth to rock, too clayey, thin layer.
193, 194 Mildred	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
195, 196 Mildred	Poor: depth to rock, shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
197 Oakdale	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
198*:				
Oakdale	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
Urban land	Variable	Variable	Variable	Variable.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
199------------------- Orose	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
200------------------- Orose	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
201------------------- Pardee	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
202*:				
Pardee---------------	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
Ranchoseco-----------	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones.
203, 204-------------- Perkins	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
205------------------- Perkins	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
206*------------------ Pits, sand	Good-----------------	Probable-------------	Improbable: too sandy.	Poor: too sandy, small stones.
207, 208-------------- Redding	Poor: cemented pan.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
209*, 210*:				
Redding--------------	Poor: cemented pan.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Corning--------------	Good-----------------	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim.
211------------------- Ricecross	Fair: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones.
212------------------- Ricecross	Fair: shrink-swell, wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey, small stones, area reclaim.
213*------------------ Riverwash	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, small stones, area reclaim.
214, 215, 216--------- San Joaquin	Poor: cemented pan.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
217*:				
San Joaquin	Poor: cemented pan.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
Urban land	Variable	Variable	Variable	Variable.
218, 219 Shanghai	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
220 Shanghai	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
221, 222 Sites	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
223 Sites	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
224 Sites	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
225, 226 Sites	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
227 Sites	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
228 Sites	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
229 Sites	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
230*:				
Sites	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Jocal	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
231*:				
Sites	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
Jocal	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Mariposa	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
232*:				
Slacreek	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
235, 236 Sobrante	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
237 Sobrante	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
238*:				
Sobrante	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Rock outcrop	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
239*:				
Sobrante	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
Timbuctoo	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
240*:				
Sobrante	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Timbuctoo	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
241*:				
Sobrante	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Timbuctoo	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
242 Surnuf	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
243 Surnuf	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
244 Surnuf	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.

See footnote at end of table.

TABLE 16.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
245, 246 Surnuf	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, large stones, area reclaim.
247 Surnuf	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, large stones, area reclaim.
248 Trainer	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
249 Tujunga	Good	Probable	Probable	Poor: too sandy, small stones.
250 Tujunga	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
251 Tujunga	Good	Probable	Probable	Poor: too sandy, small stones.
252 Woodleaf	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones.
253 Woodleaf	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
101*:						
Aiken	Moderate: seepage, slope.	Hard to pack	Deep to water	Slope	Favorable	Favorable.
Horseshoe	Severe: seepage.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
102*:						
Argonaut	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Depth to rock, percs slowly.	Depth to rock, percs slowly.
Auburn	Severe: depth to rock.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
103*, 104*:						
Argonaut	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
Auburn	Severe: depth to rock, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
105 Argovar	Slight	Moderate: hard to pack, wetness.	Percs slowly	Wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.
106 Auburn	Severe: depth to rock.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
107, 108, 109 Auburn	Severe: depth to rock, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
110*:						
Auburn	Severe: depth to rock.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
Sobrante	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
111*, 112*:						
Auburn	Severe: depth to rock, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
111*, 112*:						
Sobrante	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
113*:						
Auburn	Severe: depth to rock.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
Sobrante	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
114*, 115*, 116*:						
Auburn	Severe: depth to rock, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Sobrante	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
117*, 118*, 119*, 120*:						
Auburn	Severe: depth to rock, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Sobrante	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Rock outcrop	Severe: slope.	Slight	Deep to water	Slope	Slope	Slope.
121*:						
Auburn	Severe: depth to rock.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
Timbuctoo	Moderate: seepage, depth to rock, slope.	Moderate: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Depth to rock, percs slowly.	Depth to rock, percs slowly.
Argonaut	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Depth to rock, percs slowly.	Depth to rock, percs slowly.
122*:						
Auburn	Severe: depth to rock, slope.	Severe: thin layer, piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Timbuctoo	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
Argonaut	Severe: slope.	Severe: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
123, 124, 125----- Boomer	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope----------	Slope----------	Slope.
126*:						
Boomer-----------	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
Pendola----------	Severe: slope.	Severe: large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
127*, 128*:						
Boomer-----------	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
Pendola----------	Severe: slope.	Severe: large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
Sites------------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
129--------------- Bruella	Slight---------	Moderate: piping.	Deep to water	Favorable------	Erodes easily	Erodes easily.
130--------------- Capay	Slight---------	Slight---------	Deep to water	Percs slowly---	Percs slowly---	Percs slowly.
131, 132---------- Hollenbeck	Moderate: cemented pan.	Moderate: thin layer, hard to pack.	Deep to water	Slow intake, percs slowly.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
133--------------- Hollenbeck	Moderate: depth to rock.	Moderate: thin layer, hard to pack.	Deep to water	Slow intake, percs slowly.	Percs slowly---	Percs slowly.
134*:						
Hollenbeck-------	Moderate: cemented pan.	Moderate: thin layer, hard to pack.	Deep to water	Slow intake, percs slowly.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
Urban land-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
135*:						
Chaix------------	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
Chawanakee-------	Severe: depth to rock, slope.	Moderate: seepage.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
Hotaw------------	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
136*:						
Chawanakee	Severe: depth to rock, slope.	Moderate: seepage.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
Chaix	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
Hotaw	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
137 Columbia	Severe: seepage.	Severe: piping.	Deep to water	Droughty, soil blowing.	Soil blowing	Droughty.
138, 139 Columbia	Severe: seepage.	Severe: piping.	Deep to water	Droughty, flooding.	Soil blowing	Droughty.
140*:						
Columbia	Severe: seepage.	Severe: piping.	Deep to water	Droughty, soil blowing.	Soil blowing	Droughty.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
141 Conejo	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
142 Conejo	Moderate: seepage.	Severe: piping.	Deep to water	Flooding	Erodes easily	Erodes easily.
143*:						
Conejo	Moderate: seepage.	Severe: piping.	Deep to water	Favorable	Erodes easily	Erodes easily.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
144*:						
Deadwood	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop	Severe: slope.	Slight	Deep to water	Slope	Slope	Slope.
Hurlbut	Severe: slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
145* Dumps, landfills	Variable	Variable	Variable	Variable	Variable	Variable.
146* Dumps, mine tailings	Variable	Variable	Variable	Variable	Variable	Variable.
147 Feather	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily, flooding.	Erodes easily	Erodes easily.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
148 Flanly	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, soil blowing, depth to rock.	Depth to rock, soil blowing.	Depth to rock.
149, 150, 151 Flanly	Severe: slope.	Severe: thin layer.	Deep to water	Slope, soil blowing, depth to rock.	Slope, depth to rock, soil blowing.	Slope, depth to rock.
152*:						
Flanly	Severe: slope.	Severe: thin layer.	Deep to water	Slope, soil blowing, depth to rock.	Slope, depth to rock, soil blowing.	Slope, depth to rock.
Rock outcrop	Severe: slope.	Slight	Deep to water	Slope	Slope	Slope.
153*:						
Flanly	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, soil blowing, depth to rock.	Depth to rock, soil blowing.	Depth to rock.
Orose	Severe: depth to rock.	Severe: thin layer.	Deep to water	Slope, soil blowing, depth to rock.	Depth to rock, soil blowing.	Depth to rock.
Verjeles	Moderate: depth to rock, slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, soil blowing, percs slowly.	Depth to rock, soil blowing.	Depth to rock, percs slowly.
154*:						
Flanly	Severe: slope.	Severe: thin layer.	Deep to water	Slope, soil blowing, depth to rock.	Slope, depth to rock, soil blowing.	Slope, depth to rock.
Orose	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, soil blowing, depth to rock.	Slope, depth to rock, soil blowing.	Slope, depth to rock.
Verjeles	Severe: slope.	Moderate: thin layer, hard to pack.	Deep to water	Slope, soil blowing, percs slowly.	Slope, depth to rock, soil blowing.	Slope, depth to rock, percs slowly.
155 Fluvaquents	Moderate: seepage.	Severe: piping, ponding.	Ponding, flooding.	Ponding, erodes easily, flooding.	Erodes easily, ponding.	Wetness, erodes easily.
158 Hoda	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
159*, 160*:						
Hoda	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Musick	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
161, 162, 163 Holillipah	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
164 Holland	Severe: slope.	Moderate: piping.	Deep to water	Slope, soil blowing.	Slope, soil blowing.	Slope.
165*, 166*, 167*:						
Holland	Severe: slope.	Moderate: piping.	Deep to water	Slope	Slope	Slope.
Hoda	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Hotaw	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
168*:						
Horseshoe	Severe: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
Aiken	Severe: slope.	Hard to pack	Deep to water	Slope	Slope	Slope.
169 Horst	Moderate: seepage.	Severe: piping.	Deep to water	Soil blowing	Erodes easily, soil blowing.	Erodes easily.
170 Horst	Moderate: seepage.	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
171, 172 Hotaw	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, soil blowing, depth to rock.	Slope, depth to rock, soil blowing.	Slope, depth to rock.
173*:						
Hotaw	Severe: seepage, slope.	Severe: thin layer.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Chawanakee	Severe: depth to rock, slope.	Moderate: seepage.	Deep to water	Slope, droughty, soil blowing.	Slope, depth to rock, soil blowing.	Slope, droughty, depth to rock.
Holland	Severe: slope.	Moderate: piping.	Deep to water	Slope	Slope	Slope.
174*:						
Hurlbut	Severe: slope.	Severe: piping.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
Deadwood	Severe: depth to rock, slope.	Severe: seepage.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop	Severe: slope.	Slight	Deep to water	Slope	Slope	Slope.
175 Jocal	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
176, 177 Jocal	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
178 Jocal	Moderate: seepage, slope.	Moderate: thin layer, piping.	Deep to water	Slope	Favorable	Favorable.
179 Jocal	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
180*, 181*:						
Jocal	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
Sites	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Mariposa	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
182 Kilaga	Slight	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly	Erodes easily, percs slowly.	Erodes easily, percs slowly.
183 Kilaga	Moderate: cemented pan.	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly, erodes easily.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
184 Kilaga	Slight	Moderate: thin layer, hard to pack.	Deep to water	Percs slowly	Erodes easily, percs slowly.	Erodes easily, percs slowly.
185 Kimball	Slight	Moderate: piping.	Deep to water	Percs slowly	Erodes easily	Erodes easily, percs slowly.
186 Kimball	Slight	Moderate: piping.	Deep to water	Percs slowly, flooding.	Erodes easily, percs slowly.	Erodes easily, percs slowly.
187, 188, 189 Mariposa	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
190*:						
Mariposa	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
Jocal	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
191*:						
Mariposa	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
191*:						
Rock outcrop-----	Severe: slope.	Slight---------	Deep to water	Slope----------	Slope----------	Slope.
192--------------- Marysville	Moderate: depth to rock.	Moderate: thin layer, piping.	Deep to water	Depth to rock	Depth to rock	Depth to rock.
193--------------- Mildred	Moderate: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, large stones, percs slowly.	Large stones, depth to rock.	Large stones, erodes easily.
194, 195, 196----- Mildred	Severe: slope.	Severe: thin layer.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, depth to rock.	Large stones, slope, erodes easily.
197--------------- Oakdale	Severe: seepage.	Severe: thin layer.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
198*:						
Oakdale----------	Severe: seepage.	Severe: thin layer.	Deep to water	Soil blowing---	Soil blowing---	Favorable.
Urban land-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable-------	Variable.
199, 200---------- Orose	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, soil blowing, depth to rock.	Slope, depth to rock, soil blowing.	Slope, depth to rock.
201--------------- Pardee	Severe: depth to rock.	Severe: thin layer.	Deep to water	Slope, droughty.	Large stones, depth to rock.	Large stones, droughty.
202*:						
Pardee-----------	Severe: depth to rock.	Severe: thin layer.	Deep to water	Droughty-------	Large stones, depth to rock.	Large stones, droughty.
Ranchoseco-------	Severe: depth to rock.	Severe: large stones.	Deep to water	Large stones, droughty.	Large stones, depth to rock.	Large stones, droughty.
203--------------- Perkins	Slight---------	Severe: piping.	Deep to water	Favorable------	Favorable------	Favorable.
204--------------- Perkins	Slight---------	Severe: piping.	Deep to water	Flooding-------	Favorable------	Favorable.
205--------------- Perkins	Severe: slope.	Moderate: piping.	Deep to water	Slope, droughty.	Slope----------	Slope, droughty.
206*-------------- Pits, sand	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
207--------------- Redding	Moderate: cemented pan.	Severe: thin layer.	Deep to water	Droughty, percs slowly.	Cemented pan---	Droughty, cemented pan, percs slowly.
208--------------- Redding	Moderate: cemented pan, slope.	Severe: thin layer.	Deep to water	Slope, droughty, percs slowly.	Cemented pan---	Droughty, cemented pan, percs slowly.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
209*:						
Redding	Moderate: cemented pan.	Severe: thin layer.	Deep to water	Droughty, percs slowly.	Cemented pan	Droughty, cemented pan, percs slowly.
Corning	Moderate: seepage.	Slight	Deep to water	Droughty, percs slowly.	Percs slowly	Droughty, percs slowly.
210*:						
Redding	Moderate: cemented pan, slope.	Severe: thin layer.	Deep to water	Slope, droughty, percs slowly.	Cemented pan	Droughty, cemented pan, percs slowly.
Corning	Moderate: seepage, slope.	Slight	Deep to water	Slope, droughty, percs slowly.	Percs slowly	Droughty, percs slowly.
211 Ricecross	Slight	Severe: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
212 Ricecross	Moderate: seepage.	Moderate: wetness.	Flooding	Wetness, erodes easily, flooding.	Erodes easily, wetness.	Erodes easily.
213* Riverwash	Severe: seepage.	Severe: seepage, wetness.	Flooding, cutbanks cave.	Wetness, droughty.	Large stones, wetness.	Large stones, wetness.
214, 215 San Joaquin	Moderate: cemented pan.	Severe: thin layer.	Deep to water	Percs slowly	Cemented pan, erodes easily.	Erodes easily, cemented pan.
216 San Joaquin	Moderate: cemented pan.	Severe: thin layer.	Deep to water	Percs slowly	Cemented pan, erodes easily, percs slowly.	Erodes easily, cemented pan, percs slowly.
217*:						
San Joaquin	Moderate: cemented pan.	Severe: thin layer.	Deep to water	Percs slowly	Cemented pan, erodes easily.	Erodes easily, cemented pan.
Urban land	Variable	Variable	Variable	Variable	Variable	Variable.
218 Shanghai	Moderate: seepage.	Moderate: piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
219 Shanghai	Moderate: seepage.	Moderate: piping, wetness.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
220 Shanghai	Moderate: seepage.	Moderate: piping.	Deep to water	Percs slowly, erodes easily.	Erodes easily	Erodes easily.
221 Sites	Moderate: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.
222, 223, 224 Sites	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
225 Sites	Moderate: depth to rock, slope.	Severe: hard to pack.	Deep to water	Slope	Favorable	Favorable.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for-- Pond reservoir areas	Embankments, dikes, and levees	Features affecting-- Drainage	Irrigation	Terraces and diversions	Grassed waterways
226, 227, 228, 229 Sites	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
230*:						
Sites	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Jocal	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
231*:						
Sites	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Jocal	Severe: slope.	Moderate: thin layer, piping.	Deep to water	Slope	Slope	Slope.
Mariposa	Severe: depth to rock, slope.	Severe: thin layer.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
232*:						
Slacreek	Severe: slope.	Severe: seepage.	Deep to water	Slope, droughty, depth to rock.	Slope, depth to rock.	Slope, droughty, depth to rock.
Rock outcrop	Severe: slope.	Slight	Deep to water	Slope	Slope	Slope.
235 Sobrante	Moderate: seepage, depth to rock, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Depth to rock	Depth to rock.
236, 237 Sobrante	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
238*:						
Sobrante	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Rock outcrop	Severe: slope.	Slight	Deep to water	Slope	Slope	Slope.
239*, 240*, 241*:						
Sobrante	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Timbuctoo	Severe: slope.	Moderate: thin layer.	Deep to water	Slope, percs slowly, depth to rock.	Slope, depth to rock, percs slowly.	Slope, depth to rock, percs slowly.
242, 243, 244 Surnuf	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
245, 246, 247 Surnuf	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, large stones.	Slope, large stones.	Large stones, slope.

See footnote at end of table.

TABLE 17.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
248--------------- Trainer	Severe: seepage.	Severe: piping.	Deep to water	Flooding-------	Favorable------	Favorable.
249--------------- Tujunga	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowing.	Droughty.
250--------------- Tujunga	Severe: seepage.	Severe: seepage.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
251--------------- Tujunga	Severe: seepage.	Severe: seepage, piping.	Deep to water	Droughty, fast intake.	Too sandy, soil blowing.	Droughty.
252, 253---------- Woodleaf	Severe: slope.	Severe: thin layer, large stones.	Deep to water	Slope, large stones, percs slowly.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 18.--ENGINEERING INDEX PROPERTIES

(Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
101*:											
Aiken-----------	0-21	Loam-------------	ML	A-4, A-5	0-5	95-100	80-100	65-75	50-60	25-45	NP-10
	21-29	Clay loam--------	ML	A-6, A-7	0-10	95-100	90-100	75-95	65-80	35-50	10-20
	29-65	Clay-------------	ML, MH	A-7	0-10	95-100	95-100	90-95	75-85	45-60	15-25
Horseshoe-------	0-15	Loam-------------	CL-ML, ML	A-4	0-10	80-95	75-95	70-85	50-60	25-35	5-10
	15-75	Loam, clay loam	CL	A-6, A-7	0-10	80-95	75-95	70-90	60-70	30-50	10-25
	75-79	Weathered bedrock	---	---	---	---	---	---	---	---	---
102*, 103*:											
Argonaut--------	0-7	Loam-------------	ML, CL-ML	A-4	0-5	80-100	75-95	70-90	50-80	20-30	NP-10
	7-14	Loam, gravelly clay loam, gravelly loam.	CL	A-6	0-10	75-95	70-90	65-85	50-70	25-40	10-20
	14-21	Clay loam, gravelly clay loam, gravelly loam.	CL	A-6	5-10	75-95	70-90	65-85	50-60	25-40	10-20
	21-35	Clay, gravelly clay, clay loam.	CH, CL	A-7	0-5	75-100	70-90	65-85	60-80	40-60	20-35
	35-39	Weathered bedrock	---	---	---	---	---	---	---	---	---
Auburn----------	0-17	Loam-------------	ML, CL-ML	A-4	0-10	95-100	75-95	70-90	50-80	20-30	NP-10
	17-21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
104*:											
Argonaut--------	0-14	Loam-------------	ML, CL-ML	A-4	0-5	80-100	75-95	70-90	50-80	20-30	NP-10
	14-21	Loam, gravelly clay loam, gravelly loam.	CL	A-6	0-10	75-95	70-90	65-85	50-70	25-40	10-20
	21-35	Clay loam, gravelly clay loam, gravelly loam.	CL	A-6	5-10	75-95	70-90	65-85	50-60	25-40	10-20
	35-39	Weathered bedrock	---	---	---	---	---	---	---	---	---
Auburn----------	0-17	Loam-------------	ML, CL-ML	A-4	0-10	95-100	75-95	70-90	50-80	20-30	NP-10
	17-21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
105-------------- Argovar	0-8	Silt loam--------	CL-ML, CL	A-4	0	100	95-100	85-95	60-75	20-30	5-10
	8-17	Loam-------------	CL, CL-ML	A-4, A-6	0	100	95-100	90-100	65-80	25-35	5-15
	17-26	Clay loam, loam	CL	A-6	0	100	95-100	95-100	70-85	30-40	10-20
	26-62	Clay-------------	CH, CL	A-7	0-5	95-100	90-100	85-100	70-95	40-60	20-35
106, 107, 108, 109------------ Auburn	0-17	Loam-------------	ML, CL-ML	A-4	0-10	95-100	75-95	70-90	50-80	20-30	NP-10
	17-21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
110*, 111*, 112*:											
Auburn----------	0-17	Loam-------------	ML, CL-ML	A-4	0-10	95-100	75-95	70-90	50-80	20-30	NP-10
	17-21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
110*, 111*, 112*:											
Sobrante--------	0-5	Loam-------------	ML	A-4	0	95-100	75-90	70-85	55-70	25-40	NP-10
	5-27	Loam, clay loam, silty clay loam.	CL, CL-ML	A-6, A-4	0-5	95-100	75-90	70-90	55-80	25-40	5-20
	27-39	Weathered bedrock	---	---	---	---	---	---	---	---	---
	39-43	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
113*, 114*, 115*, 116*:											
Auburn---------	0-17	Gravelly loam----	ML, GM, CL-ML, GM-GC	A-4	0-10	65-90	60-75	55-70	40-65	20-30	NP-10
	17-21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sobrante-------	0-5	Gravelly loam----	SM, GM	A-4	0-5	60-80	55-75	50-70	35-50	25-40	NP-10
	5-35	Gravelly loam, gravelly clay loam, gravelly silty clay loam.	CL-ML, CL, GM-GC, GC	A-4, A-6	0-5	60-80	55-75	50-70	40-60	25-40	5-20
	35-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
	40-44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
117*, 118*, 119*, 120*:											
Auburn---------	0-17	Gravelly loam----	ML, GM, CL-ML, GM-GC	A-4	0-10	65-90	60-75	55-70	40-65	20-30	NP-10
	17-21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Sobrante-------	0-5	Gravelly loam----	SM, GM	A-4	0-5	60-80	55-75	50-70	35-50	25-40	NP-10
	5-35	Gravelly loam, gravelly clay loam, gravelly silty clay loam.	CL-ML, CL, GM-GC, GC	A-4, A-6	0-5	60-80	55-75	50-70	40-60	25-40	5-20
	35-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
	40-44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop---	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
121*, 122*:											
Auburn----------	0-17	Gravelly loam----	ML, GM, CL-ML, GM-GC	A-4	0-10	65-90	60-75	55-70	40-65	20-30	NP-10
	17-21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
121*, 122*:											
Timbuctoo-------	0-4	Gravelly loam----	SC-SM, SM, GM-GC, GM	A-4	0-15	65-80	60-75	55-65	35-50	25-35	5-10
	4-26	Gravelly clay loam, gravelly clay.	CL, SC, GC	A-7	0-15	65-80	60-75	55-70	45-60	40-50	15-25
	26-38	Gravelly sandy clay loam.	SC	A-2	0-15	65-80	60-75	55-65	25-35	30-40	10-20
	38-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
	45-49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Argonaut--------	0-7	Gravelly loam----	GM, ML, GM-GC, CL-ML	A-4	0-10	55-75	50-75	45-75	35-55	20-30	NP-10
	7-21	Clay loam, cobbly clay loam, gravelly loam.	CL	A-6	5-25	75-95	70-90	65-85	50-60	25-40	10-20
	21-31	Clay, gravelly clay, gravelly clay loam.	CH, CL	A-7	0-5	75-100	70-90	65-85	60-80	40-60	20-35
	31-35	Weathered bedrock	---	---	---	---	---	---	---	---	---
123, 124, 125---- Boomer	0-12	Gravelly loam----	GM, SM	A-4	0-5	60-80	50-75	40-60	35-50	25-40	NP-10
	12-50	Gravelly sandy clay loam, gravelly clay loam, gravelly silty clay loam.	GC, SC, CL	A-6, A-7	0-5	60-80	50-75	45-70	35-60	25-45	10-20
	50-54	Weathered bedrock	---	---	---	---	---	---	---	---	---
126*:											
Boomer----------	0-3	Sandy loam-------	SM	A-4	0-5	85-100	75-95	50-65	35-50	20-30	NP-5
	3-57	Sandy clay loam, clay loam, silty clay loam.	CL, SC	A-6, A-7	0-5	85-100	75-95	70-85	45-80	25-45	10-20
	57-61	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pendola---------	0-9	Cobbly sandy loam	SM	A-4	10-30	75-95	70-90	50-60	35-50	20-30	NP-5
	9-21	Very cobbly loam	CL-ML, ML, CL	A-4	30-70	75-95	70-90	65-85	50-65	25-35	5-10
	21-90	Very cobbly clay loam.	CL	A-6	30-70	75-95	70-90	60-80	55-70	30-40	10-20
	90-94	Weathered bedrock	---	---	---	---	---	---	---	---	---
127*, 128*:											
Boomer----------	0-3	Sandy loam-------	SM	A-4	0-5	85-100	75-95	50-65	35-50	20-30	NP-5
	3-57	Sandy clay loam, clay loam, silty clay loam.	CL, SC	A-6, A-7	0-5	85-100	75-95	70-85	45-80	25-45	10-20
	57-61	Weathered bedrock	---	---	---	---	---	---	---	---	---
Pendola---------	0-9	Cobbly sandy loam	SM	A-4	10-30	75-95	70-90	50-60	35-50	20-30	NP-5
	9-21	Very cobbly loam	CL-ML, ML, CL	A-4	30-70	75-95	70-90	65-85	50-65	25-35	5-10
	21-90	Very cobbly clay loam.	CL	A-6	30-70	75-95	70-90	60-80	55-70	30-40	10-20
	90-94	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
127*, 128*:											
Sites-----------	0-9	Clay loam--------	CL	A-6	0-5	90-100	80-95	65-75	50-65	30-40	10-20
	9-45	Clay loam, clay	MH, ML	A-7	0	90-100	85-95	75-90	70-85	45-60	15-25
	45-49	Weathered bedrock	---	---	---	---	---	---	---	---	---
129-------------- Bruella	0-13	Loam-------------	ML, CL-ML	A-4	0	100	95-100	65-75	50-60	25-35	5-10
	13-70	Sandy clay loam, sandy loam, loam.	SC	A-6	0	95-100	95-100	65-80	35-50	30-40	10-15
130-------------- Capay	0-9	Clay loam--------	CL	A-7	0	100	100	95-100	85-95	40-50	15-25
	9-35	Clay, silty clay	CL, CH	A-7	0	100	100	95-100	85-95	40-60	20-35
	35-60	Silty clay loam, clay loam.	CL	A-7	0	100	100	95-100	75-95	40-50	15-25
131, 132--------- Hollenbeck	0-8	Silty clay loam	CH, CL	A-7	0	100	100	95-100	90-95	40-55	20-30
	8-43	Clay, silty clay	CH, CL	A-7	0	100	100	90-100	85-95	40-60	20-35
	43-47	Silty clay loam, clay loam.	CL	A-6, A-7	0	100	95-100	85-100	75-90	35-50	15-25
	47-65	Cemented---------	---	---	---	---	---	---	---	---	---
133-------------- Hollenbeck	0-27	Clay-------------	CH, CL	A-7	0-5	100	75-100	70-100	60-95	40-60	20-35
	27-48	Clay, silty clay	CH, CL	A-7	0	100	100	95-100	85-95	40-60	20-35
	48-59	Clay loam, silty clay loam.	CL	A-7	0	100	100	95-100	75-95	40-50	15-25
	59-63	Weathered bedrock	---	---	---	---	---	---	---	---	---
134*:											
Hollenbeck------	0-8	Silty clay loam	CH, CL	A-7	0	100	100	95-100	90-95	40-55	20-30
	8-43	Clay, silty clay	CH, CL	A-7	0	100	100	90-100	85-95	40-60	20-35
	43-47	Silty clay loam, clay loam.	CL	A-6, A-7	0	100	95-100	85-100	75-90	35-50	15-25
	47-65	Cemented---------	---	---	---	---	---	---	---	---	---
Urban land------	0-60	Variable---------	---	---	---	---	---	---	---	---	---
135*:											
Chaix-----------	0-9	Coarse sandy loam	SM	A-1, A-2	0-5	90-100	75-95	45-65	20-35	---	NP
	9-29	Coarse sandy loam, sandy loam.	SM	A-1, A-2	0-5	90-100	75-95	45-65	20-35	---	NP
	29-33	Weathered bedrock	---	---	---	---	---	---	---	---	---
Chawanakee------	0-15	Coarse sandy loam	SM	A-1, A-2	0-5	90-100	75-95	45-65	20-35	---	NP
	15-19	Weathered bedrock	---	---	---	---	---	---	---	---	---
Hotaw-----------	0-12	Loam-------------	ML	A-4	0	90-100	85-100	65-85	50-60	25-35	NP-10
	12-34	Sandy clay loam, clay loam.	SC, CL	A-6	0-5	90-100	85-100	70-90	35-60	25-40	10-20
	34-38	Weathered bedrock	---	---	---	---	---	---	---	---	---
136*:											
Chawanakee------	0-15	Coarse sandy loam	SM	A-1, A-2	0-5	90-100	75-95	45-65	20-35	---	NP
	15-19	Weathered bedrock	---	---	---	---	---	---	---	---	---
Chaix-----------	0-9	Coarse sandy loam	SM	A-1, A-2	0-5	90-100	75-95	45-65	20-35	---	NP
	9-29	Coarse sandy loam, sandy loam.	SM	A-1, A-2	0-5	90-100	75-95	45-65	20-35	---	NP
	29-33	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
136*:											
Hotaw-----------	0-12	Loam-------------	ML	A-4	0	90-100	85-100	65-85	50-60	25-35	NP-10
	12-34	Sandy clay loam, clay loam.	SC, CL	A-6	0-5	90-100	85-100	70-90	35-60	25-40	10-20
	34-38	Weathered bedrock	---	---	---	---	---	---	---	---	---
137, 138, 139---- Columbia	0-9	Fine sandy loam	SM, SC-SM	A-2, A-4	0	100	95-100	65-90	30-50	20-30	NP-10
	9-18	Fine sandy loam, sandy loam.	SM, SC-SM	A-2, A-4	0	100	95-100	65-90	30-50	20-30	NP-10
	18-68	Stratified sand to silt loam.	SM	A-4	0	100	95-100	60-90	35-50	20-25	NP-5
140*:											
Columbia---------	0-9	Fine sandy loam	SM, SC-SM	A-2, A-4	0	100	95-100	65-90	30-50	20-30	NP-10
	9-18	Fine sandy loam, sandy loam.	SM, SC-SM	A-2, A-4	0	100	95-100	65-90	30-50	20-30	NP-10
	18-68	Stratified sand to silt loam.	SM	A-4	0	100	95-100	60-90	35-50	20-25	NP-5
Urban land------	0-60	Variable---------	---	---	---	---	---	---	---	---	---
141, 142--------- Conejo	0-6	Loam-------------	CL-ML, ML	A-4	0	95-100	90-100	70-85	50-65	25-35	5-10
	6-65	Loam, clay loam	CL	A-6	0	95-100	90-100	70-90	50-85	25-40	10-20
143*:											
Conejo-----------	0-6	Loam-------------	CL-ML, ML	A-4	0	95-100	90-100	70-85	50-65	25-35	5-10
	6-65	Loam, clay loam	CL	A-6	0	95-100	90-100	70-90	50-85	25-40	10-20
Urban land------	0-60	Variable---------	---	---	---	---	---	---	---	---	---
144*:											
Deadwood---------	0-14	Very gravelly sandy loam.	GP-GM, GM	A-1	0-5	30-55	25-50	10-30	5-20	20-30	NP-5
	14-18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Hurlbut----------	0-3	Gravelly fine sandy loam.	SM, GM	A-2, A-4	0	60-85	55-75	45-65	25-45	20-30	NP-5
	3-23	Gravelly silt loam, gravelly loam, silt loam.	GC, GM-GC, CL-ML, CL	A-4, A-6	0	60-95	55-85	50-80	35-60	25-35	5-15
	23-27	Weathered bedrock	---	---	---	---	---	---	---	---	---
145*------------- Dumps, landfills	0-60	Variable---------	---	---	---	---	---	---	---	---	---
146*------------- Dumps, mine tailings	0-60	Variable---------	---	---	---	---	---	---	---	---	---
147-------------- Feather	0-26	Silt loam--------	ML	A-4	0	100	100	95-100	85-95	20-35	NP-10
	26-60	Silt loam--------	ML	A-4	0	100	100	95-100	85-95	20-35	NP-10

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag-ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas-ticity index
	In				Pct					Pct	
148, 149, 150, 151------------- Flanly	0-9	Sandy loam-------	SM	A-4	0-15	80-100	75-100	55-75	35-50	20-30	NP-5
	9-16	Loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0-15	80-100	75-100	65-85	40-55	25-35	5-10
	16-34	Loam, clay loam	CL	A-6	0-15	80-100	75-100	75-95	60-70	30-40	10-15
	34-38	Weathered bedrock	---	---	---	---	---	---	---	---	---
152*:											
Flanly----------	0-5	Sandy loam-------	SM	A-4	0-15	80-100	75-100	55-75	35-50	20-30	NP-5
	5-25	Loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0-15	80-100	75-100	65-85	40-55	25-35	5-10
	25-29	Weathered bedrock	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
153*, 154*:											
Flanly----------	0-9	Sandy loam-------	SM	A-4	0-15	80-100	75-100	55-75	35-50	20-30	NP-5
	9-16	Loam, sandy loam	CL-ML, ML, SC-SM, SM	A-4	0-15	80-100	75-100	65-85	40-55	25-35	5-10
	16-34	Loam, clay loam	CL	A-6	0-15	80-100	75-100	75-95	60-70	30-40	10-15
	34-38	Weathered bedrock	---	---	---	---	---	---	---	---	---
Orose-----------	0-2	Sandy loam-------	SM	A-2, A-4	0-10	85-100	80-100	55-65	30-40	20-30	NP-5
	2-17	Sandy loam-------	SC-SM	A-2	0-15	80-100	75-100	50-60	25-35	20-30	5-10
	17-21	Weathered bedrock	---	---	---	---	---	---	---	---	---
Verjeles--------	0-5	Sandy loam-------	SC-SM, SC	A-2, A-4	0-15	80-100	75-100	45-65	30-40	20-30	5-10
	5-20	Loam, clay loam	CL	A-6	0-15	80-100	75-100	65-85	55-75	30-40	10-15
	20-31	Clay-------------	CL, CH	A-7	0	100	100	95-100	90-100	40-60	20-30
	31-37	Clay loam--------	CL	A-6	0	100	100	90-100	70-85	30-40	10-20
	37-41	Weathered bedrock	---	---	---	---	---	---	---	---	---
155------------- Fluvaquents	0-7	Loam-------------	ML	A-4	0	100	100	80-90	50-70	25-35	NP-10
	7-60	Stratified sandy loam to silty clay loam.	ML	A-4	0	100	100	80-90	50-80	35-55	NP-10
158------------- Hoda	0-7	Loam-------------	ML	A-4	0	90-100	85-100	75-85	50-65	25-35	NP-10
	7-11	Loam, clay loam	ML, CL	A-4, A-6	0	95-100	90-100	60-85	50-60	30-40	5-15
	11-77	Clay loam, clay	MH	A-7	0	95-100	90-100	75-90	60-80	50-60	15-25
159*, 160*:											
Hoda------------	0-7	Loam-------------	ML	A-4	0	90-100	85-100	75-85	50-65	25-35	NP-10
	7-14	Loam, clay loam	ML, CL	A-4, A-6	0	95-100	90-100	60-85	50-60	30-40	5-15
	14-72	Clay loam, clay	MH	A-7	0	95-100	90-100	75-90	60-80	50-60	15-25
Musick----------	0-8	Loam-------------	ML	A-4	0	100	95-100	80-90	50-60	30-40	NP-10
	8-35	Sandy clay loam, clay loam.	SM, ML	A-7	0	100	95-100	80-90	40-60	40-50	10-20
	35-80	Sandy clay loam, sandy loam.	SM	A-6, A-7	0	100	95-100	70-85	35-50	35-45	10-15
161, 162, 163---- Holillipah	0-6	Loamy sand-------	SM	A-2	0	90-100	85-100	60-75	20-30	---	NP
	6-66	Stratified silt loam to sand.	SM	A-1, A-2	0	80-100	75-100	35-75	10-30	---	NP

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
164-------------- Holland	0-18	Sandy loam-------	SM	A-2, A-4	0	90-100	85-100	60-70	25-45	20-30	NP-5
	18-25	Loam-------------	ML, CL-ML, CL	A-4	0	90-100	85-100	65-85	50-60	25-35	5-10
	25-60	Sandy clay loam, clay loam.	SC, CL	A-6	0	90-100	85-100	70-90	40-70	25-40	10-20
165*, 166*:											
Holland---------	0-15	Loam-------------	ML	A-4	0	90-100	85-100	65-85	50-60	20-35	NP-10
	15-65	Sandy clay loam, clay loam.	SC, CL	A-6	0	90-100	85-100	70-90	40-70	25-40	10-20
Hoda------------	0-7	Loam-------------	ML	A-4	0	90-100	85-100	75-85	50-65	25-35	NP-10
	7-14	Loam, clay loam	ML, CL	A-4, A-6	0	95-100	90-100	60-85	50-60	30-40	5-15
	14-72	Clay loam, clay	MH	A-7	0	95-100	90-100	75-90	60-80	50-60	15-25
Hotaw-----------	0-12	Loam-------------	ML	A-4	0	90-100	85-100	65-85	50-60	25-35	NP-10
	12-34	Sandy clay loam, clay loam.	SC, CL	A-6	0-5	90-100	85-100	70-90	35-60	25-40	10-20
	34-38	Weathered bedrock	---	---	---	---	---	---	---	---	---
167*:											
Holland---------	0-3	Loam-------------	ML	A-4	0	90-100	85-100	65-85	50-60	20-35	NP-10
	3-67	Sandy clay loam, clay loam.	SC, CL	A-6	0	90-100	85-100	70-90	40-70	25-40	10-20
Hoda------------	0-7	Loam-------------	ML	A-4	0	90-100	85-100	75-85	50-65	25-35	NP-10
	7-14	Loam, clay loam	ML, CL	A-4, A-6	0	95-100	90-100	60-85	50-60	30-40	5-15
	14-72	Clay loam, clay	MH	A-7	0	95-100	90-100	75-90	60-80	50-60	15-25
Hotaw-----------	0-5	Loam-------------	ML	A-4	0	90-100	85-100	65-85	50-60	25-35	NP-10
	5-21	Sandy clay loam, clay loam.	SC, CL	A-6	0-5	90-100	85-100	70-90	35-60	25-40	10-20
	21-25	Weathered bedrock	---	---	---	---	---	---	---	---	---
168*:											
Horseshoe-------	0-15	Loam-------------	CL-ML, ML	A-4	0-10	80-95	75-95	70-85	50-60	25-35	5-10
	15-75	Loam, clay loam	CL	A-6, A-7	0-10	80-95	75-95	70-90	60-70	30-50	10-25
	75-79	Weathered bedrock	---	---	---	---	---	---	---	---	---
Aiken-----------	0-21	Loam-------------	ML	A-4, A-5	0-5	95-100	80-100	65-75	50-60	25-45	NP-10
	21-29	Clay loam--------	ML	A-6, A-7	0-10	95-100	90-100	75-95	65-80	35-50	10-20
	29-65	Clay-------------	ML, MH	A-7	0-10	95-100	95-100	90-95	75-85	45-60	15-25
169-------------- Horst	0-10	Sandy loam-------	SM	A-4	0	95-100	85-100	65-75	35-50	20-30	NP-5
	10-15	Loamy sand-------	SM	A-2	0	90-100	85-100	60-75	20-30	---	NP
	15-62	Silt loam--------	ML	A-4, A-6, A-7	0	100	100	90-100	85-90	30-45	5-15
170-------------- Horst	0-26	Silt loam--------	CL-ML, ML	A-4	0	100	100	90-100	85-90	25-35	5-10
	26-60	Silt loam--------	ML	A-4, A-6, A-7	0	100	100	90-100	85-90	30-45	5-15
	60-70	Loam-------------	CL-ML, ML	A-4	0	100	100	85-95	60-75	25-35	5-10
171, 172--------- Hotaw	0-4	Sandy loam-------	SM	A-2, A-4	0-5	90-100	85-100	60-70	25-45	20-30	NP-5
	4-23	Sandy clay loam, clay loam.	SC, CL	A-6	0-5	90-100	85-100	70-90	35-60	25-40	10-20
	23-27	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
173*:											
Hotaw	0-12	Loam	ML	A-4	0	90-100	85-100	65-85	50-60	25-35	NP-10
	12-34	Sandy clay loam, clay loam.	SC, CL	A-6	0-5	90-100	85-100	70-90	35-60	25-40	10-20
	34-38	Weathered bedrock	---	---	---	---	---	---	---	---	---
Chawanakee	0-15	Coarse sandy loam	SM	A-1, A-2	0-5	90-100	75-95	45-65	20-35	---	NP
	15-19	Weathered bedrock	---	---	---	---	---	---	---	---	---
Holland	0-15	Loam	ML	A-4	0	90-100	85-100	65-85	50-60	20-35	NP-10
	15-65	Sandy clay loam, clay loam.	SC, CL	A-6	0	90-100	85-100	70-90	40-70	25-40	10-20
174*:											
Hurlbut	0-23	Gravelly fine sandy loam.	SM, GM	A-2, A-4	0	60-85	55-75	45-65	25-45	20-30	NP-5
	23-27	Weathered bedrock	---	---	---	---	---	---	---	---	---
Deadwood	0-6	Very gravelly sandy loam.	GP-GM, GM	A-1	0-5	30-55	25-50	10-30	5-20	20-30	NP-5
	6-14	Very gravelly sandy loam, very gravelly loam, extremely gravelly sandy loam.	GP-GM, GM	A-1, A-2	0-15	20-55	15-45	10-40	5-30	25-35	NP-10
	14-18	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
175, 176, 177, 178, 179 Jocal	0-8	Loam	ML	A-4	0	80-95	75-95	65-80	55-70	25-35	NP-10
	8-73	Clay loam, silty clay loam.	ML, CL	A-6, A-7	0	80-95	75-95	70-90	60-85	35-50	10-25
180*, 181*:											
Jocal	0-18	Loam	ML	A-4	0	80-95	75-95	65-80	55-70	25-35	NP-10
	18-70	Clay loam, silty clay loam.	ML, CL	A-6, A-7	0	80-95	75-95	70-90	60-85	35-50	10-25
Sites	0-9	Clay loam	CL	A-6	0-5	90-100	80-95	65-75	50-65	30-40	10-20
	9-45	Clay loam, clay	MH, ML	A-7	0	90-100	85-95	75-90	70-85	45-60	15-25
	45-49	Weathered bedrock	---	---	---	---	---	---	---	---	---
Mariposa	0-6	Gravelly loam	SM, GM	A-2, A-4	0-5	65-85	60-75	40-60	30-45	25-40	NP-10
	6-33	Gravelly loam, gravelly silt loam, gravelly clay loam.	SC-SM, SC, GC, GM-GC	A-2, A-4, A-6	0-5	65-85	55-75	40-60	30-45	25-40	5-15
	33-37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
182 Kilaga	0-21	Clay loam	CL	A-6	0	100	95-100	85-95	60-75	30-40	10-20
	21-60	Clay, sandy clay, clay loam.	CL, CH	A-6, A-7	0	100	95-100	85-95	50-85	35-55	15-30

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
183-------------- Kilaga	0-21	Clay loam--------	CL	A-6	0	100	95-100	85-95	65-80	30-40	10-20
	21-55	Silty clay loam, silty clay, clay loam.	CH, CL	A-7	0	100	100	95-100	85-95	40-60	20-35
	55-60	Indurated material.	---	---	---	---	---	---	---	---	---
	60-64	Weathered bedrock	---	---	---	---	---	---	---	---	---
184-------------- Kilaga	0-21	Clay loam--------	CL	A-6	0	100	95-100	85-95	60-75	30-40	10-20
	21-60	Clay, sandy clay, clay loam.	CL, CH	A-6, A-7	0	100	95-100	85-95	50-85	35-55	15-30
185, 186--------- Kimball	0-16	Loam-------------	ML	A-4	0	85-100	80-100	60-95	50-65	25-35	NP-10
	16-42	Clay, clay loam	CH, CL	A-7	0	90-100	85-100	80-100	75-95	45-65	20-35
	42-60	Sandy clay loam, clay loam, loam.	SC, CL	A-6, A-7	0	80-100	75-100	65-95	35-70	30-45	10-20
187, 188, 189---- Mariposa	0-4	Gravelly loam----	SM, GM	A-2, A-4	0-5	65-85	60-75	40-60	30-45	25-40	NP-10
	4-23	Gravelly loam, gravelly silt loam, gravelly clay loam.	SC-SM, SC, GC, GM-GC	A-2, A-4, A-6	0-5	65-85	55-75	40-60	30-45	25-40	5-15
	23-27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
190*:											
Mariposa--------	0-6	Gravelly loam----	SM, GM	A-2, A-4	0-5	65-85	60-75	40-60	30-45	25-40	NP-10
	6-33	Gravelly loam, gravelly silt loam, gravelly clay loam.	SC-SM, SC, GC, GM-GC	A-2, A-4, A-6	0-5	65-85	55-75	40-60	30-45	25-40	5-15
	33-37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Jocal-----------	0-18	Loam-------------	ML	A-4	0	80-95	75-95	65-80	55-70	25-35	NP-10
	18-70	Clay loam, silty clay loam.	ML, CL	A-6, A-7	0	80-95	75-95	70-90	60-85	35-50	10-25
191*:											
Mariposa--------	0-4	Stony loam-------	SM, GM	A-2, A-4	5-15	65-85	55-75	40-60	30-45	25-40	NP-10
	4-25	Stony loam, stony silt loam, stony clay loam.	SC-SM, SC, GC, GM-GC	A-2, A-4, A-6	5-15	65-85	55-75	40-60	30-45	25-40	5-15
	25-29	Clay-------------	---	---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
192-------------- Marysville	0-6	Loam-------------	CL-ML, ML	A-4	0	100	100	85-95	70-85	25-35	5-10
	6-36	Clay loam, silty clay loam.	ML	A-6, A-7	0	100	100	95-100	85-95	35-45	10-15
	36-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
193, 194, 195, 196------------- Mildred	0-3	Cobbly loam------	ML, CL-ML, SC-SM, SM	A-4	10-40	65-90	60-85	55-75	40-60	25-35	5-10
	3-9	Cobbly clay loam	CL	A-6	10-40	65-90	60-85	60-80	50-60	30-40	10-20
	9-23	Clay loam, clay	CL, CH	A-7	0-20	80-100	75-100	70-90	65-75	40-60	20-35
	23-27	Weathered bedrock	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
197 Oakdale	0-9	Sandy loam	SM	A-2, A-4	0	95-100	90-100	50-70	25-40	20-30	NP-5
	9-53	Coarse sandy loam, sandy loam, sandy clay loam.	SC-SM	A-4	0	95-100	90-100	50-70	35-50	20-30	5-10
	53-70	Loamy sand, sandy loam.	SM	A-1, A-2	0	95-100	85-100	40-70	15-30	20-30	NP-5
198*:											
Oakdale	0-9	Sandy loam	SM	A-2, A-4	0	95-100	90-100	50-70	25-40	20-30	NP-5
	9-53	Coarse sandy loam, sandy loam, sandy clay loam.	SC-SM	A-4	0	95-100	90-100	50-70	35-50	20-30	5-10
	53-70	Loamy sand, sandy loam.	SM	A-1, A-2	0	95-100	85-100	40-70	15-30	20-30	NP-5
Urban land	0-60	Variable	---	---	---	---	---	---	---	---	---
199, 200 Orose	0-2	Sandy loam	SM	A-2, A-4	0-10	85-100	80-100	55-65	30-40	20-30	NP-5
	2-17	Sandy loam	SC-SM	A-2	0-15	80-100	75-100	50-60	25-35	20-30	5-10
	17-21	Weathered bedrock	---	---	---	---	---	---	---	---	---
201 Pardee	0-4	Gravelly loam	GM, SM, GM-GC, SC-SM	A-4	0-5	55-80	50-75	45-65	35-50	20-30	NP-10
	4-17	Very cobbly loam, very gravelly clay loam, very gravelly loam.	GC, GM-GC	A-6, A-4	15-45	55-65	50-60	45-55	35-50	25-35	5-15
	17-21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
202*:											
Pardee	0-4	Gravelly loam	GM, SM, GM-GC, SC-SM	A-4	0-5	55-80	50-75	45-65	35-50	20-30	NP-10
	4-17	Very cobbly loam, very gravelly clay loam, very gravelly loam.	GC, GM-GC	A-6, A-4	15-45	55-65	50-60	45-55	35-50	25-35	5-15
	17-21	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Ranchoseco	0-3	Very cobbly loam	GM	A-2	15-40	50-60	45-55	40-45	25-35	25-35	NP-10
	3-8	Very gravelly loam, very cobbly loam.	GM, GM-GC	A-2	15-40	50-60	45-55	40-45	25-35	25-35	5-10
	8-12	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
203, 204 Perkins	0-5	Loam	ML	A-4	0-5	80-100	75-95	60-80	50-60	25-35	NP-10
	5-58	Loam, clay loam	CL-ML, CL	A-4, A-6	0-5	80-100	75-95	60-85	60-75	25-40	5-15
	58-66	Stratified sandy loam to clay loam.	SC-SM, SC, CL-ML, CL	A-4, A-6	0-5	80-100	75-95	50-75	40-60	20-40	5-15
	66-72	Stratified very gravelly sandy loam to very cobbly clay loam.	GM-GC, GC	A-1, A-2	5-20	30-60	25-50	20-50	15-35	20-40	5-15

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification Unified	Classification AASHTO	Frag- ments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
205-------------- Perkins	0-8	Gravelly loam----	SM, GM	A-2, A-4	0-10	55-80	50-75	50-65	25-50	25-35	NP-10
	8-65	Gravelly loam, gravelly clay loam.	SC-SM, GM-GC, GC, CL	A-4, A-6	0-10	55-80	50-75	50-70	35-55	25-40	5-15
206*------------- Pits, sand	0-10	Sand-------------	SP, SW	A-1, A-3	0	100	80-100	30-60	0-5	---	NP
	10-60	Coarse sand, sand, gravelly coarse sand.	SP, SW	A-1, A-3	0	80-100	50-100	20-60	0-5	---	NP
207, 208--------- Redding	0-6	Gravelly loam----	SC, SC-SM, GC, GM-GC	A-4, A-6	0-15	55-90	50-75	45-70	35-50	20-35	5-15
	6-19	Gravelly loam, gravelly clay loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	55-80	50-75	45-70	35-55	25-40	5-15
	19-33	Clay, clay loam	CH, CL	A-7	0	80-95	75-90	70-90	60-75	40-60	15-30
	33-37	Indurated material.	---	---	---	---	---	---	---	---	---
209*, 210*:											
Redding---------	0-6	Gravelly loam----	SC, SC-SM, GC, GM-GC	A-4, A-6	0-15	55-90	50-75	45-70	35-50	20-35	5-15
	6-19	Gravelly loam, gravelly clay loam.	CL, CL-ML, GC, GM-GC	A-4, A-6	0-5	55-80	50-75	45-70	35-55	25-40	5-15
	19-33	Clay, clay loam	CH, CL	A-7	0	80-95	75-90	70-90	60-75	40-60	15-30
	33-37	Indurated material.	---	---	---	---	---	---	---	---	---
Corning---------	0-24	Gravelly loam----	SM, SC-SM	A-4	0-5	75-90	60-75	60-70	40-50	25-35	5-10
	24-36	Gravelly clay loam, gravelly clay, clay loam.	SC, CL, GC, CH	A-7	0-15	70-80	60-75	55-75	40-60	40-60	20-35
	36-67	Stratified sandy loam to very gravelly clay loam.	SC, SC-SM, GC, GM-GC	A-2, A-4, A-6	0-15	60-75	50-75	35-60	25-40	20-35	5-15
211-------------- Ricecross	0-6	Loam-------------	CL-ML, ML	A-4	0	90-100	85-100	75-85	60-70	25-35	5-10
	6-72	Loam, clay loam	CL-ML, CL	A-4, A-6	0	90-100	85-100	80-90	65-75	25-35	5-15
212-------------- Ricecross	0-6	Loam-------------	CL-ML, ML	A-4	0	90-100	85-100	75-85	60-70	25-35	5-10
	6-33	Loam, clay loam, sandy clay loam.	CL-ML, CL	A-4, A-6	0	90-100	85-100	80-90	65-75	25-35	5-15
	33-60	Gravelly sandy clay loam.	SC, SC-SM	A-2	0-5	65-80	60-75	50-65	25-35	25-35	5-15
213*------------- Riverwash	0-5	Gravelly coarse sand.	SM	A-3	0-15	60-80	50-75	25-50	5-10	---	NP
	5-60	Stratified gravelly sand to extremely gravelly coarse sand.	GM, SM	A-1, A-2	0-20	35-55	25-50	15-40	0-25	10-20	NP-5
214, 215, 216---- San Joaquin	0-16	Loam-------------	CL-ML, ML	A-4	0	95-100	95-100	75-90	50-60	15-30	NP-10
	16-25	Clay loam, clay	CL	A-7	0	95-100	95-100	80-95	55-70	40-50	25-35
	25-29	Indurated material.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
217*:											
San Joaquin	0-16	Loam	CL-ML, ML	A-4	0	95-100	95-100	75-90	50-60	15-30	NP-10
	16-25	Clay loam, clay	CL	A-7	0	95-100	95-100	80-95	55-70	40-50	25-35
	25-29	Indurated material.	---	---	---	---	---	---	---	---	---
Urban land	0-60	Variable	---	---	---	---	---	---	---	---	---
218 Shanghai	0-20	Silt loam	ML	A-4	0	100	100	90-100	75-90	30-40	5-10
	20-69	Stratified silty clay loam to fine sandy loam.	ML	A-6, A-7	0	100	100	90-100	85-95	35-45	10-15
219 Shanghai	0-20	Silt loam	ML	A-4	0	100	100	90-100	75-90	30-40	5-10
	20-69	Stratified silty clay loam to fine sandy loam.	ML	A-6, A-7	0	100	100	90-100	85-95	35-45	10-15
220 Shanghai	0-8	Silt loam	ML	A-4	0	100	100	90-100	75-90	30-40	5-10
	8-41	Stratified silty clay loam to fine sandy loam.	ML	A-6, A-7	0	100	100	90-100	85-95	35-45	10-15
	41-60	Clay	CH, CL	A-7	0	100	100	95-100	85-95	45-65	20-40
221, 222 Sites	0-6	Loam	ML	A-4	0-5	90-100	80-95	60-75	50-65	20-40	NP-10
	6-16	Clay loam	CL	A-6	0-5	90-100	85-95	65-75	55-70	30-40	10-20
	16-51	Clay, clay loam	MH, ML	A-7	0	90-100	85-95	75-90	70-85	45-60	15-25
	51-61	Clay loam	CL	A-6	0-5	90-100	85-95	65-75	55-70	30-40	10-20
	61-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
223, 224 Sites	0-5	Gravelly loam	SM, GM	A-4	0-5	60-80	55-75	50-70	35-50	20-40	NP-10
	5-11	Gravelly clay loam.	CL, GC	A-6	0-5	60-80	55-75	50-70	40-60	30-40	10-20
	11-18	Gravelly clay, gravelly clay loam.	GM, ML, MH	A-7	0-5	60-80	55-75	50-70	45-60	45-60	15-25
	18-62	Clay, clay loam	ML, MH	A-7	0	90-100	85-95	75-90	70-85	45-60	15-25
225, 226, 227, 228 Sites	0-5	Gravelly loam	SM, GM	A-4	0-5	60-80	55-75	50-70	35-50	20-40	NP-10
	5-53	Gravelly clay loam, gravelly clay.	GM, ML, MH	A-7	0-5	60-80	55-75	50-70	45-60	45-60	15-25
	53-57	Weathered bedrock	---	---	---	---	---	---	---	---	---
229 Sites	0-6	Loam	ML	A-4	0-5	90-100	80-95	60-75	50-65	20-40	NP-10
	6-16	Clay loam	CL	A-6	0-5	90-100	85-95	65-75	55-70	30-40	10-20
	16-51	Clay, clay loam	MH, ML	A-7	0	90-100	85-95	75-90	70-85	45-60	15-25
	51-61	Clay loam	CL	A-6	0-5	90-100	85-95	65-75	55-70	30-40	10-20
	61-65	Weathered bedrock	---	---	---	---	---	---	---	---	---
230*:											
Sites	0-9	Clay loam	CL	A-6	0-5	90-100	80-95	65-75	50-65	30-40	10-20
	9-45	Clay loam, clay	MH, ML	A-7	0	90-100	85-95	75-90	70-85	45-60	15-25
	45-49	Weathered bedrock	---	---	---	---	---	---	---	---	---
Jocal	0-18	Loam	ML	A-4	0	80-95	75-95	65-80	55-70	25-35	NP-10
	18-70	Clay loam, silty clay loam.	ML, CL	A-6, A-7	0	80-95	75-95	70-90	60-85	35-50	10-25

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag- ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
231*:											
Sites	0-9	Clay loam	CL	A-6	0-5	90-100	80-95	65-75	50-65	30-40	10-20
	9-45	Clay loam, clay	MH, ML	A-7	0	90-100	85-95	75-90	70-85	45-60	15-25
	45-49	Weathered bedrock	---	---	---	---	---	---	---	---	---
Jocal	0-18	Loam	ML	A-4	0	80-95	75-95	65-80	55-70	25-35	NP-10
	18-70	Clay loam, silty clay loam.	ML, CL	A-6, A-7	0	80-95	75-95	70-90	60-85	35-50	10-25
Mariposa	0-6	Gravelly loam	SM, GM	A-2, A-4	0-5	65-85	60-75	40-60	30-45	25-40	NP-10
	6-33	Gravelly loam, gravelly silt loam, gravelly clay loam.	SC-SM, SC, GC, GM-GC	A-2, A-4, A-6	0-5	65-85	55-75	40-60	30-45	25-40	5-15
	33-37	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
232*:											
Slacreek	0-6	Gravelly sandy loam.	SM, GM	A-2	0-10	55-80	50-75	40-60	25-35	20-30	NP-5
	6-14	Gravelly loam	SM, GM	A-4	0-10	55-80	50-75	45-60	35-50	20-30	NP-5
	14-34	Very gravelly loam.	GM	A-1, A-2	5-15	30-55	25-50	20-40	15-25	25-35	NP-10
	34-38	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
235, 236, 237 Sobrante	0-5	Gravelly loam	SM, GM	A-4	0-5	60-80	55-75	50-70	35-50	25-40	NP-10
	5-35	Gravelly loam, gravelly clay loam, gravelly silty clay loam.	CL-ML, CL, GM-GC, GC	A-4, A-6	0-5	60-80	55-75	50-70	40-60	25-40	5-20
	35-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
	40-44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
238*:											
Sobrante	0-5	Gravelly loam	SM, GM	A-4	0-5	60-80	55-75	50-70	35-50	25-40	NP-10
	5-35	Gravelly loam, gravelly clay loam, gravelly silty clay loam.	CL-ML, CL, GM-GC, GC	A-4, A-6	0-5	60-80	55-75	50-70	40-60	25-40	5-20
	35-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
	40-44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Rock outcrop	0-60	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
239*:											
Sobrante	0-5	Gravelly loam	SM, GM	A-4	0-5	60-80	55-75	50-70	35-50	25-40	NP-10
	5-35	Gravelly loam, gravelly clay loam, gravelly silty clay loam.	CL-ML, CL, GM-GC, GC	A-4, A-6	0-5	60-80	55-75	50-70	40-60	25-40	5-20
	35-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
	40-44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments 3-10 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
239*:											
Timbuctoo-------	0-4	Gravelly loam----	SC-SM, SM, GM-GC, GM	A-4	0-15	65-80	60-75	55-65	35-50	25-35	5-10
	4-26	Gravelly clay loam, gravelly clay.	CL, SC, GC	A-7	0-15	65-80	60-75	55-70	45-60	40-50	15-25
	26-38	Gravelly sandy clay loam.	SC	A-2	0-15	65-80	60-75	55-65	25-35	30-40	10-20
	38-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
	45-49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
240*:											
Sobrante--------	0-5	Gravelly loam----	SM, GM	A-4	0-5	60-80	55-75	50-70	35-50	25-40	NP-10
	5-35	Gravelly loam, gravelly clay loam, gravelly silty clay loam.	CL-ML, CL, GM-GC, GC	A-4, A-6	0-5	60-80	55-75	50-70	40-60	25-40	5-20
	35-39	Weathered bedrock	---	---	---	---	---	---	---	---	---
Timbuctoo-------	0-4	Gravelly loam----	SC-SM, SM, GM-GC, GM	A-4	0-15	65-80	60-75	55-65	35-50	25-35	5-10
	4-26	Gravelly clay loam, gravelly clay.	CL, SC, GC	A-7	0-15	65-80	60-75	55-70	45-60	40-50	15-25
	26-38	Gravelly sandy clay loam.	SC	A-2	0-15	65-80	60-75	55-65	25-35	30-40	10-20
	38-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
	45-49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
241*:											
Sobrante--------	0-5	Gravelly loam----	SM, GM	A-4	0-5	60-80	55-75	50-70	35-50	25-40	NP-10
	5-35	Gravelly loam, gravelly clay loam, gravelly silty clay loam.	CL-ML, CL, GM-GC, GC	A-4, A-6	0-5	60-80	55-75	50-70	40-60	25-40	5-20
	35-40	Weathered bedrock	---	---	---	---	---	---	---	---	---
	40-44	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
Timbuctoo-------	0-4	Gravelly loam----	SC-SM, SM, GM-GC, GM	A-4	0-15	65-80	60-75	55-65	35-50	25-35	5-10
	4-26	Gravelly clay loam, gravelly clay.	CL, SC, GC	A-7	0-15	65-80	60-75	55-70	45-60	40-50	15-25
	26-38	Gravelly sandy clay loam.	SC	A-2	0-15	65-80	60-75	55-65	25-35	30-40	10-20
	38-45	Weathered bedrock	---	---	---	---	---	---	---	---	---
	45-49	Unweathered bedrock.	---	---	---	---	---	---	---	---	---
242, 243, 244---- Surnuf	0-12	Loam-------------	ML	A-4	0-5	90-100	85-100	75-85	50-65	25-35	NP-10
	12-77	Clay loam, clay	ML, MH	A-7	0-5	90-100	85-100	80-90	70-85	45-60	15-25
245, 246, 247---- Surnuf	0-6	Cobbly loam------	ML	A-4	15-30	75-95	70-90	65-80	50-65	25-35	NP-10
	6-61	Cobbly clay loam, cobbly clay.	ML, MH	A-7	15-30	75-95	70-90	70-85	55-75	45-60	15-25

See footnote at end of table.

TABLE 18.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
248-------------- Trainer	0-9	Loam-------------	CL-ML, ML	A-4	0	100	95-100	85-95	50-65	25-35	5-10
	9-36	Sandy loam, loam	CL-ML, ML, SC-SM, SM	A-4	0	100	95-100	75-85	40-60	25-35	5-10
	36-66	Sandy loam, coarse sandy loam.	SM	A-2, A-4	0	100	95-100	60-70	30-40	20-30	NP-5
249-------------- Tujunga	0-6	Sand-------------	SW-SM, SM, SP-SM	A-1, A-2, A-3	0-5	90-100	75-95	40-70	5-25	---	NP
	6-58	Loamy sand, fine sand, sand.	SW-SM, SM, SP-SM	A-1, A-2, A-3	0-5	90-100	75-95	40-70	5-25	---	NP
	58-62	Stratified gravelly sand to gravelly loamy sand.	SP, SW-SM, SM, SP-SM	A-1	0-5	60-80	50-75	20-50	0-20	---	NP
250-------------- Tujunga	0-7	Gravelly sand----	SW-SM, SM, SP-SM	A-1	0-5	60-80	50-75	20-50	5-15	---	NP
	7-55	Loamy sand, fine sand, sand.	SW-SM, SM, SP-SM	A-1, A-2, A-3	0-5	90-100	75-95	40-70	5-25	---	NP
	55-65	Stratified gravelly sand to gravelly loamy sand.	SP, SW-SM, SM, SP-SM	A-1	0-5	60-80	50-75	20-50	0-20	---	NP
251-------------- Tujunga	0-6	Sand-------------	SW-SM, SM, SP-SM	A-1, A-2, A-3	0-5	90-100	75-95	40-70	5-25	---	NP
	6-58	Loamy sand, fine sand, sand.	SW-SM, SM, SP-SM	A-1, A-2, A-3	0-5	90-100	75-95	40-70	5-25	---	NP
	58-62	Stratified gravelly sand to gravelly loamy sand.	SP, SW-SM, SM, SP-SM	A-1	0-5	60-80	50-75	20-50	0-20	---	NP
252, 253--------- Woodleaf	0-9	Gravelly loam----	CL-ML, CL	A-4, A-6	10-30	60-90	55-85	50-75	50-60	25-35	5-15
	9-28	Very gravelly clay loam, very gravelly clay.	GC	A-7	15-45	40-60	35-55	35-50	35-45	40-60	20-35
	28-32	Unweathered bedrock.	---	---	---	---	---	---	---	---	---

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 19.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(Entries under "Erosion factors -T" apply to the entire profile. Entries under "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	In/hr	In/in	pH				Pct
101*:									
Aiken-----------	0-21	20-27	0.6-2.0	0.14-0.17	5.6-6.5	Low------------	0.20	5	2-10
	21-29	27-40	0.6-2.0	0.16-0.18	5.6-6.0	Moderate-------	0.28		
	29-65	40-50	0.2-0.6	0.15-0.17	4.5-6.0	Moderate-------	0.28		
Horseshoe-------	0-15	10-25	0.6-2.0	0.13-0.16	5.6-6.5	Low------------	0.28	5	2-10
	15-75	20-35	0.6-2.0	0.14-0.17	4.5-6.0	Moderate-------	0.28		
	75-79	---	---	---	---	---------------	----		
102*, 103*:									
Argonaut--------	0-7	15-20	0.6-2.0	0.14-0.17	5.6-6.5	Low------------	0.32	3	1-2
	7-14	20-30	0.2-0.6	0.14-0.18	5.6-7.3	Moderate-------	0.24		
	14-21	25-30	0.2-0.6	0.14-0.18	5.6-7.3	Moderate-------	0.24		
	21-35	35-60	0.01-0.06	0.10-0.16	6.1-7.8	High-----------	0.28		
	35-39	---	---	---	---	---------------	----		
Auburn----------	0-17	12-25	0.6-2.0	0.14-0.17	5.6-7.3	Low------------	0.32	1	1-2
	17-21	---	---	---	---	---------------	----		
104*:									
Argonaut--------	0-14	15-20	0.6-2.0	0.14-0.17	5.6-6.5	Low------------	0.32	3	1-2
	14-21	20-30	0.2-0.6	0.14-0.18	5.6-7.3	Moderate-------	0.24		
	21-35	25-30	0.2-0.6	0.14-0.18	5.6-7.3	Moderate-------	0.24		
	35-39	---	---	---	---	---------------	----		
Auburn----------	0-17	12-25	0.6-2.0	0.14-0.17	5.6-7.3	Low------------	0.32	1	1-2
	17-21	---	---	---	---	---------------	----		
105-------------- Argovar	0-8	18-25	0.6-2.0	0.15-0.17	6.1-7.3	Low------------	0.32	5	1-3
	8-17	18-27	0.6-2.0	0.15-0.17	6.1-7.3	Low------------	0.32		
	17-26	20-30	0.2-0.6	0.17-0.19	6.6-7.3	Moderate-------	0.28		
	26-62	45-60	0.01-0.06	0.14-0.16	6.6-7.3	High-----------	0.24		
106, 107, 108, 109------------- Auburn	0-17	12-25	0.6-2.0	0.14-0.17	5.6-7.3	Low------------	0.32	1	1-2
	17-21	---	---	---	---	---------------	----		
110*, 111*, 112*:									
Auburn----------	0-17	12-25	0.6-2.0	0.14-0.17	5.6-7.3	Low------------	0.32	1	1-2
	17-21	---	---	---	---	---------------	----		
Sobrante--------	0-5	10-25	0.6-2.0	0.13-0.17	5.6-6.5	Low------------	0.32	2	1-3
	5-27	25-35	0.6-2.0	0.13-0.18	5.6-6.5	Moderate-------	0.32		
	27-39	---	---	---	---	---------------	----		
	39-43	---	---	---	---	---------------	----		
113*, 114*, 115*, 116*:									
Auburn---------	0-17	12-25	0.6-2.0	0.11-0.15	5.6-7.3	Low------------	0.20	1	1-2
	17-21	---	---	---	---	---------------	----		
Sobrante-------	0-5	10-25	0.6-2.0	0.10-0.13	5.6-6.5	Low------------	0.24	2	1-3
	5-35	25-35	0.6-2.0	0.11-0.14	5.6-6.5	Moderate-------	0.20		
	35-40	---	---	---	---	---------------	----		
	40-44	---	---	---	---	---------------	----		

See footnote at end of table.

TABLE 19.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	In/hr	In/in	pH				Pct
117*, 118*, 119*, 120*:									
Auburn	0-17	12-25	0.6-2.0	0.11-0.15	5.6-7.3	Low	0.20	1	1-2
	17-21	---	---	---	---	---	----		
Sobrante	0-5	10-25	0.6-2.0	0.10-0.13	5.6-6.5	Low	0.24	2	1-3
	5-35	25-35	0.6-2.0	0.11-0.14	5.6-6.5	Moderate	0.20		
	35-40	---	---	---	---	---	----		
	40-44	---	---	---	---	---	----		
Rock outcrop	0-60	---	---	---	---	---	----	---	---
121*, 122*:									
Auburn	0-17	12-25	0.6-2.0	0.11-0.15	5.6-7.3	Low	0.20	1	1-2
	17-21	---	---	---	---	---	----		
Timbuctoo	0-4	18-27	0.6-2.0	0.11-0.14	6.1-7.3	Low	0.24	3	1-3
	4-26	35-45	0.06-0.2	0.11-0.15	6.1-7.3	Moderate	0.20		
	26-38	20-30	0.6-2.0	0.11-0.14	6.1-7.3	Moderate	0.20		
	38-45	---	---	---	---	---	----		
	45-49	---	---	---	---	---	----		
Argonaut	0-7	15-20	0.6-2.0	0.10-0.15	5.6-6.5	Low	0.20	3	1-2
	7-21	25-30	0.2-0.6	0.14-0.18	5.6-7.3	Moderate	0.24		
	21-31	35-60	0.00-0.06	0.10-0.16	6.1-7.8	High	0.28		
	31-35	---	---	---	---	---	----		
123, 124, 125 Boomer	0-12	18-27	0.6-2.0	0.10-0.15	5.6-7.3	Low	0.10	4	1-3
	12-50	25-35	0.2-0.6	0.12-0.15	5.1-6.5	Moderate	0.15		
	50-54	---	---	---	---	---	----		
126*:									
Boomer	0-3	15-20	0.6-2.0	0.12-0.15	5.6-7.3	Low	0.20	4	1-3
	3-57	25-35	0.2-0.6	0.15-0.19	5.1-6.5	Moderate	0.24		
	57-61	---	---	---	---	---	----		
Pendola	0-9	15-20	0.6-2.0	0.09-0.12	5.6-6.5	Low	0.17	5	1-3
	9-21	18-27	0.6-2.0	0.11-0.14	6.1-6.5	Low	0.20		
	21-90	27-35	0.6-2.0	0.06-0.11	6.1-6.5	Low	0.10		
	90-94	---	---	---	---	---	----		
127*, 128*:									
Boomer	0-3	15-20	0.6-2.0	0.12-0.15	5.6-7.3	Low	0.20	4	1-3
	3-57	25-35	0.2-0.6	0.15-0.19	5.1-6.5	Moderate	0.24		
	57-61	---	---	---	---	---	----		
Pendola	0-9	15-20	0.6-2.0	0.09-0.12	5.6-6.5	Low	0.17	5	1-3
	9-21	18-27	0.6-2.0	0.11-0.14	6.1-6.5	Low	0.20		
	21-90	27-35	0.6-2.0	0.06-0.11	6.1-6.5	Low	0.10		
	90-94	---	---	---	---	---	----		
Sites	0-9	27-35	0.6-2.0	0.16-0.18	5.6-6.5	Moderate	0.24	4	2-10
	9-45	35-60	0.2-0.6	0.13-0.16	4.5-6.0	Moderate	0.28		
	45-49	---	---	---	---	---	----		
129 Bruella	0-13	15-25	0.6-2.0	0.14-0.16	6.1-7.3	Low	0.37	5	.5-1
	13-70	18-30	0.2-0.6	0.13-0.17	6.1-7.3	Moderate	0.28		
130 Capay	0-9	35-40	0.06-0.2	0.17-0.19	5.6-8.4	High	0.28	5	1-2
	9-35	40-60	0.06-0.2	0.14-0.16	6.6-8.4	High	0.24		
	35-60	35-40	0.06-0.2	0.17-0.19	6.6-8.4	High	0.28		

See footnote at end of table.

TABLE 19.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	In/hr	In/in	pH				Pct
131, 132---------Hollenbeck	0-8	35-40	0.06-0.2	0.14-0.17	6.6-8.4	High-----------	0.28	3	1-2
	8-43	40-60	0.06-0.2	0.14-0.16	6.6-8.4	High-----------	0.28		
	43-47	30-40	0.2-0.6	0.17-0.20	6.6-8.4	Moderate-------	0.37		
	47-65	---	---	---	---	---------------	----		
133--------------Hollenbeck	0-27	40-60	0.06-0.2	0.14-0.16	5.6-6.5	High-----------	0.24	4	1-2
	27-48	40-60	0.06-0.2	0.14-0.16	5.6-6.5	High-----------	0.28		
	48-59	35-40	0.06-0.2	0.17-0.19	5.6-6.5	High-----------	0.28		
	59-63	---	---	---	---	---------------	----		
134*:									
Hollenbeck------	0-8	35-40	0.06-0.2	0.14-0.17	6.6-8.4	High-----------	0.28	3	1-2
	8-43	40-60	0.06-0.2	0.14-0.16	6.6-8.4	High-----------	0.28		
	43-47	30-40	0.2-0.6	0.17-0.20	6.6-8.4	Moderate-------	0.37		
	47-65	---	---	---	---	---------------	----		
Urban land------	0-60	---	---	---	---	---------------	----	---	---
135*:									
Chaix-----------	0-9	5-15	2.0-6.0	0.07-0.11	5.6-6.5	Low------------	0.20	3	2-6
	9-29	5-15	2.0-6.0	0.07-0.11	5.1-6.5	Low------------	0.20		
	29-33	---	---	---	---	---------------	----		
Chawanakee------	0-15	5-15	2.0-6.0	0.07-0.11	5.1-6.5	Low------------	0.20	2	.5-1
	15-19	---	---	---	---	---------------	----		
Hotaw-----------	0-12	7-15	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.28	3	1-5
	12-34	20-35	0.6-2.0	0.14-0.18	5.1-6.5	Moderate-------	0.24		
	34-38	---	---	---	---	---------------	----		
136*:									
Chawanakee------	0-15	5-15	2.0-6.0	0.07-0.11	5.1-6.5	Low------------	0.20	2	.5-1
	15-19	---	---	---	---	---------------	----		
Chaix-----------	0-9	5-15	2.0-6.0	0.07-0.11	5.6-6.5	Low------------	0.20	3	2-6
	9-29	5-15	2.0-6.0	0.07-0.11	5.1-6.5	Low------------	0.20		
	29-33	---	---	---	---	---------------	----		
Hotaw-----------	0-12	7-15	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.28	3	1-5
	12-34	20-35	0.6-2.0	0.14-0.18	5.1-6.5	Moderate-------	0.24		
	34-38	---	---	---	---	---------------	----		
137, 138, 139----Columbia	0-9	8-18	2.0-6.0	0.10-0.12	6.1-7.8	Low------------	0.32	5	.5-2
	9-18	10-18	2.0-6.0	0.10-0.12	6.1-7.8	Low------------	0.32		
	18-68	10-18	2.0-6.0	0.08-0.11	6.1-7.8	Low------------	0.32		
140*:									
Columbia--------	0-9	8-18	2.0-6.0	0.10-0.12	6.1-7.8	Low------------	0.32	5	.5-2
	9-18	10-18	2.0-6.0	0.10-0.12	6.1-7.8	Low------------	0.32		
	18-68	10-18	2.0-6.0	0.08-0.11	6.1-7.8	Low------------	0.32		
Urban land------	0-60	---	---	---	---	---------------	----	---	---
141, 142---------Conejo	0-6	20-27	0.6-2.0	0.15-0.17	6.1-7.8	Low------------	0.32	5	1-4
	6-65	25-35	0.2-0.6	0.14-0.19	6.1-8.4	Moderate-------	0.32		
143*:									
Conejo----------	0-6	20-27	0.6-2.0	0.15-0.17	6.1-7.8	Low------------	0.32	5	1-4
	6-65	25-35	0.2-0.6	0.14-0.19	6.1-8.4	Moderate-------	0.32		
Urban land------	0-60	---	---	---	---	---------------	----	---	---

See footnote at end of table.

TABLE 19.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	In/hr	In/in	pH				Pct
144*:									
Deadwood--------	0-14	10-20	2.0-6.0	0.02-0.05	5.6-6.5	Low------------	0.15	1	1-3
	14-18	---	---	---	---	---------------	----		
Rock outcrop----	0-60	---	---	---	---	---------------	----	---	---
Hurlbut---------	0-3	15-20	0.6-2.0	0.09-0.12	5.1-6.5	Low------------	0.20	3	1-3
	3-23	18-27	0.6-2.0	0.10-0.15	5.1-6.5	Low------------	0.28		
	23-27	---	---	---	---	---------------	----		
145*------------- Dumps, landfills	0-60	---	---	---	---	---------------	----	---	---
146*------------- Dumps, mine tailings	0-60	---	---	---	---	---------------	----	---	---
147-------------- Feather	0-26	10-18	0.6-2.0	0.16-0.19	6.6-7.8	Low------------	0.43	5	2-3
	26-60	10-18	0.6-2.0	0.15-0.18	7.4-8.4	Low------------	0.49		
148, 149, 150, 151------------- Flanly	0-9	8-20	0.6-2.0	0.14-0.17	6.1-6.5	Low------------	0.24	3	1-2
	9-16	18-25	0.6-2.0	0.14-0.17	5.6-6.0	Low------------	0.24		
	16-34	25-35	0.2-0.6	0.17-0.19	5.6-6.0	Moderate-------	0.32		
	34-38	---	---	---	---	---------------	----		
152*:									
Flanly----------	0-5	8-20	0.6-2.0	0.14-0.17	6.1-6.5	Low------------	0.24	3	1-2
	5-25	18-25	0.6-2.0	0.14-0.17	5.6-6.0	Low------------	0.24		
	25-29	---	---	---	---	---------------	----		
Rock outcrop----	0-60	---	---	---	---	---------------	----	---	---
153*, 154*:									
Flanly----------	0-9	8-20	0.6-2.0	0.14-0.17	6.1-6.5	Low------------	0.24	3	1-2
	9-16	18-25	0.6-2.0	0.14-0.17	5.6-6.0	Low------------	0.24		
	16-34	25-35	0.2-0.6	0.17-0.19	5.6-6.0	Moderate-------	0.32		
	34-38	---	---	---	---	---------------	----		
Orose-----------	0-2	5-10	2.0-6.0	0.10-0.12	6.1-6.5	Low------------	0.24	2	1-2
	2-17	10-18	2.0-6.0	0.11-0.13	5.6-6.0	Low------------	0.24		
	17-21	---	---	---	---	---------------	----		
Verjeles--------	0-5	10-20	2.0-6.0	0.10-0.13	5.6-6.0	Low------------	0.24	3	1-2
	5-20	25-30	0.6-2.0	0.16-0.19	5.6-6.0	Moderate-------	0.32		
	20-31	40-60	0.01-0.06	0.14-0.16	6.1-6.5	High-----------	0.24		
	31-37	27-40	0.2-0.6	0.17-0.19	6.1-6.5	Moderate-------	0.28		
	37-41	---	---	---	---	---------------	----		
155-------------- Fluvaquents	0-7	10-12	0.6-2.0	0.14-0.16	6.6-8.4	Low------------	0.37	5	2-12
	7-60	10-30	0.6-2.0	0.17-0.20	6.6-8.4	Low------------	0.37		
158-------------- Hoda	0-7	7-18	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.28	5	2-6
	7-11	18-30	0.6-2.0	0.15-0.18	5.1-6.0	Low------------	0.28		
	11-77	35-50	0.2-0.6	0.14-0.16	4.5-5.5	Moderate-------	0.24		
159*, 160*:									
Hoda------------	0-7	7-18	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.28	5	2-6
	7-14	18-30	0.6-2.0	0.15-0.18	5.1-6.0	Low------------	0.28		
	14-72	35-50	0.2-0.6	0.14-0.16	4.5-5.5	Moderate-------	0.24		

See footnote at end of table.

TABLE 19.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	In/hr	In/in	pH				Pct
159*, 160*:									
Musick----------	0-8	10-20	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.32	5	2-8
	8-35	21-35	0.6-2.0	0.15-0.18	5.1-6.5	Moderate-------	0.32		
	35-80	15-25	0.6-2.0	0.12-0.15	5.1-6.0	Low------------	0.32		
161, 162, 163---- Holillipah	0-6	0-10	6.0-20	0.06-0.08	6.1-7.3	Low------------	0.17	5	1-2
	6-66	0-10	2.0-6.0	0.06-0.09	6.1-7.3	Low------------	0.17		
164-------------- Holland	0-18	10-20	2.0-6.0	0.09-0.12	5.1-6.5	Low------------	0.28	5	2-5
	18-25	12-25	0.6-2.0	0.14-0.16	5.1-6.0	Low------------	0.32		
	25-60	25-35	0.6-2.0	0.14-0.18	5.1-6.0	Moderate-------	0.24		
165*, 166*:									
Holland---------	0-15	12-25	0.6-2.0	0.14-0.16	5.1-6.5	Low------------	0.32	5	2-5
	15-65	25-35	0.6-2.0	0.14-0.18	5.1-6.0	Moderate-------	0.24		
Hoda------------	0-7	7-18	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.28	5	2-6
	7-14	18-30	0.6-2.0	0.15-0.18	5.1-6.0	Low------------	0.28		
	14-72	35-50	0.2-0.6	0.14-0.16	4.5-5.5	Moderate-------	0.24		
Hotaw-----------	0-12	7-15	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.28	3	1-5
	12-34	20-35	0.6-2.0	0.14-0.18	5.1-6.5	Moderate-------	0.24		
	34-38	---	---	---	---	---------------	----		
167*:									
Holland---------	0-3	12-25	0.6-2.0	0.14-0.16	5.1-6.5	Low------------	0.32	5	2-5
	3-67	25-35	0.6-2.0	0.14-0.18	5.1-6.0	Moderate-------	0.24		
Hoda------------	0-7	7-18	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.28	5	2-6
	7-14	18-30	0.6-2.0	0.15-0.18	5.1-6.0	Low------------	0.28		
	14-72	35-50	0.2-0.6	0.14-0.16	4.5-5.5	Moderate-------	0.24		
Hotaw-----------	0-5	7-15	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.28	3	1-5
	5-21	20-35	0.6-2.0	0.14-0.18	5.1-6.5	Moderate-------	0.24		
	21-25	---	---	---	---	---------------	----		
168*:									
Horseshoe-------	0-15	10-25	0.6-2.0	0.13-0.16	5.6-6.5	Low------------	0.28	5	2-10
	15-75	20-35	0.6-2.0	0.14-0.17	4.5-6.0	Moderate-------	0.28		
	75-79	---	---	---	---	---------------	----		
Aiken-----------	0-21	20-27	0.6-2.0	0.14-0.17	5.6-6.5	Low------------	0.20	5	2-10
	21-29	27-40	0.6-2.0	0.16-0.18	5.6-6.0	Moderate-------	0.28		
	29-65	40-50	0.2-0.6	0.15-0.17	4.5-6.0	Moderate-------	0.28		
169-------------- Horst	0-10	5-15	2.0-6.0	0.10-0.13	5.6-7.8	Low------------	0.20	5	0-1
	10-15	0-10	6.0-20	0.06-0.08	6.6-7.8	Low------------	0.17		
	15-62	18-25	0.6-2.0	0.17-0.19	6.6-7.8	Moderate-------	0.37		
170-------------- Horst	0-26	18-25	0.6-2.0	0.17-0.19	5.6-7.8	Low------------	0.43	5	1-3
	26-60	18-27	0.6-2.0	0.17-0.19	6.6-7.8	Moderate-------	0.43		
	60-70	15-20	0.6-2.0	0.15-0.17	6.6-7.8	Low------------	0.37		
171, 172--------- Hotaw	0-4	7-15	2.0-6.0	0.09-0.12	5.6-6.5	Low------------	0.20	3	1-5
	4-23	20-35	0.6-2.0	0.14-0.18	5.1-6.5	Moderate-------	0.24		
	23-27	---	---	---	---	---------------	----		
173*:									
Hotaw-----------	0-12	7-15	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.28	3	1-5
	12-34	20-35	0.6-2.0	0.14-0.18	5.1-6.5	Moderate-------	0.24		
	34-38	---	---	---	---	---------------	----		

See footnote at end of table.

TABLE 19.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	In/hr	In/in	pH				Pct
173*:									
Chawanakee------	0-15	5-15	2.0-6.0	0.07-0.11	5.1-6.5	Low------------	0.20	2	.5-1
	15-19	---	---	---	---	---------------	----		
Holland---------	0-15	12-25	0.6-2.0	0.14-0.16	5.1-6.5	Low------------	0.32	5	2-5
	15-65	25-35	0.6-2.0	0.14-0.18	5.1-6.0	Moderate-------	0.24		
174*:									
Hurlbut---------	0-23	15-20	0.6-2.0	0.09-0.12	5.1-6.5	Low------------	0.20	3	1-3
	23-27	---	---	---	---	---------------	----		
Deadwood--------	0-6	10-20	2.0-6.0	0.02-0.05	5.6-6.5	Low------------	0.15	1	1-3
	6-14	10-20	2.0-6.0	0.02-0.05	5.6-6.5	Low------------	0.15		
	14-18	---	---	---	---	---------------	----		
Rock outcrop----	0-60	---	---	---	---	---------------	----	---	---
175, 176, 177, 178, 179-------- Jocal	0-8	15-27	0.6-2.0	0.13-0.17	5.6-6.5	Low------------	0.32	5	2-5
	8-73	27-35	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-------	0.32		
180*, 181*:									
Jocal-----------	0-18	15-27	0.6-2.0	0.13-0.17	5.6-6.5	Low------------	0.32	5	2-5
	18-70	27-35	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-------	0.32		
Sites-----------	0-9	27-35	0.6-2.0	0.16-0.18	5.6-6.5	Moderate-------	0.24	4	2-10
	9-45	35-60	0.2-0.6	0.13-0.16	4.5-6.0	Moderate-------	0.28		
	45-49	---	---	---	---	---------------	----		
Mariposa--------	0-6	10-20	0.6-2.0	0.09-0.14	5.6-7.3	Low------------	0.20	2	1-3
	6-33	20-35	0.6-2.0	0.10-0.14	4.5-6.0	Low------------	0.20		
	33-37	---	---	---	---	---------------	----		
182-------------- Kilaga	0-21	27-35	0.2-0.6	0.16-0.18	5.6-6.5	Moderate-------	0.32	5	.5-2
	21-60	35-50	0.06-0.2	0.13-0.17	6.6-8.4	High-----------	0.20		
183-------------- Kilaga	0-21	27-35	0.2-0.6	0.16-0.18	6.6-7.3	Moderate-------	0.37	3	.5-2
	21-55	35-60	0.06-0.2	0.13-0.17	7.4-7.8	High-----------	0.20		
	55-60	---	---	---	---	---------------	----		
	60-64	---	---	---	---	---------------	----		
184-------------- Kilaga	0-21	27-35	0.2-0.6	0.16-0.18	5.6-6.5	Moderate-------	0.32	5	.5-2
	21-60	35-50	0.06-0.2	0.13-0.17	6.6-8.4	High-----------	0.20		
185, 186--------- Kimball	0-16	15-25	0.6-2.0	0.13-0.15	5.6-7.3	Low------------	0.37	3	1-3
	16-42	35-60	0.01-0.06	0.08-0.10	5.6-7.3	High-----------	0.28		
	42-60	20-40	0.06-0.2	0.12-0.15	6.1-7.8	Moderate-------	0.28		
187, 188, 189---- Mariposa	0-4	10-20	0.6-2.0	0.09-0.14	5.6-7.3	Low------------	0.20	2	1-3
	4-23	20-35	0.6-2.0	0.10-0.14	4.5-6.0	Low------------	0.20		
	23-27	---	---	---	---	---------------	----		
190*:									
Mariposa--------	0-6	10-20	0.6-2.0	0.09-0.14	5.6-7.3	Low------------	0.20	2	1-3
	6-33	20-35	0.6-2.0	0.10-0.14	4.5-6.0	Low------------	0.20		
	33-37	---	---	---	---	---------------	----		
Jocal-----------	0-18	15-27	0.6-2.0	0.13-0.17	5.6-6.5	Low------------	0.32	5	2-5
	18-70	27-35	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-------	0.32		

See footnote at end of table.

TABLE 19.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	In/hr	In/in	pH				Pct
191*:									
Mariposa--------	0-4	10-20	0.6-2.0	0.09-0.14	6.1-7.3	Low------------	0.20	2	1-3
	4-25	20-35	0.6-2.0	0.10-0.14	4.5-6.0	Low------------	0.20		
	25-29	---	---	---	---	---------------	----		
Rock outcrop----	0-60	---	---	---	---	---------------	----	---	---
192-------------- Marysville	0-6	20-27	0.6-2.0	0.14-0.17	6.6-7.8	Low------------	0.32	3	2-3
	6-36	27-35	0.2-0.6	0.17-0.20	7.4-8.4	Moderate-------	0.28		
	36-40	---	---	---	---	---------------	----		
193, 194, 195, 196------------- Mildred	0-3	18-27	0.6-2.0	0.10-0.13	5.6-6.5	Low------------	0.37	3	1-2
	3-9	27-35	0.2-0.6	0.12-0.15	6.1-7.3	Moderate-------	0.32		
	9-23	35-60	0.00-0.06	0.14-0.16	6.1-7.3	High-----------	0.28		
	23-27	---	---	---	---	---------------	----		
197-------------- Oakdale	0-9	5-15	2.0-6.0	0.10-0.13	6.1-7.3	Low------------	0.24	5	.5-2
	9-53	15-18	2.0-6.0	0.12-0.15	6.1-7.3	Low------------	0.28		
	53-70	5-15	2.0-6.0	0.08-0.11	6.1-7.3	Low------------	0.20		
198*:									
Oakdale---------	0-9	5-15	2.0-6.0	0.10-0.13	6.1-7.3	Low------------	0.24	5	.5-2
	9-53	15-18	2.0-6.0	0.12-0.15	6.1-7.3	Low------------	0.28		
	53-70	5-15	2.0-6.0	0.08-0.11	6.1-7.3	Low------------	0.20		
Urban land------	0-60	---	---	---	---	---------------	----	---	---
199, 200--------- Orose	0-2	5-10	2.0-6.0	0.10-0.12	6.1-6.5	Low------------	0.24	2	1-2
	2-17	10-18	2.0-6.0	0.11-0.13	5.6-6.0	Low------------	0.24		
	17-21	---	---	---	---	---------------	----		
201-------------- Pardee	0-4	8-18	0.6-2.0	0.10-0.14	5.1-6.5	Low------------	0.20	1	1-2
	4-17	18-30	0.2-0.6	0.08-0.11	5.1-6.5	Low------------	0.10		
	17-21	---	---	---	---	---------------	----		
202*:									
Pardee----------	0-4	8-18	0.6-2.0	0.10-0.14	5.1-6.5	Low------------	0.20	1	1-2
	4-17	18-30	0.2-0.6	0.08-0.11	5.1-6.5	Low------------	0.10		
	17-21	---	---	---	---	---------------	----		
Ranchoseco------	0-3	12-22	0.6-2.0	0.06-0.11	4.5-6.0	Low------------	0.15	1	.5-2
	3-8	15-25	0.6-2.0	0.06-0.11	5.1-6.5	Low------------	0.15		
	8-12	---	---	---	---	---------------	----		
203, 204--------- Perkins	0-5	15-25	0.6-2.0	0.12-0.16	5.6-7.3	Low------------	0.32	5	1-4
	5-58	25-35	0.2-0.6	0.12-0.18	5.6-7.3	Moderate-------	0.32		
	58-66	10-30	0.2-0.6	0.12-0.17	6.1-7.3	Moderate-------	0.24		
	66-72	10-30	0.6-2.0	0.05-0.10	6.1-7.3	Low------------	0.15		
205-------------- Perkins	0-8	15-25	0.6-2.0	0.08-0.14	5.6-7.3	Low------------	0.20	5	1-4
	8-65	25-35	0.2-0.6	0.08-0.15	5.6-7.3	Low------------	0.24		
206*------------- Pits, sand	0-10	0-1	6.0-20	0.03-0.05	---	Low------------	0.17	5	0-.1
	10-60	0-1	6.0-20	0.02-0.05	---	Low------------	0.15		
207, 208--------- Redding	0-6	10-25	0.6-2.0	0.10-0.14	5.1-6.5	Low------------	0.24	2	.5-2
	6-19	18-30	0.2-0.6	0.11-0.14	5.1-6.5	Moderate-------	0.24		
	19-33	35-60	0.00-0.06	0.04-0.06	5.1-7.3	High-----------	0.28		
	33-37	---	---	---	---	---------------	----		

See footnote at end of table.

TABLE 19.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	In/hr	In/in	pH				Pct
209*, 210*:									
Redding----------	0-6	10-25	0.6-2.0	0.10-0.14	5.1-6.5	Low------------	0.24	2	.5-2
	6-19	18-30	0.2-0.6	0.11-0.14	5.1-6.5	Moderate-------	0.24		
	19-33	35-60	0.00-0.06	0.04-0.06	5.1-7.3	High-----------	0.28		
	33-37	---	---	---	---	---------------	----		
Corning----------	0-24	10-25	0.6-2.0	0.10-0.14	5.1-6.5	Low------------	0.20	4	.5-1
	24-36	35-55	0.01-0.06	0.04-0.06	4.5-6.5	High-----------	0.28		
	36-67	10-30	0.06-0.2	0.06-0.12	5.1-7.3	Low------------	0.20		
211-------------- Ricecross	0-6	15-25	0.6-2.0	0.15-0.17	6.1-6.5	Low------------	0.37	5	1-3
	6-72	20-30	0.2-0.6	0.16-0.19	6.1-7.3	Moderate-------	0.32		
212-------------- Ricecross	0-6	15-25	0.6-2.0	0.15-0.17	6.1-6.5	Low------------	0.37	5	1-3
	6-33	20-30	0.2-0.6	0.16-0.19	6.1-7.3	Moderate-------	0.32		
	33-60	20-27	0.6-2.0	0.12-0.15	6.1-7.3	Moderate-------	0.15		
213*------------- Riverwash	0-5	0-5	6.0-20	0.04-0.06	6.6-7.3	Low------------	0.05	5	0-.5
	5-60	0-10	2.0-20	0.03-0.07	6.1-7.3	Low------------	0.02		
214, 215--------- San Joaquin	0-16	15-25	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.37	2	.5-1
	16-25	35-50	0.01-0.06	0.04-0.06	6.1-7.8	High-----------	0.24		
	25-29	---	---	---	---	---------------	----		
216-------------- San Joaquin	0-16	15-25	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.37	2	.5-1
	16-25	35-45	0.01-0.06	0.04-0.06	5.6-7.8	High-----------	0.24		
	25-29	---	0.00-0.01	---	---	---------------	----		
217*:									
San Joaquin------	0-16	15-25	0.6-2.0	0.14-0.16	5.6-6.5	Low------------	0.37	2	.5-1
	16-25	35-50	0.01-0.06	0.04-0.06	6.1-7.8	High-----------	0.24		
	25-29	---	---	---	---	---------------	----		
Urban land-------	0-60	---	---	---	---	---------------	----	---	---
218-------------- Shanghai	0-20	20-27	0.6-2.0	0.15-0.19	6.6-7.3	Low------------	0.43	5	1-2
	20-69	20-35	0.6-2.0	0.15-0.19	6.6-7.8	Moderate-------	0.43		
219-------------- Shanghai	0-20	20-27	0.6-2.0	0.15-0.19	6.6-8.4	Low------------	0.49	5	1-2
	20-69	20-35	0.6-2.0	0.15-0.19	6.6-8.4	Moderate-------	0.43		
220-------------- Shanghai	0-8	20-27	0.6-2.0	0.15-0.19	6.6-8.4	Low------------	0.49	5	1-2
	8-41	20-35	0.6-2.0	0.15-0.19	6.6-8.4	Moderate-------	0.43		
	41-60	40-60	0.06-0.2	0.14-0.16	6.6-8.4	High-----------	0.24		
221, 222--------- Sites	0-6	15-27	0.6-2.0	0.14-0.17	5.6-6.5	Low------------	0.28	5	2-10
	6-16	27-35	0.6-2.0	0.16-0.18	4.5-6.0	Moderate-------	0.28		
	16-51	35-60	0.2-0.6	0.13-0.16	4.5-6.0	Moderate-------	0.28		
	51-61	27-35	0.6-2.0	0.15-0.18	4.5-6.0	Moderate-------	0.32		
	61-65	---	---	---	---	---------------	----		
223, 224--------- Sites	0-5	15-27	0.6-2.0	0.12-0.15	5.6-6.5	Low------------	0.24	5	2-10
	5-11	27-35	0.6-2.0	0.14-0.16	4.5-6.0	Low------------	0.20		
	11-18	35-60	0.2-0.6	0.13-0.16	4.5-6.0	Moderate-------	0.17		
	18-62	35-60	0.2-0.6	0.15-0.18	4.5-6.0	Moderate-------	0.20		
225, 226, 227, 228-------------- Sites	0-5	15-27	0.6-2.0	0.12-0.15	5.6-6.5	Low------------	0.24	4	2-10
	5-53	35-60	0.2-0.6	0.13-0.16	4.5-6.0	Moderate-------	0.17		
	53-57	---	---	---	---	---------------	----		

See footnote at end of table.

TABLE 19.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Organic matter
	In	Pct	In/hr	In/in	pH				Pct
229--------------	0-6	15-27	0.6-2.0	0.14-0.17	5.6-6.5	Low------------	0.28	5	2-10
Sites	6-16	27-35	0.6-2.0	0.16-0.18	4.5-6.0	Moderate-------	0.28		
	16-51	35-60	0.2-0.6	0.13-0.16	4.5-6.0	Moderate-------	0.28		
	51-61	27-35	0.6-2.0	0.15-0.18	4.5-6.0	Moderate-------	0.32		
	61-65	---	---	---	---	---------------	----		
230*:									
Sites-----------	0-9	27-35	0.6-2.0	0.16-0.18	5.6-6.5	Moderate-------	0.24	4	2-10
	9-45	35-60	0.2-0.6	0.13-0.16	4.5-6.0	Moderate-------	0.28		
	45-49	---	---	---	---	---------------	----		
Jocal-----------	0-18	15-27	0.6-2.0	0.13-0.17	5.6-6.5	Low------------	0.32	5	2-5
	18-70	27-35	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-------	0.32		
231*:									
Sites-----------	0-9	27-35	0.6-2.0	0.16-0.18	5.6-6.5	Moderate-------	0.24	4	2-10
	9-45	35-60	0.2-0.6	0.13-0.16	4.5-6.0	Moderate-------	0.28		
	45-49	---	---	---	---	---------------	----		
Jocal-----------	0-18	15-27	0.6-2.0	0.13-0.17	5.6-6.5	Low------------	0.32	5	2-5
	18-70	27-35	0.6-2.0	0.15-0.19	4.5-6.0	Moderate-------	0.32		
Mariposa--------	0-6	10-20	0.6-2.0	0.09-0.14	5.6-7.3	Low------------	0.20	2	1-3
	6-33	20-35	0.6-2.0	0.10-0.14	4.5-6.0	Low------------	0.20		
	33-37	---	---	---	---	---------------	----		
232*:									
Slacreek--------	0-6	5-15	2.0-6.0	0.09-0.11	5.6-6.5	Low------------	0.15	2	2-4
	6-14	10-18	2.0-6.0	0.10-0.12	5.6-6.5	Low------------	0.17		
	14-34	15-25	0.6-2.0	0.06-0.10	5.1-6.0	Low------------	0.10		
	34-38	---	---	---	---	---------------	----		
Rock outcrop----	0-60	---	---	---	---	---------------	----	---	---
235, 236, 237----	0-5	10-25	0.6-2.0	0.10-0.13	5.6-6.5	Low------------	0.24	2	1-3
Sobrante	5-35	25-35	0.6-2.0	0.11-0.14	5.6-6.5	Moderate-------	0.20		
	35-40	---	---	---	---	---------------	----		
	40-44	---	---	---	---	---------------	----		
238*:									
Sobrante--------	0-5	10-25	0.6-2.0	0.10-0.13	5.6-6.5	Low------------	0.24	2	1-3
	5-35	25-35	0.6-2.0	0.11-0.14	5.6-6.5	Moderate-------	0.20		
	35-40	---	---	---	---	---------------	----		
	40-44	---	---	---	---	---------------	----		
Rock outcrop----	0-60	---	---	---	---	---------------	----	---	---
239*:									
Sobrante--------	0-5	10-25	0.6-2.0	0.10-0.13	5.6-6.5	Low------------	0.24	2	1-3
	5-35	25-35	0.6-2.0	0.11-0.14	5.6-6.5	Moderate-------	0.20		
	35-40	---	---	---	---	---------------	----		
	40-44	---	---	---	---	---------------	----		
Timbuctoo-------	0-4	18-27	0.6-2.0	0.11-0.14	6.1-7.3	Low------------	0.24	3	1-3
	4-26	35-45	0.06-0.2	0.11-0.15	6.1-7.3	Moderate-------	0.20		
	26-38	20-30	0.6-2.0	0.11-0.14	6.1-7.3	Moderate-------	0.20		
	38-45	---	---	---	---	---------------	----		
	45-49	---	---	---	---	---------------	----		

See footnote at end of table.

TABLE 19.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Organic matter
							K	T	
	In	Pct	In/hr	In/in	pH				Pct
240*:									
Sobrante--------	0-5	10-25	0.6-2.0	0.10-0.13	5.6-6.5	Low------------	0.24	2	1-3
	5-35	25-35	0.6-2.0	0.11-0.14	5.6-6.5	Moderate-------	0.20		
	35-39	---	---	---	---	---------------	----		
Timbuctoo-------	0-4	18-27	0.6-2.0	0.11-0.14	6.1-7.3	Low------------	0.24	3	1-3
	4-26	35-45	0.06-0.2	0.11-0.15	6.1-7.3	Moderate-------	0.20		
	26-38	20-30	0.6-2.0	0.11-0.14	6.1-7.3	Moderate-------	0.20		
	38-45	---	---	---	---	---------------	----		
	45-49	---	---	---	---	---------------	----		
241*:									
Sobrante--------	0-5	10-25	0.6-2.0	0.10-0.13	5.6-6.5	Low------------	0.24	2	1-3
	5-35	25-35	0.6-2.0	0.11-0.14	5.6-6.5	Moderate-------	0.20		
	35-40	---	---	---	---	---------------	----		
	40-44	---	---	---	---	---------------	----		
Timbuctoo-------	0-4	18-27	0.6-2.0	0.11-0.14	6.1-7.3	Low------------	0.24	3	1-3
	4-26	35-45	0.06-0.2	0.11-0.15	6.1-7.3	Moderate-------	0.20		
	26-38	20-30	0.6-2.0	0.11-0.14	6.1-7.3	Moderate-------	0.20		
	38-45	---	---	---	---	---------------	----		
	45-49	---	---	---	---	---------------	----		
242, 243, 244---- Surnuf	0-12	18-27	0.6-2.0	0.15-0.18	5.6-6.5	Low------------	0.32	5	1-3
	12-77	35-60	0.2-0.6	0.16-0.17	5.1-6.0	Moderate-------	0.24		
245, 246, 247---- Surnuf	0-6	18-27	0.6-2.0	0.10-0.13	5.6-6.5	Low------------	0.17	5	1-3
	6-61	35-60	0.2-0.6	0.11-0.14	5.1-6.0	Moderate-------	0.15		
248------------- Trainer	0-9	18-27	0.6-2.0	0.14-0.16	6.6-7.8	Low------------	0.32	5	.5-1
	9-36	18-27	0.6-2.0	0.12-0.15	7.9-8.4	Low------------	0.32		
	36-66	10-18	2.0-6.0	0.09-0.12	7.9-8.4	Low------------	0.32		
249------------- Tujunga	0-6	0-5	6.0-20	0.05-0.08	6.1-7.3	Low------------	0.17	5	.5-1
	6-58	0-5	6.0-20	0.05-0.08	6.1-7.8	Low------------	0.17		
	58-62	0-5	6.0-20	0.04-0.07	6.1-7.8	Low------------	0.15		
250------------- Tujunga	0-7	0-5	6.0-20	0.04-0.07	6.1-7.3	Low------------	0.10	5	.5-1
	7-55	0-5	6.0-20	0.05-0.08	6.1-7.8	Low------------	0.17		
	55-65	0-5	6.0-20	0.04-0.07	6.1-7.8	Low------------	0.15		
251------------- Tujunga	0-6	0-5	6.0-20	0.05-0.08	6.1-7.3	Low------------	0.17	5	.5-1
	6-58	0-5	6.0-20	0.05-0.08	6.1-7.8	Low------------	0.17		
	58-62	0-5	6.0-20	0.04-0.07	6.1-7.8	Low------------	0.15		
252, 253--------- Woodleaf	0-9	18-27	0.6-2.0	0.14-0.16	5.6-6.5	Moderate-------	0.20	2	2-3
	9-28	35-60	0.06-0.2	0.13-0.15	5.6-6.5	Moderate-------	0.10		
	28-32	---	---	---	---	---------------	----		

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 20.--SOIL AND WATER FEATURES

("Flooding," "water table," and terms such as "rare," "brief," and "apparent" are explained in the text. The symbol > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In		In			
101*:													
Aiken------------	B	None--------	---	---	>6.0	---	---	>60	---	---	---	High-----	High.
Horseshoe--------	B	None--------	---	---	>6.0	---	---	60-80	Soft	---	---	High-----	High.
102*, 103*, 104*:													
Argonaut---------	D	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	High-----	Moderate.
Auburn-----------	D	None--------	---	---	>6.0	---	---	10-28	Hard	---	---	Moderate	Moderate.
105---------------- Argovar	D	None--------	---	---	2.0-4.0	Apparent	Oct-May	>60	---	---	---	High-----	Low.
106, 107, 108, 109-------------- Auburn	D	None--------	---	---	>6.0	---	---	10-28	Hard	---	---	Moderate	Moderate.
110*, 111*, 112*, 113*, 114*, 115*, 116*:													
Auburn----------	D	None--------	---	---	>6.0	---	---	10-28	Hard	---	---	Moderate	Moderate.
Sobrante--------	B	None--------	---	---	>6.0	---	---	20-40	Hard	---	---	Moderate	Moderate.
117*, 118*, 119*, 120*:													
Auburn----------	D	None--------	---	---	>6.0	---	---	10-28	Hard	---	---	Moderate	Moderate.
Sobrante--------	B	None--------	---	---	>6.0	---	---	20-40	Hard	---	---	Moderate	Moderate.
Rock outcrop----	D	None--------	---	---	>6.0	---	---	---	Hard	---	---	---	---
121*, 122*:													
Auburn-----------	D	None--------	---	---	>6.0	---	---	10-28	Hard	---	---	Moderate	Moderate.
Timbuctoo--------	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Low.
Argonaut---------	D	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	High-----	Moderate.
123, 124, 125----- Boomer	B	None--------	---	---	>6.0	---	---	40-60	Soft	---	---	Moderate	Moderate.
126*:													
Boomer-----------	B	None--------	---	---	>6.0	---	---	40-60	Soft	---	---	Moderate	Moderate.

See footnote at end of table.

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Cemented pan: Depth	Cemented pan: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
126*:													
Pendola----------	B	None--------	---	---	>6.0	---	---	60-90	Soft	---	---	Moderate	Moderate.
127*, 128*:													
Boomer-----------	B	None--------	---	---	>6.0	---	---	40-60	Soft	---	---	Moderate	Moderate.
Pendola----------	B	None--------	---	---	>6.0	---	---	60-90	Soft	---	---	Moderate	Moderate.
Sites------------	C	None--------	---	---	>6.0	---	---	40-60	Soft	---	---	High-----	High.
129--------------- Bruella	B	Rare--------	---	---	>6.0	---	---	>60	---	---	---	High-----	Low.
130--------------- Capay	D	Rare--------	---	---	>6.0	---	---	>60	---	---	---	High-----	Moderate.
131--------------- Hollenbeck	D	Rare--------	---	---	>6.0	---	---	>60	---	40-60	Thick	High-----	Low.
132--------------- Hollenbeck	D	Occasional	Brief to long.	Dec-Apr	>6.0	---	---	>60	---	40-60	Thick	High-----	Low.
133--------------- Hollenbeck	D	None--------	---	---	>6.0	---	---	40-60	Soft	---	---	High-----	Low.
134*:													
Hollenbeck-------	D	Rare--------	---	---	>6.0	---	---	>60	---	40-60	Thick	High-----	Low.
Urban land-------	---	Rare--------	---	---	---	---	---	---	---	---	---	---	---
135*:													
Chaix------------	B	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
Chawanakee-------	C	None--------	---	---	>6.0	---	---	10-20	Soft	---	---	Moderate	Moderate.
Hotaw------------	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
136*:													
Chawanakee-------	C	None--------	---	---	>6.0	---	---	10-20	Soft	---	---	Moderate	Moderate.
Chaix------------	B	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
Hotaw------------	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
137--------------- Columbia	B	Rare--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.

See footnote at end of table.

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In		In			
138--------------- Columbia	C	Occasional	Brief to long.	Dec-Apr	3.0-5.0	Apparent	Dec-Mar	>60	---	---	---	Moderate	Low.
139--------------- Columbia	C	Frequent----	Brief to long.	Dec-Apr	3.0-5.0	Apparent	Dec-Mar	>60	---	---	---	Moderate	Low.
140*:													
Columbia----------	B	Rare---------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.
Urban land--------	---	Rare---------	---	---	---	---	---	---	---	---	---	---	---
141--------------- Conejo	B	Rare---------	---	---	>6.0	---	---	>60	---	---	---	High-----	Low.
142--------------- Conejo	B	Occasional	Brief to long.	Dec-Apr	>6.0	---	---	>60	---	---	---	High-----	Low.
143*:													
Conejo------------	B	Rare---------	---	---	>6.0	---	---	>60	---	---	---	High-----	Low.
Urban land--------	---	Rare---------	---	---	---	---	---	---	---	---	---	---	---
144*:													
Deadwood----------	D	None---------	---	---	>6.0	---	---	10-20	Hard	---	---	Moderate	Moderate.
Rock outcrop------	D	None---------	---	---	>6.0	---	---	---	Hard	---	---	---	---
Hurlbut-----------	C	None---------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
145*-------------- Dumps, landfills	---	None---------	---	---	>6.0	---	---	>60	---	---	---	---	---
146*-------------- Dumps, mine tailings	---	None---------	---	---	>6.0	---	---	>60	---	---	---	---	---
147--------------- Feather	B	Occasional	Brief to long.	Dec-Apr	>6.0	---	---	>60	---	---	---	High-----	Low.
148, 149, 150, 151--------------- Flanly	B	None---------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
152*:													
Flanly------------	B	None---------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
Rock outcrop------	D	None---------	---	---	>6.0	---	---	---	Hard	---	---	---	---

See footnote at end of table.

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hardness	Cemented pan: Depth	Cemented pan: Hardness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
153*, 154*:													
Flanly-----------	B	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
Orose------------	C	None--------	---	---	>6.0	---	---	10-20	Soft	---	---	Low------	Moderate.
Verjeles---------	D	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
155--------------- Fluvaquents	D	Occasional	Brief to very long.	Nov-Mar	+1-0.5	Apparent	Jan-Dec	>60	---	---	---	---	---
158--------------- Hoda	C	None--------	---	---	>6.0	---	---	>60	---	---	---	High-----	High.
159*, 160*:													
Hoda-------------	C	None--------	---	---	>6.0	---	---	>60	---	---	---	High-----	High.
Musick-----------	B	None--------	---	---	>6.0	---	---	>60	---	---	---	High-----	Moderate.
161--------------- Holillipah	A	Rare--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.
162--------------- Holillipah	A	Occasional	Brief to long.	Dec-Apr	>6.0	---	---	>60	---	---	---	Moderate	Low.
163--------------- Holillipah	A	Frequent----	Brief to long.	Dec-Apr	>6.0	---	---	>60	---	---	---	Moderate	Low.
164--------------- Holland	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
165*, 166*, 167*:													
Holland----------	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
Hoda-------------	C	None--------	---	---	>6.0	---	---	>60	---	---	---	High-----	High.
Hotaw------------	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
168*:													
Horseshoe--------	B	None--------	---	---	>6.0	---	---	60-80	Soft	---	---	High-----	High.
Aiken------------	B	None--------	---	---	>6.0	---	---	>60	---	---	---	High-----	High.
169, 170---------- Horst	B	Rare--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.
171, 172---------- Hotaw	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.

See footnote at end of table.

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In		In			
173*:													
Hotaw------------	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
Chawanakee-------	C	None--------	---	---	>6.0	---	---	10-20	Soft	---	---	Moderate	Moderate.
Holland----------	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
174*:													
Hurlbut----------	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Moderate.
Deadwood---------	D	None--------	---	---	>6.0	---	---	10-20	Hard	---	---	Moderate	Moderate.
Rock outcrop-----	D	None--------	---	---	>6.0	---	---	---	Hard	---	---	---	---
175, 176, 177, 178, 179--------- Jocal	B	None--------	---	---	>6.0	---	---	60-80	Soft	---	---	Moderate	Moderate.
180*, 181*:													
Jocal------------	B	None--------	---	---	>6.0	---	---	60-80	Soft	---	---	Moderate	Moderate.
Sites------------	C	None--------	---	---	>6.0	---	---	40-60	Soft	---	---	High-----	High.
Mariposa---------	C	None--------	---	---	>6.0	---	---	12-35	Hard	---	---	High-----	High.
182--------------- Kilaga	C	Rare--------	---	---	>6.0	---	---	>60	---	---	---	High-----	Moderate.
183--------------- Kilaga	C	Rare--------	---	---	>6.0	---	---	60-80	Soft	40-60	Thin	High-----	Low.
184--------------- Kilaga	C	Occasional	Brief-----	Dec-Mar	>6.0	---	---	>60	---	---	---	High-----	Moderate.
185--------------- Kimball	D	None--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
186--------------- Kimball	D	Occasional	Brief to long.	Dec-Apr	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
187, 188, 189----- Mariposa	C	None--------	---	---	>6.0	---	---	12-35	Hard	---	---	High-----	High.
190*:													
Mariposa---------	C	None--------	---	---	>6.0	---	---	12-35	Hard	---	---	High-----	High.
Jocal------------	B	None--------	---	---	>6.0	---	---	60-80	Soft	---	---	Moderate	Moderate.

See footnote at end of table.

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding			High water table			Bedrock		Cemented pan		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Depth	Hard-ness	Depth	Hard-ness	Uncoated steel	Concrete
					Ft			In		In			
191*:													
Mariposa----------	C	None---------	---	---	>6.0	---	---	12-35	Hard	---	---	High-----	High.
Rock outcrop-----	D	None---------	---	---	>6.0	---	---	---	Hard	---	---	---	---
192---------------- Marysville	B	Rare---------	---	---	>6.0	---	---	20-40	Soft	---	---	High-----	Low.
193, 194, 195, 196--------------- Mildred	D	None---------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Low.
197---------------- Oakdale	B	None---------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.
198*:													
Oakdale-----------	B	None---------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.
Urban land--------	---	None---------	---	---	---	---	---	---	---	---	---	---	---
199, 200----------- Orose	C	None---------	---	---	>6.0	---	---	10-20	Soft	---	---	Low------	Moderate.
201---------------- Pardee	D	None---------	---	---	>6.0	---	---	10-20	Hard	---	---	Moderate	Moderate.
202*:													
Pardee------------	D	None---------	---	---	>6.0	---	---	10-20	Hard	---	---	Moderate	Moderate.
Ranchoseco--------	D	None---------	---	---	>6.0	---	---	4-10	Hard	---	---	Moderate	Moderate.
203---------------- Perkins	B	Rare---------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.
204---------------- Perkins	B	Occasional	Brief to long.	Dec-Apr	>6.0	---	---	>60	---	---	---	Moderate	Low.
205---------------- Perkins	C	None---------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.
206*--------------- Pits, sand	A	None---------	---	---	>6.0	---	---	>60	---	---	---	---	---
207, 208----------- Redding	D	None---------	---	---	>6.0	---	---	>60	---	20-40	Thick	High-----	Moderate.
209*, 210*:													
Redding-----------	D	None---------	---	---	>6.0	---	---	>60	---	20-40	Thick	High-----	Moderate.

See footnote at end of table.

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Cemented pan: Depth	Cemented pan: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
209*, 210*:													
Corning----------	D	None--------	---	---	>6.0	---	---	>60	---	---	---	High-----	High.
211--------------- Ricecross	B	Rare--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.
212--------------- Ricecross	B	Occasional	Very brief	Nov-May	2.0-3.0	Apparent	Nov-Apr	>60	---	---	---	Moderate	Low.
213*-------------- Riverwash	D	Frequent----	Long to very long.	Nov-May	0-2.0	Apparent	Jan-Dec	>60	---	---	---	---	---
214--------------- San Joaquin	D	Rare--------	---	---	>6.0	---	---	>60	---	20-40	Thick	Moderate	Moderate.
215--------------- San Joaquin	D	None--------	---	---	>6.0	---	---	>60	---	20-40	Thick	Moderate	Moderate.
216--------------- San Joaquin	D	Occasional	Brief-----	Dec-Apr	>6.0	---	---	>60	---	20-40	Thick	Moderate	Moderate.
217*:													
San Joaquin------	D	Rare--------	---	---	>6.0	---	---	>60	---	20-40	Thick	Moderate	Moderate.
Urban land-------	---	Rare--------	---	---	---	---	---	---	---	---	---	---	---
218--------------- Shanghai	B	Rare--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.
219--------------- Shanghai	C	Occasional	Brief to long.	Dec-Apr	3.0-5.0	Apparent	Dec-Apr	>60	---	---	---	High-----	Low.
220--------------- Shanghai	C	Rare--------	---	---	4.0-6.0	Apparent	Dec-Apr	>60	---	---	---	High-----	Low.
221, 222---------- Sites	C	None--------	---	---	>6.0	---	---	60-80	Soft	---	---	High-----	High.
223, 224---------- Sites	C	None--------	---	---	>6.0	---	---	60-80	Soft	---	---	High-----	Moderate.
225, 226, 227, 228-------------- Sites	C	None--------	---	---	>6.0	---	---	40-60	Soft	---	---	High-----	High.
229--------------- Sites	C	None--------	---	---	>6.0	---	---	60-80	Soft	---	---	High-----	High.

See footnote at end of table.

TABLE 20.--SOIL AND WATER FEATURES--Continued

Soil name and map symbol	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Bedrock: Depth	Bedrock: Hard-ness	Cemented pan: Depth	Cemented pan: Hard-ness	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In		In			
230*:													
Sites------------	C	None--------	---	---	>6.0	---	---	40-60	Soft	---	---	High-----	High.
Jocal------------	B	None--------	---	---	>6.0	---	---	60-80	Soft	---	---	Moderate	Moderate.
231*:													
Sites------------	C	None--------	---	---	>6.0	---	---	40-60	Soft	---	---	High-----	High.
Jocal------------	B	None--------	---	---	>6.0	---	---	60-80	Soft	---	---	Moderate	Moderate.
Mariposa---------	C	None--------	---	---	>6.0	---	---	12-35	Hard	---	---	High-----	High.
232*:													
Slacreek---------	B	None--------	---	---	>6.0	---	---	20-40	Hard	---	---	Moderate	Moderate.
Rock outcrop-----	D	None--------	---	---	>6.0	---	---	---	Hard	---	---	---	---
235, 236, 237----- Sobrante	B	None--------	---	---	>6.0	---	---	20-40	Hard	---	---	Moderate	Moderate.
238*:													
Sobrante---------	B	None--------	---	---	>6.0	---	---	20-40	Hard	---	---	Moderate	Moderate.
Rock outcrop-----	D	None--------	---	---	>6.0	---	---	---	Hard	---	---	---	---
239*, 240*, 241*:													
Sobrante---------	B	None--------	---	---	>6.0	---	---	20-40	Hard	---	---	Moderate	Moderate.
Timbuctoo--------	C	None--------	---	---	>6.0	---	---	20-40	Soft	---	---	Moderate	Low.
242, 243, 244, 245, 246, 247---- Surnuf	B	None--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Moderate.
248--------------- Trainer	B	Occasional	Brief-----	Dec-Apr	3.0-5.0	Apparent	Jan-Dec	>60	---	---	---	High-----	Low.
249--------------- Tujunga	A	Rare--------	---	---	>6.0	---	---	>60	---	---	---	Moderate	Low.
250--------------- Tujunga	A	Rare--------	---	---	>6.0	---	---	>60	---	---	---	Low------	Low.
251--------------- Tujunga	A	Occasional	Brief-----	Dec-Mar	>6.0	---	---	>60	---	---	---	Moderate	Low.
252, 253---------- Woodleaf	C	None--------	---	---	>6.0	---	---	20-40	Hard	---	---	Moderate	Moderate.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 21.--PHYSICAL ANALYSES OF SELECTED SOILS

(Absence of an entry indicates that data were not available)

Soil name and sample number	Depth	Horizon	Particle-size distribution (<2mm)								Coarse fragments >2 mm	Water content	
			Clay <0.002 mm)	Silt (0.05-0.002 mm)	Sand							1/3 bar	15 bar
					Total (2-0.05 mm)	Very fine (0.1-0.05 mm)	Fine (0.25-0.10 mm)	Medium (0.5-0.25 mm)	Coarse (1.0-0.5 mm)	Very coarse (2.0-1.0 mm)			
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct (wt)	---Pct (wt)---	
Argonaut:	0-2	A1	13.4	49.2	37.4	10.2	10.5	7.0	5.2	4.5	6	26.7	11.3
S84CA-	2-7	A2	14.4	46.9	38.7	10.0	9.8	6.7	6.0	6.2	4	17.8	9.5
115-004*	7-14	Bt1	15.1	46.8	38.1	10.3	11.1	7.5	4.9	4.3	12	20.4	10.1
	14-21	Bt2	17.9	44.1	38.0	9.4	10.2	7.1	5.6	5.7	6	18.8	11.9
	21-32	2Bt	36.0	36.7	27.3	7.9	8.4	4.4	3.2	3.4	2	33.7	23.3
	32-35	2BC	20.9	40.0	39.1	11.9	11.8	5.9	4.7	4.8	3	22.4	19.1
	35-43	2Cr	17.4	35.8	46.8	9.6	12.4	9.2	8.8		2	19.4	7.4
Flanly:	0-3	A	8.5	31.2	60.3	24.1	20.6	7.4	4.8	3.4	---	---	7.4
S85CA-	3-9	BAt	10.1	32.8	57.1	22.9	20.7	7.3	4.1	2.1	---	---	5.7
115-011	9-16	Bt1	13.7	31.4	54.9	23.4	19.1	7.0	3.6	1.8	---	---	7.1
	16-24	Bt2	25.3	33.7	41.0	18.4	13.6	4.7	2.5	1.8	---	---	12.5
	24-34	Bt3	25.1	34.5	40.4	22.3	12.5	3.2	1.7	0.7	---	---	13.4
Jocal:	0-4	A	14.0	47.4	38.6	8.1	9.1	8.2	8.7	4.5	14	36.6	15.1
S84CA-	4-8	Bt1	14.5	47.2	38.3	8.6	9.2	8.9	8.3	3.3	4	23.5	10.5
115-013*	8-20	Bt2	18.5	48.0	33.4	9.9	8.1	7.6	6.3	1.5	---	25.2	11.8
	20-30	Bt3	14.7	53.2	32.1	11.0	8.7	7.6	4.4	0.4	---	25.9	10.3
	30-42	Bt4	12.9	53.3	33.8	11.1	8.8	8.2	5.1	0.6	---	25.8	9.2
	42-59	Bt5	11.2	53.6	35.2	11.4	9.3	8.6	5.6	0.3	---	25.8	8.5
	59-73	Bt6	11.8	49.9	38.3	12.6	10.0	9.1	6.1	0.5	---	26.0	8.9
Mariposa:	0-4	A	25.9	46.0	28.1	3.7	2.5	2.8	4.9	14.2	32	48.7	20.0
S84CA-	4-10	Bt1	30.8	46.1	23.1	4.0	2.6	2.4	4.5	9.6	44	39.4	16.9
115-008**	10-17	Bt2	32.6	43.5	23.9	3.4	2.1	2.2	4.1	12.1	35	39.0	16.6
	17-23	Bt3	34.6	44.3	21.1	3.9	2.6	2.6	3.9	8.1	39	39.2	15.6
Mildred:	0-3	A	16.0	39.7	44.3	10.4	11.8	8.6	8.1	5.4	---	---	11.0
S85CA-	3-9	Bt	28.1	41.4	30.5	7.2	8.6	6.9	5.6	2.2	---	---	13.9
115-010	9-15	2Bt1	53.2	32.2	14.6	3.8	3.9	2.9	2.3	1.7	2	---	19.4
	15-20	2Bt2	45.0	36.6	18.4	6.7	5.3	3.4	2.0	1.0	1	---	17.6
	20-23	2BCt	29.1	30.1	40.8	9.9	9.3	7.6	8.4	5.6	2	---	12.8
Redding:	0-6	A	14.1	41.5	44.4	9.5	17.7	10.3	3.7	3.2	22	12.8	6.0
S84CA-	6-13	BA	15.4	40.2	44.4	9.8	18.0	10.6	3.5	2.5	17	13.2	6.3
115-001	13-19	Bt	18.4	38.6	42.7	8.8	15.8	9.6	4.2	4.3	19	15.2	7.4
	19-27	2Bt1	54.8	27.8	17.4	4.7	6.2	2.9	1.6	2.0	5	34.6	22.5
	27-33	2Bt2	49.0	33.0	18.0	4.4	5.9	2.9	1.7	3.1	14	39.3	21.6
	33-50	3Bqm	10.8	29.7	59.5	7.2	10.8	10.5	14.4	16.6	---	---	---

See footnotes at end of table.

TABLE 21.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution (<2mm): Clay (<0.002 mm)	Silt (0.05-0.002 mm)	Sand: Total (2-0.05 mm)	Very fine (0.1-0.05 mm)	Fine (0.25-0.10 mm)	Medium (0.5-0.25 mm)	Coarse (1.0-0.5 mm)	Very coarse (2.0-1.0 mm)	Coarse fragments >2 mm	Water content: 1/3 bar	15 bar
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct (wt)	---Pct (wt)---	
San													
Joaquin:	0-4	A	12.3	45.6	42.1	11.1	16.7	8.8	3.6	1.9	2	11.4	5.3
S84CA-	4-9	BA	15.2	45.2	39.6	10.6	16.2	8.0	3.5	1.3	4	12.2	6.1
115-002	9-16	Bt	16.9	43.0	40.1	9.6	16.2	8.5	3.5	2.1	2	14.5	7.4
	16-25	2Bt	44.5	31.8	23.7	7.2	9.1	4.3	2.0	1.1	2	40.9	20.8
	25-41	3Bqm	8.5	24.9	66.6	14.7	24.0	16.2	10.7	1.0	---	---	---
Sites:	0-6	A	25.8	56.0	18.2	4.6	3.6	2.8	3.0	4.2	---	26.4	16.9
S84CA-	6-16	Bt1	32.7	49.6	17.7	4.4	3.9	3.0	3.1	3.3	5	32.3	17.8
115-006	16-27	Bt2	38.7	43.3	18.0	5.0	4.7	3.5	2.8	2.0	---	31.2	20.6
	27-40	Bt3	34.1	42.9	23.0	6.3	6.0	4.8	3.9	2.0	---	33.0	19.7
	40-51	Bt4	33.4	42.9	23.7	6.0	5.4	4.4	4.3	3.6	---	32.4	20.1
	51-61	Bt5	29.4	44.2	26.4	7.3	6.8	5.5	4.5	2.3	---	37.9	19.0
	61-71	Cr	8.8	39.6	51.6	9.7	8.3	6.9	10.1	16.6	---	---	11.7
Sites:	0-5	A	25.4	46.4	28.2	5.8	4.1	2.4	4.4	11.5	20	50.8	25.4
S84CA-	5-11	BAt	24.7	48.4	26.9	6.6	4.8	2.7	4.1	8.7	14	44.6	24.4
115-010*	11-18	Bt1	28.7	46.7	24.6	5.8	4.3	2.4	3.8	8.3	21	36.5	22.9
	18-25	Bt2	32.5	44.4	23.1	5.4	4.3	2.2	3.4	7.8	15	32.2	21.2
	25-36	Bt3	33.8	44.4	21.8	6.2	5.1	2.3	2.6	5.6	12	30.1	21.2
	36-52	Bt4	40.7	40.7	18.5	5.4	4.5	2.0	2.0	4.6	5	29.2	22.1
	52-70	Bt5	42.6	38.6	18.6	5.6	4.7	2.2	2.3	3.8	2	28.9	21.8
Surnuf:	0-5	A	12.1	37.4	50.5	10.1	14.9	12.6	9.3	3.6	---	---	9.2
S85CA-	5-12	BAt	19.1	38.2	42.7	8.5	12.7	11.4	7.5	2.6	---	---	11.4
115-009	12-19	Bt1	39.8	35.8	24.4	5.6	7.1	6.5	4.0	1.2	---	---	19.1
	19-34	Bt2	38.8	38.3	22.9	6.0	6.8	5.4	3.8	0.9	---	---	20.6
	34-54	Bt3	29.2	44.1	26.7	7.8	8.6	6.6	3.3	0.4	---	---	19.0
	54-66	Bt4	37.1	40.1	22.8	4.8	6.9	6.9	3.4	0.8	---	---	19.2
	66-77	BCt	37.4	40.6	22.0	5.2	6.5	6.8	3.1	0.4	---	---	19.5
Timbuctoo:	0-4	A	28.9	41.9	29.2	6.7	7.2	4.8	4.3	6.2	37	27.0	14.7
S84CA-	4-9	Bt1	34.2	40.3	25.5	7.0	7.7	3.6	4.9	2.3	29	27.6	16.0
115-005	9-18	Bt2	40.1	31.2	28.7	5.8	6.6	4.9	4.4	7.0	41	25.3	17.2
	18-26	Bt3	44.6	30.5	24.9	7.4	7.5	3.0	3.9	3.1	14	28.1	20.9
	26-38	BCt	37.5	29.7	32.8	10.2	9.2	4.2	4.5	4.7	26	30.7	19.4
	38-45	Cr	26.3	27.9	45.8	12.2	13.4	5.9	7.6	6.7	28	---	16.7
Verjeles:	0-5	A	10.7	36.4	52.9	21.0	17.1	7.4	4.6	2.8	---	---	7.2
S85CA-	5-11	Bt1	14.9	35.6	49.5	19.4	16.0	7.3	4.3	2.5	---	---	8.0
115-008	11-20	Bt2	21.1	34.0	44.9	17.9	15.2	6.7	3.5	1.6	---	---	10.6
	20-31	2Bt1	44.9	29.6	25.5	13.7	7.2	2.4	1.4	0.8	---	---	20.2
	31-37	2Bt2	29.9	37.6	32.5	19.9	10.6	1.4	0.4	0.2	---	---	19.4

See footnotes at end of table.

TABLE 21.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Particle-size distribution (<2mm): Clay (<0.002 mm)	Silt (0.05-0.002 mm)	Sand: Total (2-0.05 mm)	Very fine (0.1-0.05 mm)	Fine (0.25-0.10 mm)	Medium (0.5-0.25 mm)	Coarse (1.0-0.5 mm)	Very coarse (2.0-1.0 mm)	Coarse fragments >2 mm	Water content: 1/3 bar	15 bar
	In		Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct	Pct (wt)	---Pct (wt)---	
Woodleaf:	0-4	A1	22.4	43.7	33.9	6.2	6.3	6.5	7.3	7.6	36	32.8	13.1
S84CA-	4-9	A2	24.1	41.7	34.2	5.4	5.2	5.7	7.5	10.4	44	56.0	14.1
115-009	9-17	2Bt1	35.4	41.4	23.2	4.5	3.9	4.2	5.2	5.4	52	45.8	18.0
	17-28	2Bt2	37.5	40.6	21.9	5.6	3.7	2.8	3.4	6.4	54	58.6	21.3

* Poor dispersion implies use of 2.5x15 bar water to estimate clay content and family texture class.

** These soils are a taxadjunct to the series. They have oxidic mineralogy and a high content of organic carbon in the Bt horizon.

TABLE 22.--CHEMICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Organic carbon	Extractable bases (ammonium acetate)				Extractable acidity	Cation-exchange capacity		Base saturation		pH	
				Ca	Mg	Na	K		Sum of cations	Ammonium acetate	Sum of cations	Ammonium acetate	$CaCl_2$ 1:2	H_2O 1:1
	In			------Milliequivalents per 100 grams of soil------							Pct	Pct		
Argonaut:	0-2	A1	3.08	13.4	7.3	---	0.1	9.7	30.5	24.1	68	86	5.6	6.1
S84CA-115-	2-7	A2	0.58	8.5	8.7	---	---	6.0	23.2	20.1	74	86	5.6	6.3
004	7-14	Bt1	0.27	7.1	10.6	---	---	5.6	23.3	20.2	76	88	5.4	6.1
	14-21	Bt2	0.19	8.8	16.7	0.1	---	5.9	31.5	27.7	81	92	5.4	6.2
	21-32	2Bt	0.20	15.9	41.0	0.3	0.2	7.3	64.7	59.4	89	97	5.4	6.2
	32-35	2BC	0.08	15.7	38.5	0.4	0.1	5.7	60.4	57.7	91	95	5.7	6.5
	35-43	2Cr	0.05	16.0	39.2	0.6	0.2	5.9	61.9	55.8	90	100	5.8	6.6
Auburn:	0-2	A	1.68	8.0	2.3	---	0.1	6.1	16.5	13.4	63	78	5.4	6.0
S84CA-115-	2-10	Bw1	0.51	8.2	3.5	---	---	4.2	15.9	12.9	74	91	5.5	6.3
003	10-17	Bw2	0.27	8.5	4.6	---	---	3.8	16.9	14.2	78	92	5.7	6.4
Flanly:	0-3	A	3.22	6.2	1.7	---	0.1	8.6	16.6	12.8	48	62	4.9	5.5
S85CA-115-	3-9	BAt	0.92	3.4	1.2	---	---	5.4	10.0	7.9	46	58	4.7	5.5
011	9-16	Bt1	0.55	3.7	1.4	---	---	5.2	10.3	8.0	50	64	4.6	5.4
	16-24	Bt2	0.41	4.9	3.3	0.1	---	7.2	13.8	11.5	60	72	4.8	5.6
	24-34	Bt3	0.32	4.1	3.9	0.1	---	4.9	13.0	10.6	62	76	4.9	5.7
Jocal:	0-4	A	6.62	7.5	0.8	---	0.4	22.4	31.1	23.4	28	37	5.0	5.7
S84CA-115-	4-8	Bt1	1.17	2.4	0.5	---	0.2	9.1	12.2	10.1	25	31	5.1	5.6
013	8-20	Bt2	0.44	1.6	0.5	0.1	0.4	5.6	8.2	8.2	32	32	4.6	5.2
	20-30	Bt3	0.40	0.5	0.2	---	---	7.3	8.0	7.7	9	9	4.6	4.9
	30-42	Bt4	0.19	0.2	0.1	---	---	7.7	8.0	7.4	4	4	4.5	4.8
	42-59	Bt5	0.15	---	0.1	---	0.1	8.2	8.4	9.1	2	3	4.2	4.7
	59-73	Bt6	0.19	---	0.1	---	0.1	10.0	10.2	10.2	2	2	5.7	4.8
Mariposa:	0-4	A	5.23	11.1	1.1	---	0.3	19.7	32.2	22.0	39	57	5.4	6.0
S84CA-115-	4-10	Bt1	1.60	2.4	0.6	---	0.1	13.9	17.0	11.2	18	28	4.9	5.6
008	10-17	Bt2	1.20	2.4	0.5	---	0.1	11.5	14.5	9.5	21	32	5.1	5.7
	17-23	Bt3	0.84	2.5	0.6	---	0.1	10.4	13.6	8.1	24	40	5.2	5.6
Mildred:	0-3	A	2.92	9.1	4.8	---	0.2	9.6	23.7	20.0	59	70	5.1	5.7
S85CA-115-	3-9	Bt	1.37	8.7	6.2	---	0.1	7.5	22.5	19.7	67	76	5.1	5.8
010	9-15	2Bt1	0.44	12.4	12.4	0.1	0.1	5.4	30.4	28.9	82	87	5.6	6.3
	15-20	2Bt2	0.27	13.4	12.4	0.1	0.1	3.9	29.9	26.3	87	99	5.8	6.4
	20-23	2BCt	0.19	10.8	10.2	0.1	0.1	2.8	24.0	20.2	88	100	5.6	6.3
Redding:	0-6	A	0.68	6.0	1.9	---	---	3.7	11.6	9.2	68	86	5.7	6.3
S84CA-115-	6-13	BA	0.29	5.6	2.3	---	---	3.2	11.1	9.1	71	87	5.6	6.3
001	13-19	Bt	0.20	6.2	2.8	---	---	3.2	12.2	9.9	74	91	5.5	6.3
	19-27	2Bt1	0.33	17.0	10.0	0.3	0.3	5.5	33.1	28.7	83	96	6.2	6.6
	27-33	2Bt2	0.14	19.0	11.1	0.4	0.3	3.2	34.0	29.4	91	100	6.7	7.3
	33-50	3Bqm	0.02	17.0	9.4	0.4	0.1	2.4	29.3	26.6	92	100	7.1	7.6
San														
Joaquin:	0-4	A	0.72	5.2	1.9	---	---	3.4	10.5	8.9	68	80	5.5	6.0
S84CA-115-	4-9	BA	0.22	5.9	2.6	---	---	2.8	11.3	9.0	75	94	5.4	6.1
002	9-16	Bt	0.16	6.0	3.0	0.1	---	2.8	11.9	9.8	76	93	5.5	6.3
	16-25	2Bt	0.22	19.0	11.6	0.5	0.3	4.3	35.7	31.6	88	99	6.3	6.8
	25-41	3Bqm	0.04	20.6	12.2	0.6	0.1	2.4	35.9	32.9	93	100	7.0	7.7
Sites:	0-6	A	3.51	1.8	0.3	---	0.7	20.0	22.8	17.1	12	16	4.8	5.4
S84CA-115-	6-16	Bt1	1.48	1.4	0.4	---	0.3	13.5	15.6	11.3	13	19	4.6	5.3
006	16-27	Bt2	0.32	2.8	0.9	---	0.2	8.9	12.8	9.0	30	43	4.9	5.5
	27-40	Bt3	0.24	2.0	0.9	---	0.2	9.9	13.0	8.7	24	36	5.0	5.5
	40-51	Bt4	0.22	1.3	0.6	---	0.2	12.7	14.8	10.1	14	21	4.7	5.3
	51-61	Bt5	0.27	1.0	0.5	---	0.2	13.9	15.6	10.7	11	16	5.0	5.2
	61-71	Cr	0.06	0.5	0.3	---	0.2	11.4	12.4	9.7	8	10	5.1	5.3

TABLE 22.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Organic carbon	Extractable bases (ammonium acetate)				Extract-able acidity	Cation-exchange capacity		Base saturation		pH	
				Ca	Mg	Na	K		Sum of cations	Ammonium acetate	Sum of cations	Ammonium acetate	$CaCl_2$ 1:2	H_2O 1:1
	In			------Milliequivalents per 100 grams of soil------							Pct	Pct		
Sites:	0-5	A	5.09	5.6	0.9	---	0.4	26.4	33.3	23.2	21	30	5.2	5.9
S84CA-115-	5-11	BAt	2.79	1.9	0.5	---	0.2	20.1	22.7	14.4	11	18	5.3	5.8
010	11-18	Bt1	1.47	0.7	0.5	---	0.2	15.5	16.9	9.2	8	15	5.5	5.6
	18-25	Bt2	0.68	0.7	0.5	---	0.1	11.5	12.8	6.7	10	19	5.5	5.7
	25-36	Bt3	0.56	0.6	0.4	---	0.1	11.3	12.4	6.5	9	17	5.4	5.7
	36-52	Bt4	0.37	0.6	0.5	---	0.1	10.6	11.8	5.8	10	21	5.5	5.7
	52-70	Bt5	0.17	0.4	0.8	---	---	9.6	10.8	5.4	11	22	5.8	5.8
Surnuf:	0-5	A	2.30	6.8	1.7	---	0.4	8.4	17.3	14.3	51	62	4.9	5.5
S85CA-115-	5-12	BAt	1.14	5.2	1.9	---	0.3	6.5	13.9	12.1	53	61	4.8	5.6
009	12-19	Bt1	0.59	6.4	2.4	---	0.3	6.4	15.5	13.0	59	70	4.9	5.6
	19-34	Bt2	0.29	6.3	3.0	---	0.2	5.2	14.7	13.3	65	71	5.0	5.6
	34-54	Bt3	0.20	6.2	3.9	---	0.1	6.4	16.6	14.4	61	71	4.8	5.5
	54-66	Bt4	0.12	5.4	4.1	---	0.1	7.0	16.6	14.9	58	64	4.6	5.3
	66-77	BCt	0.14	5.8	4.3	---	0.2	7.8	18.1	15.9	57	65	4.5	5.2
Timbuctoo:	0-4	A	2.42	22.5	3.3	---	---	9.3	35.1	28.2	74	91	6.1	6.6
S84CA-115-	4-9	Bt1	1.09	20.9	5.6	---	---	9.3	35.8	27.6	74	96	6.2	7.0
005	9-18	Bt2	0.57	18.8	7.0	---	---	9.1	34.9	27.4	74	94	6.1	6.9
	18-26	Bt3	0.43	21.0	9.8	0.1	---	10.9	41.8	34.8	74	89	6.0	6.7
	26-38	BCt	0.35	22.5	10.6	0.1	---	11.1	44.3	35.5	75	94	5.8	6.7
	38-45	Cr	0.24	23.2	12.8	0.2	---	11.1	47.3	39.1	77	93	5.7	6.4
Verjeles:	0-5	A	1.85	5.4	1.9	---	0.1	7.6	15.0	10.0	49	74	4.7	5.5
S85CA-115-	5-11	Bt1	0.65	5.3	2.2	---	---	6.0	13.5	11.8	56	64	4.7	5.6
008	11-20	Bt2	0.42	5.9	3.3	0.1	---	5.8	15.1	12.9	62	72	4.8	5.6
	20-31	2Bt1	0.29	14.1	10.1	0.3	0.1	6.0	30.6	26.1	80	94	5.3	6.1
	31-37	2Bt2	0.16	15.2	14.0	0.3	0.2	2.6	32.3	30.1	92	99	6.0	6.6
Woodleaf:	0-4	A1	2.22	3.7	7.6	---	0.2	12.8	24.3	17.0	47	68	5.6	6.2
S84CA-115-	4-9	A2	2.04	2.6	9.8	---	0.2	11.9	24.5	17.7	51	71	5.7	6.2
009	9-17	2Bt1	1.03	1.9	13.7	---	0.1	10.0	25.7	21.1	61	74	5.7	6.2
	17-28	2Bt2	0.64	1.7	21.1	---	0.1	8.7	31.6	26.0	72	88	6.1	6.6

TABLE 23.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Aiken	Clayey, oxidic, mesic Xeric Haplohumults
Argonaut	Fine, mixed, thermic Mollic Haploxeralfs
Argovar	Fine-loamy over clayey, mixed, thermic Typic Argiaquolls
Auburn	Loamy, oxidic, thermic Ruptic-Lithic Xerochrepts
Boomer	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Bruella	Fine-loamy, mixed, thermic Ultic Palexeralfs
Capay	Fine, montmorillonitic, thermic Typic Haploxererts
Chaix	Coarse-loamy, mixed, mesic Dystric Xerochrepts
Chawanakee	Loamy, mixed, mesic, shallow Dystric Xerochrepts
Columbia	Coarse-loamy, mixed, nonacid, thermic Aquic Xerofluvents
Conejo	Fine-loamy, mixed, thermic Pachic Haploxerolls
Corning	Fine, mixed, thermic Typic Palexeralfs
Deadwood	Loamy-skeletal, mixed, mesic Dystric Lithic Xerochrepts
Feather	Coarse-silty, mixed, thermic Cumulic Haploxerolls
Flanly	Fine-loamy, mixed, thermic Ultic Haploxeralfs
Fluvaquents	Fluvaquents
Hoda	Fine, kaolinitic, mesic Ultic Haploxeralfs
Holillipah	Sandy, mixed, thermic Typic Xerofluvents
Holland	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Hollenbeck	Fine, montmorillonitic, thermic Chromic Haploxererts
Horseshoe	Fine-loamy, oxidic, mesic Xeric Haplohumults
Horst	Fine-silty, mixed, thermic Pachic Haploxerolls
Hotaw	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Hurlbut	Fine-loamy, mixed, mesic Dystric Xerochrepts
Jocal	Fine-loamy, mixed, mesic Typic Haploxerults
Kilaga	Fine, mixed, thermic Mollic Haploxeralfs
Kimball	Fine, mixed, thermic Mollic Palexeralfs
*Mariposa	Fine-loamy, mixed, mesic Ruptic-Lithic-Xerochreptic Haploxerults
Marysville	Fine-silty, mixed, thermic Mollic Haploxeralfs
Mildred	Fine, mixed, mesic Ultic Haploxeralfs
Musick	Fine-loamy, mixed, mesic Ultic Haploxeralfs
Oakdale	Coarse-loamy, mixed, thermic Mollic Haploxeralfs
Orose	Loamy, mixed, thermic, shallow Ultic Haploxeralfs
Pardee	Loamy-skeletal, mixed, thermic Lithic Mollic Haploxeralfs
Pendola	Loamy-skeletal, mixed, mesic Ultic Haploxeralfs
Perkins	Fine-loamy, mixed, thermic Mollic Haploxeralfs
Ranchoseco	Loamy-skeletal, mixed, nonacid, thermic Lithic Xerorthents
Redding	Fine, mixed, thermic Abruptic Durixeralfs
Ricecross	Fine-loamy, mixed, thermic Pachic Ultic Argixerolls
San Joaquin	Fine, mixed, thermic Abruptic Durixeralfs
Shanghai	Fine-silty, mixed, nonacid, thermic Aquic Xerofluvents
Sites	Clayey, oxidic, mesic Xeric Haplohumults
Slacreek	Loamy-skeletal, mixed, frigid Ultic Haploxeralfs
Sobrante	Fine-loamy, mixed, thermic Mollic Haploxeralfs
Surnuf	Fine, oxidic, mesic Ultic Palexeralfs
Timbuctoo	Fine, mixed, thermic Typic Rhodoxeralfs
Trainer	Fine-loamy, mixed, thermic Aquic Xerochrepts
Tujunga	Mixed, thermic Typic Xeropsamments
Verjeles	Fine-loamy, mixed, thermic Ultic Haploxeralfs
Woodleaf	Clayey-skeletal, serpentinitic, mesic Ultic Haploxeralfs

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