# Soil and Vegetation Survey

covering part of:

# Westwood West 7.5 Minute Quadrangle (34A-4)

**Lassen and Plumas Counties, California**

A Joint Publication of:

**California Department of Forestry and Fire Protection**

and

**USDA, Soil Conservation Service**

in cooperation with

**University of California Davis**

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# Preface

This is an interim publication prepared by the California Department of Forestry and Fire Protection (CDF), Soil-Vegetation Survey program. The soil and vegetation mapping on this 1:24,000 scale, 7.5 minute quadrangle are part of the larger (about 2 million acres) Soil Survey of the Susanville Area (parts of Lassen, Modoc, and Plumas Counties, California). The Soil Conservation Service (SCS) led the mapping effort for the Soil Survey of the Susanville Area and will publish it in whole and final form in the future. CDF worked jointly with SCS in mapping soil and vegetation for about 300,000 acres in the Susanville Survey Area and prepared this interim publication covering the Westwood West quadrangle for advance use. Its contents are subject to change pending release of the final Survey Area publication by SCS. Plans are to update this interim report to include any significant changes at the time the final publication is released. The information will be available, at that time, in the CDF quadrangle report and in the SCS report covering the entire Susanville Soil Survey Area.

This is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including CDF, and local agencies. The USDA, SCS has leadership for the federal part of the National Cooperative Soil Survey. CDF, through its Soil-Vegetation Survey program, makes soil surveys in state-owned and privately-owned wildland areas of California, and worked jointly with SCS in surveying the soils on this quadrangle. Existing vegetation (present at the time of mapping) was also mapped during the course of soil survey fieldwork. CDF provided leadership for the vegetation mapping.

Major field work in the area of this quadrangle was performed in the period 1985-86. Soil names and descriptions and vegetation mapping were tentatively approved in 1987. Unless otherwise indicated, statements in this interim publication refer to conditions in the area in the period 1985-86.

In line with both federal and state policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, marital status, or age.

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# Forward

This survey contains information about soils and vegetation for the Westwood West 7.5 minute quadrangle.

This Interim Soil and Vegetation Survey Report is designed for many different users, but emphasizes forest management and productivity. Foresters, can use it to evaluate the potential of the soil and the management needed for maximum fiber production. Conservationists, teachers, students, and specialists in recreation and wildlife management and others can use the survey to help them understand and protect the environment.

The location of each soil, or complex or association of soils, is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil.

The vegetation that was present at the time the survey fieldwork was done is also shown on the maps. Information on vegetative cover classes, dominant woody species, and timber site class is given, and a list of observed plant species is provided for the quadrangle.

Help in using this publication and additional information are available at the Soil-Vegetation Survey program headquarters, or at the local office of the California Department of Forestry and Fire Protection, of the USDA, Soil Conservation Service, or of the University of California Cooperative Extension (Farm Advisor).

# Soil and Vegetation Survey

# Westwood West 7.5 Minute Quadrangle (34A-4)

## Lassen and Plumas Counties, California

By Steven J. Borchard, Soil Conservation Service and David W. Smith, Soil Conservation Service/Soil-Vegetation Survey

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(Note: The Soil-Vegetation Survey is a program of the California Department Of Forestry and Fire Protection. Those persons listed above showing joint affiliation worked under the funding and direction of the Soil-Vegetation Survey via Interagency Agreement from the other listed organization.)

A Joint Publication of California Department of Forestry and Fire Protection, Soil-Vegetation Survey and United States Department of Agriculture, Soil Conservation Service in cooperation with University of California, Davis

# How To Use This Survey Report

First, locate your area of interest on the map sheet. Note the soil map unit symbols (i.e., 405) and/or the vegetation mapping symbols (i.e., 2/YApILr 2 for vegetation type and timber site class, respectively).

To use the soil survey information: (a) turn to "Index to Soil Map Units" which lists the name of each soil map unit and the page where the map unit is described; (b) see Table 3 for additional data on specific soil uses. Those users interested in more technical soil descriptions and soil classification information should refer to "Soil Series Descriptions" and Table 4 ("Classification of the Soils").

To use the vegetation mapping information: (a) read the cover class from the "numerator" position in the symbol (1, 2, 3, 4, and 5 – dense, semi-dense, open, very open, and extremely open, respectively); (b) refer to Table 1 for a list of plant names which correspond to the symbols listed in the "denominator" position in the map symbol (species are listed in the map symbol in their order of relative abundance); (c) read Dunning's timber site class from the map. Refer to the sections "How the Vegetation Was Mapped" and "Vegetation Mapping Symbols" for

a more complete description of the vegetation mapping information.

# How This Soil Survey Was Made

Soil scientists made this survey to learn what soils are in the survey area, where they are, and how they can be used. They traversed the landscape observing the steepness, length, and shape of slopes; the size of streams and the general pattern of drainage; the kinds of native plants or crops; and the kinds of rock. They dug many holes to study soil profiles. A profile is the sequence of natural layers, or horizons, in a soil. It extends from the surface down into the parent material, which has been changed very little by leaching or by plant roots.

The soil scientists recorded the characteristics of the profiles they studied and compared those profiles with others in nearby counties and in more distant places. They classified and named the soils according to nationwide uniform procedures (11). They drew the boundaries of the soils on aerial photographs. These photographs show trees, buildings, roads, and other details that help in drawing soil boundaries accurately. The soil map that accompanies this publication was prepared from the aerial photographs.

The areas shown on these soil and vegetation maps are called soil map units and vegetation map units. Most soil map units on this quadrangle are made up of two or more kinds of soil. Some are made up of one kind. The vegetation map units are a collection of plant species occurring within the delineated soil map unit or sometimes subdividing the soil map unit. The soil map units in this interim publication are described under "Detailed Soil Map Units". The vegetation mapping is described in detail under "How the Vegetation was Mapped".

While a soil survey is in progress soil samples are collected from selected soils for chemical, physical and mineralogical laboratory measurements. All soils are field tested to determine their characteristics. Interpretations of those characteristics may be modified during the survey. Data are assembled from other sources, such as test results, records, field experience, and state and local specialists.

But only part of a soil survey is done when the soils have been named, described, interpreted, and delineated on aerial photographs and when laboratory data and other data have been assembled. The mass of detailed information then needs to be organized into a soil survey report so that it can be used by forestland and rangeland managers, farmers, engineers, planners, developers, home buyers, and others.

# How The Vegetation Was Mapped

The maps show the vegetation that was present on the landscape at the time of survey fieldwork — 1985 to 1987.

Soil scientists first determined and drew boundaries of soil map units on aerial photographs. Soil scientists, foresters, and other vegetation specialists then added vegetation symbols within the boundaries of the soil map unit delineations. Soil delineations were subdivided, when necessary, to indicate contrasting vegetative features.

The formation and distribution of soils on the landscape are influenced by the vegetation, animals, climate, parent material, and topography present in the soil forming environment, and by the amount of time that these factors have been interacting. Vegetation patterns on the landscape are influenced by those same interrelationships. In general, natural vegetation patterns tend to change where soils change on the landscape and soil map unit boundaries therefore serve as a logical basis from which to proceed with vegetation mapping.

The maps show the vegetation that was present at the time of mapping. Efforts were also made during the course of survey fieldwork to determine a potential plant community for each of the soils identified. However, not all areas of a given soil, when mapped, support the expected potential plant community. Natural and man-caused disturbances such as fire, drought, insects, and various kinds of land use commonly alter vegetation patterns. For example, an area of soil that is considered to have a potential plant community of a specific mixed conifer forest type may support a transitory cover of brush if a fire has previously killed the trees. Given time, changes in vegetation from that mapped are expected in many areas, trending toward the reestablishment of the potential plant community. The detailed soil map unit descriptions contained elsewhere in this report include some information about expected potential plant community for each soil listed under "main tree species" and "common understory plants" headings. That

information can be compared to the present vegetation shown on the maps.

Vegetation inventory plots were established in selected areas to document current vegetation, and to provide information for determining potential plant communities according to kinds of soils.

Plots were also established to measure timber site productivity on individual soils at representative locations throughout the survey area. Replicate tree ring increment borings (measure of age) and tree-height measurements were taken on 3 to 10 plots per soil, and the data were statistically analyzed. Preliminary soil map units were sometimes separated into two or more units because of differences in timber site. An average site index and range in variability were eventually established for each phase of forest soil series mapped in the survey area and are reported in Table 3. Timber site classes (each class encompasses a range of indices) are shown within the mapping delineations directly on the maps.

Additional information concerning the location of vegetation inventory plots and timber site productivity plots and copies of the detailed inventories may be obtained by contacting the Soil Vegetation Survey office.

The majority of vegetation mapping boundaries and mapping symbols were placed following direct field observations. Some aerial photo interpretation was also used. The minimum size delineation used for areas of contrasting vegetation was 10 acres.

Vegetation mapping procedures are further described in the Soil-Vegetation Survey field manual (9).

# Vegetation Mapping Symbols

Vegetation mapping symbols list the predominant plant species, percent cover class, and timber site class observed within the boundary of each map delineation.

The primary vegetation mapping symbol is in the form of a fraction. An additional and separate mapping symbol is placed within vegetation mapping delineations to signify timber site class in areas of soils that are capable of supporting commercial conifer trees. A timber site class symbol is not given for areas that are considered unsuited for the production of commercial conifer trees, and in those cases an "N" precedes the cover class designation in the primary vegetation mapping symbol.

*Vegetation Cover Class:* The "numerator" position in the primary mapping symbol signifies the cover class of total woody vegetation (all trees and shrubs, including low-growing shrubs). Cover is defined for this purpose as percent of total woody vegetation exposed to the open sky as viewed from above. Class symbols and limits are:

1 = Dense (80 to 100 percent cover)
2 = Semi-dense (50 to 79 percent cover)
3 = Open (20 to 49 percent cover)
4 = Very open (5 to 19 percent cover)
5 = Extremely open or none (less than 5 percent cover)

*Species Composition:* The "denominator" position in the primary mapping symbol shows the predominant plant species and other mapping components that were present at the time of mapping. They are listed in descending order of abundance. Various combinations of capital and lower case letters are used to signify each individual plant species, generalized vegetation mapping components and non-plant components. Generalized vegetation mapping components include various herbaceous species which are commonly lumped together and identified simply as "grasses and herbs". Often, it is not practical to map individual herbaceous species. Non-plant components include litter, rock, or bare ground. Each individual mapping component begins with or consists solely of a capital letter (e.g., Cpo, Lr, Y).

All components must occupy at least 5 percent or more of ground space to be mapped except individual annual plants which must occupy at least 20 percent. Up to but not more than five individual plant species may be identified within the vegetation mapping symbols. When used, non-plant components or general herbaceous components may bring the total number of components to more than five. Thus, only predominant plant species are listed and the less abundant plants that may occur within an individual vegetation mapping delineation are not identified. Some exceptions to the five-species limit are made where it is considered highly significant to list more species.

Vegetation complexes are sometimes mapped in areas where vegetation patterns are distinct but are too small or too intricately intermingled to be practically separated at the scale of mapping.

Multiple vegetation mapping symbols are used on the maps to designate complexes.

*Timber site class:* The potential productivity of the land for growing commercial conifer timber is expressed as site index. Site index is the average height of dominant trees at age 50, 100, or 300 years, depending on the site classification curve used. A site class encompasses a specified range of site indices. The average site index measured on each forest soil is given in the detailed soil map unit descriptions and in Table 3. The predominant site class considered to occur within each vegetation delineation is indicated on the maps.

The site classes indicated on the maps are based on Dunning's site classification curves (3). Dunning's curves are recognized under the State of California Forest Practice Rules for use in the mixed-conifer forest areas of the state (other curves are recognized for redwood and coastal Douglas-fir forests). The average site indices and the individual site curves used are listed in the detailed soil map unit descriptions.

Site class is indicated on the maps using symbols 1a through 5:

| SV Survey Site Class Map Symbol: | Dunning Height (feet) At 100 years | At 300 years |
|---|---|---|
| 1a | more than 133 | more than 188 |
| 1 | 114-132 | 163-187 |
| 2 | 93-113 | 138-162 |
| 3 | 75-92 | 113-137 |
| 4 | 60-74 | 88-112 |
| 5 | less than 60 | less than 88 |

Site class complexes are mapped in some areas of soil complexes where the different soils exhibit different site classes. Example mapping symbols that represent site class complexes are: 1/2, 4/3, N/5.

Some variations outside the usual range of site indices for some soils were observed during the vegetation mapping, but were not extensive enough to warrant separate soil units. These site values were mapped as they were found. Thus, a site class shown on a map may occasionally vary from the class that a site index range for a soil would indicate.

Two examples illustrate the vegetation mapping system:

*Example A: 2/YLrICpoBa 2*

- 50 to 79 percent total woody cover
- components are:
  - Y = ponderosa pine
  - Lr = litter covered soil
  - I = incense cedar
  - Cpo = squaw carpet
  - Ba = bare soil
- Dunning's "2" timber site class

*Example B: N4/GrAtv*

- area not suited to commercial conifer production
- 5 to 19 percent total woody cover
- components are:
  - Gr = mixed annual and perennial grasses and associated herbaceous plants
  - Atv = mountain big sagebrush

Refer to Table 1 for an index to the vegetation map symbols including plant names and other selected characteristics. Refer to Table 2 for a list of all plants mapped or observed within the vegetation mapping portion of the survey area.

Table 1 lists individual map symbols in alphabetical order with corresponding common and scientific plant names, growth habit, sprout nature, and browse value. Growth habit is the general growth form (tree, shrub, etc.) of a particular plant as it was observed in the survey area. Sprout nature is whether or not a particular plant species tends to sprout after the top is killed by fire. Browse value is the over-all value of a particular plant species for use as browse forage by horses, cattle, sheep, and deer. Relative ratings of very low through very high are given. This information was gathered by the University of California Davis, Soil-Vegetation Survey vegetation specialist through literature reviews, personal communication with researchers and specialists, and personal observations.

Table 2 lists all the plants that were recorded within the vegetation mapping portion of the survey area. Although not an exhaustive floristic list, the table is quite complete for woody plants in dry, upland habitats and includes most other plants commonly encountered. The plants are grouped by growth habit or taxonomic limits or both (annual grasses, coniferous trees, shrubs, etc.) and are listed alphabetically by scientific name within these groups. Occurrence indicates how presence was documented in the survey area. It might have been mapped and/or recorded at a vegetation inventory plot(s), or it might have been observed in the area but not mapped or recorded at a plot(s). Detailed

observations and measurements of plant composition and cover were recorded at the various vegetation inventory plots. Of these data, only presence is given in Table 2. The more detailed plot information is on file at the CDF Soil-Vegetation Survey headquarters office and is available for use upon request.

# Forest Management and Productivity

Prepared by Jack Bramhall, Area Forester, Soil Conservation Service

The following information is intended for use as a guide. It will be useful to professional resource managers, landowners, planners, and visitors to the area for understanding the characteristics and management of forest soils on this quadrangle. An on-site investigation by resource professionals will result in site-specific data and better solutions to resource problems than can be presented in this report.

Table 3 (Woodland Interpretation Table) can be used by woodland owners or forest managers in planning the use of soils for wood crops. The information presented in the table is described and discussed in the following paragraphs.

*Potential productivity* of merchantable or common trees on a soil is expressed as a site index. This 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.

The average (mean) site index and the range in site indices have been listed for each phase of the soil series in the map unit description where adequate data was available. Jeffrey and ponderosa pine site indices are based on the 100-year base age curves from Meyer (6). Douglas-fir site indices are from 100-year base age curves by McArdle & Meyer (5). White fir and California red fir site indices are from 50-year base age curves by Schumacher (7 and 8 respectively). Western white pine site indices are from 100-year base age curves by Haig (4).

Included in the mapping unit descriptions are site indices based on the 50-year CACTOS site curve (15). CACTOS is an abbreviation for California Conifer Timber Output Simulator. The system was an effort of the Northern California Forest Yield Cooperative. Site class, based on Dunning's 300-year curves (3), are also found in the map unit descriptions and in Table 3. These curves are recognized by the State of California, Forest Practice Act.

The terms slight, moderate, and severe listed in Table 3 indicate the degree of the major soil limitations to be considered in management.

*Seedling mortality* ratings indicate the degree to which the soil properties affects the mortality of tree seedlings. Plant competition is not considered in this rating. 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.

Soil properties that commonly influence seedling mortality include texture, amount of rock fragments, temperature, and drainage. Soils with available water capacity (AWC) less than 2.5 inches in the upper 24 inches of soil cause severe limitations for seedlings, especially on south and west facing slopes below 5,000 feet. Low available water capacity is less critical at the higher elevations where the potential plant water use is generally less.

Low elevation soils that have relatively warm mean annual temperatures can present major problems to seedling survival. Soil temperatures (at 20 inches soil depth) are commonly several degrees higher in the open than under a tree canopy. Surface temperatures may also 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 available water capacity of the soil need to be considered when reforesting soils in this area.

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; 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 to control 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 (AWC) of the soils. Productive soils have a high AWC and many plant species grow well, usually resulting in severe plant competition. Perennial and annual grasses, forbs, various manzanitas, deerbrush, whitethorn ceanothus, and Sierra chinkapin can dominate a site for several years after timber harvesting. Conifer seedlings are often slow to regenerate, and they can be suppressed by other vegetation because of the competition for moisture and light. Careful selection of the silvicultural and harvesting systems, intensive site preparation, and followup treatments may be needed to insure adequate reforestation. Less productive soils have lower AWC and plant competition is less intense, except where unwanted plants have had enough time to establish extensive root systems. However, on these soils tree growth is slower and seedling mortality may be high due to the high temperatures and lack of soil moisture.

Ratings of *difficulty of revegetating exposed subsoil* indicate the degree the exposed subsoil affects revegetation. Subsoil horizons are frequently exposed during forest management activities. This occurs on road fills and landings, and on some skid roads. Land managers may desire to revegetate these areas, or they may be required to do so by regulations. Revegetation may be for erosion control or for timber production. Separate ratings are given for revegetation with either grasses or trees. Characteristics of the subsoil which influence planting conditions, germination, and subsequent growth rate are considered in the ratings.

A rating of slight indicates there are few problems with revegetation. If locally adapted grasses are properly seeded, a good stand can be expected to reduce surface erosion. If trees are planted, good survival and growth can be expected (unless compaction or other local unfavorable conditions prevail). Natural revegetation will be better on these subsoils than on those with moderate or severe ratings. Moderate indicates that additional care is needed in choosing methods or types of plants for erosion control. If trees are planted, some mortality, and growth rates below those on undisturbed areas, can be expected. Severe indicates that intensive, and expensive, measures would be needed to establish erosion control plants. Some soils with a severe rating have little need for erosion control plantings because exposed areas have large amounts of hard rock with only a small amount of erodible soil. Tree planting would be very difficult, survival would be low, or growth rates would be very slow or greatly reduced below those of undisturbed areas. On-site evaluation is essential when considering revegetation on severe sites.

Ratings of *equipment limitations* reflect the characteristics and conditions of the soil that restricts 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 due to seasonal precipitation has an influence on the type of equipment and time of use. Soils are usually too wet for ground yarding systems between November 15 and April l. Soil compaction by wheeled or tracked equipment can be a problem on all soils when they are wet except for sandy or very gravelly soils. Roads are frequently impassable during the rainy season except where they are rocked or where they are on very gravelly or sandy soils. Depth of snowpack limits access and equipment use at elevations above 4,500 feet from November 15 through April 15. Some soils are extremely dusty when dry. Watering, oiling, or other road surface and dust control treatments may be desirable on these soils during periods of heavy use.

Steepness of slope is an important consideration when selecting harvesting equipment or systems. There are few limitations to wheeled and tracked equipment on slope gradients of less than 30 percent. On slopes of 30 to 50 percent, more care is needed in choosing equipment and laying out the site. Cable yarding systems generally cause the least soil disturbance where the terrain and road systems are conducive to their use. However, where existing skid and haul roads can be used, or where short, steep slopes are intermixed with flat areas, tractor yarding equipment can sometimes be used with minimal soil disturbance. Low ground-pressure, torsion-suspension equipment can be used on steeper slopes with less soil disturbance and compaction than conventional tractor equipment (1). Large areas with slope gradients over 50 percent will have less soil disturbance when cable yarded than when tractor yarded.

Ratings of *susceptibility to soil damage from fire* are intended to be used as a general guideline when planning either prescribed burns or revegetation after wildfires. Soil damage can sometimes occur from fire. The risk of damage increases with the intensity of heat. The damage is mainly related to the loss of organic matter (14). Some soils have characteristics which enable them to withstand this loss better than other soils. These characteristics are used to rate these 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 is needed in planning to maintain favorable soil characteristics; and severe, that special precautions are needed to protect soil organic matter in order to maintain productivity.

Ratings of *susceptibility to soil damage from compaction (compaction hazard)* 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 can affect productivity by increasing resistance to root penetration and reducing availability of oxygen to plant roots. Compaction also reduces soil infiltration capacity. The rating is based on the texture, organic matter content, and rock fragment content of the top 10 inches (25 cm) of the soil. A rating of slight indicates that considerable effort would be required to compact the soil enough to cause adverse effects on plant growth or water infiltration rates. Moderate indicates less effort is required to cause compaction; or that an easily compacted soil also recovers rapidly because of the type and amount of clay. Severe indicates soils that are easily compacted enough to cause adverse effects. Their recovery period is very slow, usually several years or more. Compaction is most likely to occur when the soil is wet. Forest management activities that can cause compaction problems are site preparation, log skidding, livestock grazing, or any other activity that applies weight on a wet soil.

Special Considerations

If brush clearing or site preparation by tractor windrowing is considered as a reforestation technique, care should be taken to avoid removal of the upper part of the surface layer because the soils have nutrients concentrated there. Removal of the surface layer may increase mortality and reduce productivity. Windrows should be constructed on the contour to avoid soil erosion resulting from surface runoff concentration. Windrow piles should extend entirely across the cleared slope to catch the surface runoff, or the ends of windrow piles should overlap the ends of piles downslope. Soil erosion can be reduced by decreasing the downslope distance between windrow piles.

For those quads located in the Almanor Basin; many soils are are suited to growing sugar pine. White pine blister rust is a problem in sugar pine. Species of *Ribes* are an alternate host to the blister rust. Because of this potential problem with sugar pine survival, sugar pine is not recommended for reforestation in areas where *Ribes* plants are present in the understory.

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# Detailed Soil Map Units

The soil map unit descriptions in this section, along with the soil map, can be used to determine the suitability and potential of a soil for specific uses. They can also be used to plan the management needed for those uses.

Each map unit on the detailed soil maps represents an area on the landscape and consists on one or more soils for which the unit is named.

Soils rarely occur as pure units. They typically blend from one to another on the landscape. Small bodies of dissimilar soils are often mixed in. Because of the practical limitations of field mapping and cartographic detail at a scale of 1:24,000, inclusions of other soils will occur within delineated areas of a named soil. The soil bounderies delineated on the map, and the soil interpretations listed in the map unit descriptions and tables, are not absolute. They are meant to be used as a guide. The interpretations given are for the central concept of the named soil.

The soil map is designed to give the user enough information to reach a logical conclusion about each area delineated. The smallest area delineated on the soil map is about 10 acres in highly contrasting areas and about 40 acres in places where soils are more similar.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are most alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They can also differ in slope, stonieness, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the map units shown on the detailed soil maps consist of phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Mountmed loam, 0 to 2 percent slopes is one of several phases in the Mountmed series.

Some map units are made up of two or more major soils. These map units are called soil complexes.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil map. The pattern and proportion of the soils are somewhat similar in all areas. Baileycreek-Weste complex, 15 to 30 percent slopes is an example.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are indentified in each map unit description. Some small areas of strongly contrasting soils are indentified by a special symbol on the soil maps.

This survey includes *miscellaneous areas*. Such areas have little or no soil and support little or no vegetation. Rubble land and Rock outcrop is an example. Miscellaneous areas are shown on the soil map. Some that are too small to be shown are identified by a special symbol on the soil map.

Interpretive tables (see "Summary of tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

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## 405-Baileycreek-Weste complex, 5 to 15 percent slopes

### *SETTING*

*Landform:* mountains
*Elevation:* 4600 to 4900 feet
*Slope Range:* 5 to 15 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### *COMPOSITION*

*Baileycreek very gravelly loam and similar inclusions:* 45 percent
*Weste very gravelly sandy loam and similar inclusions:* 35 percent
*Contrasting Inclusions:* 20 percent

### *BAILEYCREEK SOIL CHARACTERISTICS*

*Position on Landscape:* on south-facing back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 1 inch thick

*Typical Profile:*
- 0 to 9 inches: brown and reddish brown very gravelly loam
- 9 to 30 inches: yellowish red very gravelly loam
- 30 inches: weathered basalt

*Depth Class:* moderately deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* very low to low
*Potential Rooting Depth:* 20 to 40 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 20 to 40 inches to weathered basalt

### *WESTE SOIL CHARACTERISTICS*

*Position on Landscape:* on south-facing back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 3 inches thick
*Typical Profile:*
- 0 to 12 inches: reddish brown very gravelly sandy loam
- 12 to 26 inches: red extremely cobbly loam
- 26 inches: hard basalt

*Depth Class:* moderately deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* very low to low
*Potential Rooting Depth:* 20 to 40 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 20 to 40 inches to hard basalt

### *INCLUDED AREAS*

- Inville very gravelly loam in basins and broad drainageways
- Baileycreek and Weste with bouldery, stony or cobbly surface layers
- impervious material on Lake Almanor Peninsula

### *MAJOR USES*

*Current uses:* timber production and urban development in some areas

### *TIMBER PRODUCTION*

*Major Management Factors:*
Very low to low available water capacity of the Baileycreek and Weste soils

### *BAILEYCREEK VEGETATION CHARACTERISTICS*

*Main Tree Species:* Jeffrey pine, white fir, sugar pine
*Mean Site Index For Stated Species:*
Jeffrey pine: 112 based on a 100 year site curve by Meyer
*Dunning Site Class:* I
*Cactos Site Index:* 78
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### *WESTE VEGETATION CHARACTERISTICS*

*Main Tree Species:* Jeffrey pine, white fir, sugar pine
*Mean Site Index For Stated Species:*
Jeffrey pine: 101 based on a 100 year site curve by Meyer
White fir: 53 based on a 50 year site curve by Schumacher
*Dunning Site Class:* II
*Cactos Site Index:* 70
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
The very low available water capacity in the upper 24 inches of the Baileycreek and Weste soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, ponderosa pine, white fir and sugar pine.

### *URBAN DEVELOPMENT*

*Major Management Factors:*
Depth to bedrock

*General Management Considerations:*
Cuts needed to provide essentially level building sites can expose bedrock.

### INTERPRETIVE GROUPS

*Capability Subclass:* VIe (22), nonirrigated

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## 406-Baileycreek-Weste complex, 15 to 30 percent slopes

### SETTING

*Landform:* mountains
*Elevation:* 4700 to 5000 feet
*Slope Range:* 15 to 30 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### COMPOSITION

*Baileycreek very stony loam and similar inclusions:* 50 percent
*Weste very stony sandy loam and similar inclusions:* 35 percent
*Contrasting Inclusions:* 15 percent

### BAILEYCREEK SOIL CHARACTERISTICS

*Position on Landscape:* on south-facing back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 20 percent stones and 5 percent cobbles
*Typical Profile:*
- 0 to 9 inches: brown very stony loam
- 9 to 23 inches: yellowish red extremely gravelly loam
- 23 inches: weathered andesite

*Depth Class:* moderately deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* very low to low
*Potential Rooting Depth:* 20 to 40 inches
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* moderate
*Depth to Restrictive Layer:* 20 to 40 inches to weathered andesite

### WESTE SOIL CHARACTERISTICS

*Position on Landscape:* on south-facing back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 20 percent stones and 5 percent cobbles
*Typical Profile:*
- 0 to 12 inches: reddish brown very stony sandy loam
- 12 to 34 inches: red extremely cobbly loam
- 34 inches: hard basalt

*Depth Class:* moderately deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* very low to low
*Potential Rooting Depth:* 20 to 40 inches
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* moderate
*Depth to Restrictive Layer:* 20 to 40 inches to hard basalt

### INCLUDED AREAS

- Swainow very gravelly sandy loam on north-facing back slopes
- extremely stony and very bouldery phases of Baileycreek and Weste
- Rock outcrop on ridge crests

### MAJOR USES

*Current Uses:* timber production

### TIMBER PRODUCTION

*Major Management Factors:*
Hazard of erosion
Rock fragments on the surface of the Baileycreek and Weste soils
Very low to low available water capacity of the Baileycreek and Weste soils

### BAILEYCREEK VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, white fir
*Mean Site Index For Stated Species:*
Jeffrey pine: 112 based on a 100 year site curve by Meyer
*Dunning Site Class:* I
*Cactos Site Index:* 78
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### WESTE VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, white fir, sugar pine
*Mean Site Index For Stated Species:*
Jeffrey pine: 101 based on a 100 year site curve by Meyer
White fir: 53 based on a 50 year site curve by Schumacher

*Dunning Site Class:* II
*Cactos Site Index:* 70
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
The bare soil erosion hazard rating of the Baileycreek soil may be reduced to low by managing for approximately 40 percent cover.
The bare soil erosion hazard rating of the Weste soil may be reduced to low by managing for approximately 20 percent cover.
Rock fragments on the surface can interfere with felling, yarding and other operations involving the use of equipment.
The low available water capacity in the upper 24 inches of the Baileycreek and Weste soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, ponderosa pine, white fir and sugar pine.

#### *INTERPRETIVE GROUPS*

*Capability Subclass:* VIe (22), nonirrigated

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## 428-Rubble land and Rock outcrop

#### *SETTING*

*Landform:* escarpments
*Elevation:* 4600 to 6800 feet
*Slope Range:* 30 to 70 percent
*Vegetation:* usually barren
*Mean Annual Precipitation:* 9 to 16 inches
*Mean Annual Temperature:* 45 to 50 degrees F.
*Frost Free Period:* 60 to 100 days

#### *COMPOSITION*

Rubble land and similar inclusions: 45 percent
Rock outcrop and similar inclusions: 40 percent
*Contrasting Inclusions:* 15 percent

#### *RUBBLE LAND CHARACTERISTICS*

Rubble land consists of areas of loose basalt or andesite cobbles and stones. It generally is barren, but some grasses and brush grow at the edges, where water runs off and the stones and cobbles are not so close together.

#### *ROCK OUTCROP CHARACTERISTICS*

Rock outcrop consists of exposures of andesite or basalt bedrock. They generally are barren, but in some areas a few perennial grasses and shrubs grow between the rocks.

#### *INCLUDED AREAS*

- Longcreek very stony loam
- Fiddler very stony loam
- Fivesprings very stony loam
- Fredonyer very stony loam

#### *MAJOR USES*

*Current Uses:* watershed and wildlife habitat

#### *INTERPRETIVE GROUPS*

*Capability Subclass:* VIIs (21,22), nonirrigated

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## 430-Pits and Dumps

#### *SETTING*

*Landform:* lake terraces
*Elevation:* 4000 to 5300 feet
*Slope Range:* 2 to 15 percent
*Vegetation:* usually barren
*Mean Annual Precipitation:* 6 to 14 inches
*Mean Annual Temperature:* 47 to 52 degrees F.
*Frost Free Period:* 60 to 130 days

#### *COMPOSITION*

*Pits and similar inclusions:* 50 percent
*Dumps and similar inclusions:* 40 percent
*Contrasting Inclusions:* 10 percent

#### *PITS CHARACTERISTICS*

Pits consist of open excavations in the Badenaugh, Cochran, McConnel, Mottsville, Toulon and Zorravista soils for the removal of sand and gravel.

#### *DUMPS CHARACTERISTICS*

Dumps consist of mounds of over-sized rock fragments and fines left after removing gravel or areas of imported refuse.

#### *INCLUDED AREAS*

- Badenaugh
- Cochran
- McConnel
- Toulon
- Fiddler
- Dunnlake

- Zorravista

### MAJOR USES

*Current Uses:* sand and gravel pits, refuse dumps and rock quarries

### INTERPRETIVE GROUPS

*Capability Subclass:* VIIe (23,21), nonirrigated

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## 480-Redriver-Weste complex, 2 to 9 percent slopes

### SETTING

*Landform:* plateaus
*Elevation:* 4950 to 5400 feet
*Slope Range:* 2 to 9 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### COMPOSITION

*Redriver very gravelly sandy loam and similar inclusions:* 50 percent
*Weste very gravelly sandy loam and similar inclusions:* 30 percent
*Contrasting Inclusions:* 20 percent

### REDRIVER SOIL CHARACTERISTICS

*Position on Landscape:* on plateaus
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 1 inch thick
*Typical Profile:*
- 0 to 3 inches: dark brown very gravelly sandy loam
- 3 to 36 inches: brown/dark brown very gravelly sandy loam and extremely cobbly sandy loam
- 36 inches: hard basalt

*Depth Class:* moderately deep
*Drainage Class:* somewhat excessively drained
*Permeability:* moderately rapid
*Available Water Capacity:* very low
*Potential Rooting Depth:* 20 to 40 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 20 to 40 inches to hard basalt

### WESTE SOIL CHARACTERISTICS

*Position on Landscape:* on plateaus
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 3 inches thick
*Typical Profile:*
- 0 to 14 inches: reddish brown and red very gravelly sandy loam
- 14 to 24 inches: yellowish red very gravelly loam
- 24 inches: hard basalt

*Depth Class:* moderately deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* very low to low
*Potential Rooting Depth:* 20 to 40 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 20 to 40 inches to hard basalt

### INCLUDED AREAS

- Inville very gravelly loam in drainage ways
- Keddie loam in drainage ways
- Swainow very gravelly sandy loam
- Woodwest very stony sandy loam on ridges

### MAJOR USES

*Current Uses:* timber production

### TIMBER PRODUCTION

*Major Management Factors:*
Very low to low available water capacity of the Redriver and Weste soils

### REDRIVER VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, white fir, incense cedar
*Mean Site Index For Stated Species:*
Jeffrey pine: 100 based on a 100 year site curve by Meyer
White fir: 51 based on a 50 year site curve by Schumacher
*Dunning Site Class:* II
*Cactos Site Index:* 67
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### WESTE VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, white fir, sugar pine
*Mean Site Index For Stated Species:*
Jeffrey pine: 101 based on a 100 year site curve by Meyer

White fir: 53 based on a 50 year site curve by Schumacher
*Dunning Site Class:* II
*Cactos Site Index:* 70
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
The low available water capacity of the Redriver and Weste soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, ponderosa pine, white fir and sugar pine.

### *INTERPRETIVE GROUPS*

*Capability Subclass:* VIe (22), nonirrigated

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## 482-Redriver-Woodwest-Wafla complex, 0 to 9 percent slopes

### *SETTING*

*Landform:* plateaus
*Elevation:* 4950 to 5200 feet
*Slope Range:* 0 to 9 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### *COMPOSITION*

*Redriver stony sandy loam and similar inclusions:* 50 percent
*Woodwest very stony sandy loam and similar inclusions:* 20 percent
*Wafla gravelly sandy loam and similar inclusions:* 15 percent
*Contrasting Inclusions:* 15 percent

### *REDRIVER SOIL CHARACTERISTICS*

*Position on Landscape:* on back slopes and plains
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Slope Range:* 0 to 9 percent
*Important Surface Feature:* the surface is covered with duff and 10 percent stones
*Typical Profile:*
- 0 to 6 inches: dark brown stony sandy loam
- 6 to 31 inches: brown extremely cobbly sandy loam and strong brown extremely gravelly sandy loam
- 31 inches: fractured basalt

*Depth Class:* moderately deep
*Drainage Class:* somewhat excessively drained
*Permeability:* moderately rapid
*Available Water Capacity:* very low
*Potential Rooting Depth:* 20 to 40 inches
*Surface Runoff:* slow
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 20 to 40 inches to fractured basalt

### *WOODWEST SOIL CHARACTERISTICS*

*Position on Landscape:* on ridges
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Slope Range:* 0 to 5 percent
*Important Surface Feature:* the surface is covered with 15 percent stones and 10 percent cobbles
*Typical Profile:*
- 0 to 9 inches: dark brown very stony sandy loam
- 9 to 19 inches: brown extremely cobbly sandy loam and strong brown extremely gravelly sandy loam
- 19 inches: fractured basalt

*Depth Class:* shallow
*Drainage Class:* somewhat excessively drained
*Permeability:* moderately rapid
*Available Water Capacity:* very low
*Potential Rooting Depth:* 12 to 20 inches
*Surface Runoff:* slow
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 12 to 20 inches to fractured basalt

### *WAFLA SOIL CHARACTERISTICS*

*Position on Landscape:* in basins
*Parent Material:* stratified alluvium overlying weathered basalt
*Slope Range:* 0 to 2 percent
*Important Surface Feature:* the surface is covered with duff, 1 inch thick
*Typical Profile:*
- 0 to 13 inches: brown and strong brown gravelly sandy loam
- 13 to 24 inches: strong brown very cobbly sandy loam
- 24 to 35 inches: strong brown gravelly loam

- 35 to 42 inches: strong brown very cobbly loam
- 42 to 52 inches: strong brown loam
- 52 to 62 inches: saprolite

*Depth Class:* deep and very deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* moderate
*Potential Rooting Depth:* 40 to 72 inches
*Surface Runoff:* slow
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 40 to 72 inches to weathered basalt

### INCLUDED AREAS

- Inville very gravelly loam
- Rock outcrop
- impervious material within Westwood

### MAJOR USES

*Current Uses:* timber production and urban development in some areas

### TIMBER PRODUCTION

*Major Management Factors:*
Low available water capacity of the Redriver and Woodwest soils
Rock fragments on the surface of the Woodwest soil
Moderate available water capacity of the Wafla soil

### REDRIVER VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, white fir, incense cedar
*Mean Site Index For Stated Species:*
Jeffrey pine: 85 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 59
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### WOODWEST VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, white fir
*Mean Site Index For Stated Species:*
Jeffrey pine: 78 based on a 100 year site curve by Meyer
*Dunning Site Class:* III
*Cactos Site Index:* 52
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### WAFLA VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, ponderosa pine, white fir
*Mean Site Index For Stated Species:*
Jeffrey pine: 104 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 75
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
Rock fragments on the surface of the Woodwest soil can interfere with felling, yarding and other operations involving the use of equipment.
The very low available water capacity in the upper 24 inches of the Redriver, Woodwest and Wafla soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, ponderosa pine, white fir and sugar pine.

### URBAN DEVELOPMENT

*Major Management Factors:*
Depth to bedrock
Large stones on the Redriver and Woodwest soils

*General Management Considerations:*
Cuts needed to provide essentially level building sites can expose bedrock.
If the density of housing is moderate to high, community sewage systems are needed to prevent contamination of water supplies as a result of seepage from on-site sewage disposal systems.
Large stones must be cleared from sites for buildings and roads.

### INTERPRETIVE GROUPS

*Capability Subclass:* VIIs (22), nonirrigated

## 483-Tahoma-Swainow-Almanor complex, 2 to 15 percent slopes

### SETTING

*Landform:* plateaus
*Elevation:* 5200 to 6300 feet
*Slope Range:* 2 to 15 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### COMPOSITION

*Tahoma gravelly sandy loam and similar inclusions:* 35 percent
*Swainow stony sandy loam and similar inclusions:* 30 percent
*Almanor very gravelly sandy loam and similar inclusions:* 20 percent
*Contrasting Inclusions:* 15 percent

### TAHOMA SOIL CHARACTERISTICS

*Position on Landscape:* on broad, gently sloping ridges
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 1 inch thick

Typical Profile:
- 0 to 8 inches: brown gravelly sandy loam and reddish brown sandy loam
- 8 to 46 inches: yellowish red gravelly clay loam
- 46 inches: volcanic rock

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderately slow
*Available Water Capacity:* moderate
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* moderate
*Depth to Restrictive Layer:* 40 to 60 inches to volcanic rock

### SWAINOW SOIL CHARACTERISTICS

*Position on Landscape:* on broad, gently sloping ridges
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff and 10 percent stones

*Typical Profile:*
- 0 to 18 inches: brown/dark brown stony sandy loam
- 18 to 35 inches: yellowish red and strong brown very gravelly loam
- 35 to 44 inches: yellowish brown extremely stony loam
- 44 inches: volcanic rock

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* very low to low
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 40 to 60 inches to volcanic rock

### ALMANOR SOIL CHARACTERISTICS

*Position on Landscape:* on broad, gently sloping ridges
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 3 inches thick
*Typical Profile:*
- 0 to 5 inches: brown/dark brown very gravelly sandy loam
- 5 to 40 inches: brown very gravelly sandy loam and strong brown extremely gravelly sandy loam
- 40 inches: hard basalt

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderately rapid
*Available Water Capacity:* low
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 40 to 60 inches to hard basalt

### INCLUDED AREAS:

- Keddie loam along drainage ways
- Woodwest very stony sandy loam
- Rock outcrop

### MAJOR USES

*Current Uses:* timber production

### TIMBER PRODUCTION

*Major Management Factors:*
Hazard of erosion of the Tahoma soil
Moderate available water capacity of the Tahoma soil

Very low to low available water capacity of the Swainow soil
Low available water capacity of the Almanor soil

#### TAHOMA VEGETATION CHARACTERISTICS

*Main Tree Species:* white fir, California red fir, Jeffrey pine
*Mean Site Index For Stated Species:*
White fir: 60 based on a 50 year site curve by Schumacher
Jeffrey pine: 107 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 65
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

#### SWAINOW VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, white fir, sugar pine
*Mean Site Index For Stated Species:*
White fir: 64 based on a 50 year site curve by Schumacher
Jeffrey pine: 94 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 67
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

#### ALMANOR VEGETATION CHARACTERISTICS

*Main Tree Species:* white fir, Jeffrey pine, sugar pine, incense cedar
*Mean Site Index For Stated Species:*
White fir: 61 based on a 50 year site curve by Schumacher
Jeffrey pine: 83 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 66
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
The bare soil erosion hazard rating of the Tahoma soil may be reduced to low by managing for approximately 50 percent cover.
The very low available water capacity in the upper 24 inches of the Swainow and Almanor soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, ponderosa pine, white fir and sugar pine.

#### INTERPRETIVE GROUPS

*Capability Subclass:* VIs (22), nonirrigated

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## 485-Almanor-Whorled-Inville complex, 0 to 15 percent slopes

#### SETTING

*Landform:* plateaus
*Elevation:* 5400 to 5600 feet
*Slope Range:* 0 to 15 percent
*Description of Areas:* Areas are dissected by perennial and intermittent streams
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

#### COMPOSITION

*Almanor very gravelly sandy loam and similar inclusions:* 35 percent
*Whorled very gravelly sandy loam and similar inclusions:* 35 percent
*Inville very gravelly loam and similar inclusions:* 15 percent
*Contrasting Inclusions:* 15 percent

#### ALMANOR SOIL CHARACTERISTICS

*Position on Landscape:* on slightly convex back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Slope:* 2 to 15 percent
*Important Surface Feature:* the surface is covered with duff, 3 inches thick
*Typical Profile:*
- 0 to 5 inches: brown/dark brown very gravelly sandy loam

- 5 to 40 inches: brown very gravelly sandy loam and strong brown extremely gravelly sandy loam
- 40 inches: hard basalt

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderately rapid
*Available Water Capacity:* low
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 40 to 60 inches to hard basalt

### WHORLED SOIL CHARACTERISTICS

*Position on Landscape:* on concave back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Slope:* 2 to 15 percent
*Important Surface Feature:* the surface is covered with duff, 3 inches thick
*Typical Profile:*

- 0 to 5 inches: brown very gravelly sandy loam
- 5 to 27 inches: yellowish brown extremely gravelly sandy loam
- 27 inches: hard basalt

*Depth Class:* moderately deep
*Drainage Class:* well drained
*Permeability:* moderately rapid
*Available Water Capacity:* very low to low
*Potential Rooting Depth:* 20 to 40 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 20 to 40 inches to hard basalt

### INVILLE SOIL CHARACTERISTICS

*Position on Landscape:* in convex basins or broad drainageways
*Parent Material:* alluvium weathered from basalt, andesite and volcanic ash
*Slope:* 0 to 4 percent
*Important Surface Feature:* the surface is covered with duff, 1 inch thick
*Typical Profile:*

- 0 to 10 inches: yellowish brown very gravelly loam
- 10 to 44 inches: brownish yellow extremely gravelly sandy loam
- 44 inches: soft andesitic conglomerate

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* low
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* slow
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 40 to 60 inches to soft andesitic conglomerate

### INCLUDED AREAS

- Tahoma gravelly sandy loam
- soils similar to Inville but are frequently flooded in drainage ways

### MAJOR USES

*Current Uses:* timber production

### TIMBER PRODUCTION

*Major Management Factors:*
Low available water capacity of the Almanor and Inville soils
Very low to low available water capacity of the Whorled soil

### ALMANOR VEGETATION CHARACTERISTICS

*Main Tree Species:* white fir, Jeffrey pine, sugar pine, incense cedar
*Mean Site Index For Stated Species:*
White fir: 61 based on a 50 year site curve by Schumacher
Jeffrey pine: 83 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 66
*Common Understory Plants:*

- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### WHORLED VEGETATION CHARACTERISTICS

*Main Tree Species:* white fir, Jeffrey pine
*Mean Site Index For Stated Species:*
White fir: 60 based on a 50 year site curve by Schumacher
*Dunning Site Class:* II
*Cactos Site Index:* 67
*Common Understory Plants:*

- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### INVILLE VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, ponderosa pine, lodgepole pine
*Mean Site Index For Stated Species:*
Jeffrey pine: 90 based on a 100 year site curve by Meyer

*Dunning Site Class:* II
*Cactos Site Index:* 60
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
The very low available water capacity in the upper 24 inches of the Almanor, Whorled and Inville soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, ponderosa pine, white fir and sugar pine.

### *INTERPRETIVE GROUPS*

*Capability Subclass:* VIs (22), nonirrigated

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## 486-Whorled-Almanor complex, 15 to 30 percent slopes

### *SETTING*

*Landform:* mountains
*Elevation:* 5100 to 5400 feet
*Slope Range:* 15 to 30 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### *COMPOSITION*

*Whorled very gravelly sandy loam and similar inclusions:* 45 percent
*Almanor very gravelly sandy loam and similar inclusions:* 35 percent
*Contrasting Inclusions:* 20 percent

### *WHORLED SOIL CHARACTERISTICS*

*Position on Landscape:* on convex back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 3 inches thick
*Typical Profile:*
- 0 to 5 inches: brown very gravelly sandy loam
- 5 to 27 inches: yellowish brown extremely gravelly sandy loam
- 27 inches: hard basalt

*Depth Class:* moderately deep
*Drainage Class:* well drained
*Permeability:* moderately rapid
*Available Water Capacity:* very low to low
*Potential Rooting Depth:* 20 to 40 inches
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* moderate
*Depth to Restrictive Layer:* 20 to 40 inches to hard basalt

### *ALMANOR SOIL CHARACTERISTICS*

*Position on Landscape:* on concave back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 3 inches thick
*Typical Profile:*
- 0 to 5 inches: brown/dark brown very gravelly sandy loam
- 5 to 40 inches: brown very gravelly sandy loam and strong brown extremely gravelly sandy loam
- 40 inches: hard basalt

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderately rapid
*Available Water Capacity:* low
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 40 to 60 inches to hard basalt

### *INCLUDED AREAS*

- Tahoma gravelly sandy loam in convex draws
- soils similar to Almanor but are more than 60 inches deep
- areas with bouldery or very stony surfaces
- Rock outcrop

### *MAJOR USES*

Current Uses: timber production

### *TIMBER PRODUCTION*

*Major Management Factors:*
Hazard of erosion of the Whorled soil
Rock fragments on the surface of the Whorled soil
Low available water capacity

### *WHORLED VEGETATION CHARACTERISTICS*

*Main Tree Species:* white fir, Jeffrey pine
*Mean Site Index For Stated Species:*
White fir: 60 based on a 50 year site curve by Schumacher
*Dunning Site Class:* II

*Cactos Site Index:* 67
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### ALMANOR VEGETATION CHARACTERISTICS

*Main Tree Species:* white fir, Jeffrey pine, sugar pine, incense cedar
*Mean Site Index For Stated Species:*
White fir: 61 based on a 50 year site curve by Schumacher
Jeffrey pine: 83 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 66
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
The bare soil erosion hazard rating of the Whorled soil may be reduced to low by managing for approximately 20 percent cover.
Rock fragments on the surface can interfere with felling, yarding and other operations involving the use of equipment.
The very low available water capacity in the upper 24 inches of the Whorled and Almanor soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, white fir, ponderosa pine and sugar pine.

### INTERPRETIVE GROUPS

*Capability Subclass:* VIe (22), nonirrigated

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## 487-Swainow-Almanor complex, 15 to 30 percent slopes

### SETTING

*Landform:* mountains
*Elevation:* 5200 to 6300 feet
*Slope Range:* 15 to 30 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### COMPOSITION

*Swainow very stony sandy loam and similar inclusions:* 65 percent
*Almanor very stony sandy loam and similar inclusions:* 20 percent
*Contrasting Inclusions:* 15 percent

### SWAINOW SOIL CHARACTERISTICS

*Position on Landscape:* on south-facing back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 20 percent stones and 5 percent cobbles
*Typical Profile:*
- 0 to 18 inches: brown and strong brown very and extremely stony sandy loam
- 18 to 35 inches: yellowish red and strong brown very gravelly loam
- 35 to 44 inches: yellowish brown extremely stony loam
- 44 inches: volcanic rock

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* very low to low
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* moderate
*Depth to Restrictive Layer:* 40 to 60 inches to volcanic rock

### ALMANOR SOIL CHARACTERISTICS

*Position on Landscape:* on north-facing back slopes and toe slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 20 percent stones and 5 percent cobbles
*Typical Profile:*
- 0 to 5 inches: brown/dark brown very stony sandy loam
- 5 to 40 inches: brown very gravelly sandy loam and strong brown extremely gravelly sandy loam
- 40 inches: hard basalt

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderately rapid

*Available Water Capacity:* low
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* medium
*Bare Soil Erosion Hazard Rating:* moderate
*Depth to Restrictive Layer:* 40 to 60 inches to hard basalt

### INCLUDED AREAS

- Keddie loam in drainage ways
- Tahoma gravelly sandy loam
- Whorled very gravelly sandy loam
- soils similar to Almanor but are shallow to bedrock
- soils similar to Swainow and Almanor but have extremely bouldery surfaces
- Rock outcrop

### MAJOR USES

*Current Uses:* timber production

### TIMBER PRODUCTION

*Major Management Factors:*
Hazard of erosion
Rock fragments on the surface of the Swainow and Almanor soils
Very low to low available water capacity of the Swainow soil
Low available water capacity of the Almanor soil

### SWAINOW VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, white fir, sugar pine
*Mean Site Index For Stated Species:*
Jeffrey pine: 94 based on a 100 year site curve by Meyer
White fir: 64 based on a 50 year site curve by Schumacher
*Dunning Site Class:* II
*Cactos Site Index:* 67
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### ALMANOR VEGETATION CHARACTERISTICS

*Main Tree Species:* white fir, Jeffrey pine, sugar pine, incense cedar
*Mean Site Index For Stated Species:*
White fir: 61 based on a 50 year site curve by Schumacher
Jeffrey pine: 83 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 66
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
The bare soil erosion hazard rating of the Swainow soil may be reduced to low by managing for approximately 20 percent cover.
The bare soil erosion hazard rating of the Almanor soil may be reduced to low by managing for approximately 20 percent cover.
Rock fragments on the surface can interfere with felling, yarding and other operations involving the use of equipment.
The very low available water capacity in the upper 24 inches of the Swainow and Almanor soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, ponderosa pine, white fir and sugar pine.

### INTERPRETIVE GROUPS

*Capability Subclass:* VIe (22), nonirrigated

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## 490-Inville very gravelly sandy loam, 0 to 5 percent slopes

### SETTING

*Landform:* alluvial fans
*Elevation:* 5000 to 5300 feet
*Slope Range:* 0 to 5 percent
*Description of Areas:* this unit is dissected by intermittent stream channels
*Vegetation:* lodgepole pine, Jeffrey pine, ponderosa pine and white fir
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### COMPOSITION

*Inville very gravelly sandy loam and similar inclusions: 80 percent*
*Contrasting Inclusions:* 20 percent

### *INVILLE SOIL CHARACTERISTICS*

*Parent Material:* alluvium weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the surface is covered with duff, 1 inch thick
*Typical Profile:*

- 0 to 10 inches: yellowish brown and strong brown very gravelly sandy loam
- 10 to 21 inches: reddish yellow very cobbly loam
- 21 to 60 inches: brownish yellow extremely gravelly sandy loam and yellowish brown and reddish yellow very gravelly loam

*Depth Class:* very deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* low
*Potential Rooting Depth:* 60 inches or more
*Surface Runoff:* slow
*Bare Soil Erosion Hazard Rating:* low

### *INCLUDED AREAS*

- Mountmed clay loam adjacent to streams
- Swainow very gravelly sandy loam on toe slopes
- soils similar to Inville but are poorly drained
- impervious material within Westwood

### *MAJOR USES*

*Current Uses:* timber production and urban development

### *TIMBER PRODUCTION*

*Major Management Factors:*
Low available water capacity

### *INVILLE VEGETATION CHARACTERISTICS*

*Main Tree Species:* Jeffrey pine, lodgepole pine, ponderosa pine
*Mean Site Index For Stated Species:*
Jeffrey pine: 90 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 60
*Common Understory Plants:*

- manzanita
- snowbrush ceanothus
- mountain whitethorn

*General Management Considerations:*
The very low available water capacity in the upper 24 inches of this soil reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, ponderosa pine and white fir.

### *URBAN DEVELOPMENT*

*Major Management Factors:*
Moderate permeability
Intermittent stream channels
Cut bank cave-in
*General Management Considerations:*
Where this unit is used for urban development the main limitations are caving banks and the presence of intermittent stream channels.
The intermittent stream channels in this unit restrict the placement of buildings and roads.
If the soil used for septic tank absorption fields, the limitation of moderate permeability can be overcome by increasing the size of the absorption field.

### *INTERPRETIVE GROUPS*

*Capability Subclass:* VIs (22), nonirrigated

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## 491-Swainow-Almanor-Tahoma complex, altered, 2 to 30 percent slopes

### *SETTING*

*Landform:* mountains
*Elevation:* 5500 to 6200 feet
*Slope Range:* 2 to 30 percent
*Description of Areas:* Windrows of brush and the upper 4 to 6 inches of soil contour the slopes. The windrows are 4 to 6 feet high, 12 to 15 feet wide and 75 to 100 feet apart.
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### *COMPOSITION*

*Swainow stony sandy loam and similar inclusions:* 35 percent
*Almanor very gravelly sandy loam and similar inclusions:* 30 percent
*Tahoma gravelly sandy loam and similar inclusions:* 20 percent
*Contrasting Inclusions:* 15 percent

### SWAINOW SOIL CHARACTERISTICS

*Position on Landscape:* on ridges and back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the upper 4 to 6 inches of the surface layer has been removed and piled in windrows. The surface is covered with 10 percent stones and 5 percent cobbles
*Typical Profile:*
- 0 to 11 inches: strong brown stony sandy loam
- 11 to 28 inches: yellowish red very gravelly loam
- 28 to 42 inches: yellowish brown extremely stony loam
- 42 inches: volcanic rock

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* very low to low
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* moderate
*Depth to Restrictive Layer:* 40 to 60 inches to volcanic rock

### ALMANOR SOIL CHARACTERISTICS

*Position on Landscape:* on ridges and back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the upper 4 to 6 inches of the surface layer has been removed and piled in windrows. The surface is covered with 5 percent stones and 5 percent cobbles
*Typical Profile:*
- 0 to 5 inches: brown/dark brown very gravelly sandy loam
- 5 to 40 inches: strong brown very gravelly sandy loam
- 40 inches: hard basalt

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderately rapid
*Available Water Capacity:* low
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 40 to 60 inches to hard basalt

### TAHOMA SOIL CHARACTERISTICS

*Position on Landscape:* on ridges and back slopes
*Parent Material:* material weathered from basalt, andesite and volcanic ash
*Important Surface Feature:* the upper 4 to 6 inches of the surface layer has been removed and piled in windrows
*Typical Profile:*
- 0 to 3 inches: gravelly sandy loam
- 3 to 46 inches: yellowish red gravelly clay loam
- 46 inches: volcanic rock

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderate slow
*Available Water Capacity:* moderate
*Potential Rooting Depth:* 40 to 60 inches
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* low
*Depth to Restrictive Layer:* 40 to 60 inches to volcanic rock

### INCLUDED AREAS

- soils similar to Almanor but are shallow to bedrock
- windrows of brush and the upper 4 to 6 inches of soil from nearby surfaces

### MAJOR USES

*Current Uses:* timber production

### TIMBER PRODUCTION

*Major Management Factors:*
Hazard of erosion of the Swainow soil
Very low to low available water capacity of the Swainow soil
Low available water capacity of the Almanor soil
Moderate available water capacity of the Tahoma soil

### SWAINOW VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, white fir, sugar pine
*Mean Site Index For Stated Species:*
Evidence indicates productivity of the site has been altered. To date, there is no data available to forecast the actual impact of the alteration of the of the soil on its productivity. The productivity data presented here is for unaltered soil conditions. The user is invited to make his or her own adjustments.
Jeffrey pine: 94 based on a 100 year sited curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 67
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus

- mountain whitethorn
- needlegrass
- mountain brome

### *ALMANOR VEGETATION CHARACTERISTICS*

*Main Tree Species:* Jeffrey pine, white fir
*Mean Site Index For Stated Species:*
Evidence indicates productivity of the site has been altered. To date, there is no data available to forecast the actual impact of the alteration of the of the soil on its productivity. The productivity data presented here is for unaltered soil conditions. The user is invited to make his or her own adjustments.
White fir: 61 based on a 50 year site curve by Schumacher
Jeffrey pine: 83 based on a 100 year sited curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 66
*Common Understory Plants:*

- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### *TAHOMA VEGETATION CHARACTERISTICS*

*Main Tree Species:* Jeffrey pine, white fir, sugar pine
*Mean Site Index For Stated Species:*
Evidence indicates productivity of the site has been altered. To date, there is no data available to forecast the actual impact of the alteration of the of the soil on its productivity. The productivity data presented here is for unaltered soil conditions. The user is invited to make his or her own adjustments.
Jeffrey pine: 107 based on a 100 year sited curve by Meyer
White fir: 60 based on a 50 year site curve by Schumacher
*Dunning Site Class:* II
*Cactos Site Index:* 65
*Common Understory Plants:*

- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
The bare soil erosion hazard rating of the Swainow soil may be reduced to low by managing for approximately 40 percent cover.
The very low available water capacity in the upper 24 inches of the Swainow and Almanor soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, white fir, ponderosa pine and sugar pine

### *INTERPRETIVE GROUPS*

*Capability Subclass:* VIe (22), nonirrigated

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## 545-Mountmed peat, 0 to 1 percent slopes

### *SETTING*

*Landform:* floodplains
*Elevation:* about 5000 feet
*Slope Range:* 0 to 1 percent
*Description of Areas:* water ponds on the surface from November to June for long periods
*Vegetation:* perennial grasses and grass-like plants
*Mean Annual Precipitation:* 30 to 35 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### *COMPOSITION*

*Mountmed peat and similar inclusions:* 80 percent
*Contrasting Inclusions:* 20 percent

### *MOUNTMED SOIL CHARACTERISTICS*

*Parent Material:* alluvium from granitic and volcanic sources
*Typical Profile:*

- 0 to 6 inches: peat
- 6 to 16 inches: gray clay
- 16 to 47 inches: pale yellow clay loam
- 47 to 60 inches: pale yellow gravelly coarse sandy loam and sand

*Depth Class:* very deep
*Drainage Class:* very poorly drained
*Permeability:* slow
*Available Water Capacity:* low
*Potential Rooting Depth:* 10 to 20 inches
*Surface Runoff:* ponded
*Bare Soil Erosion Hazard Rating:* low
*Depth of Water Ponding:* +6 to 10 inches
*Depth to Water Table:* 12 to 20 inches from July to November

### INCLUDED AREAS

- soils similar to Mountmed but have a loam surface layer
- soils similar to Mountmed but have a thick dark surface layer
- soils similar to Mountmed but are moderately deep on margins of floodplains

### MAJOR USES

*Current Uses:* livestock grazing and wildlife habitat

### LIVESTOCK GRAZING

*Major Management Factors:*
Water ponding
Slow permeability

*Potential Plant Community:*
- perennial grasses
- sedge
- rush
- shrubs
- willow
- perennial forbs

*General Management Considerations:*
When the soil is saturated, equipment use and livestock trampling can damage the soil and vegetation.

### WILDLIFE HABITAT

*General Management Considerations:*
This unit provides important habitat for resident and migratory waterfowl and raptors.
Waterfowl nest, rear young and graze in the spring and summer months.
Raptors hunt rodents on this unit.

### INTERPRETIVE GROUPS

*Capability Subclass:* Vw (21), nonirrigated

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## 546-Mountmed loam, 0 to 2 percent slopes

### SETTING

*Landform:* floodplains
*Elevation:* 5200 to 5300 feet
*Slope Range:* 0 to 2 percent
*Vegetation:* perennial grasses and grass-like plants
*Mean Annual Precipitation:* 30 to 35 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### COMPOSITION

*Mountmed loam and similar inclusions:* 80 percent
*Contrasting Inclusions:* 20 percent

### MOUNTMED SOIL CHARACTERISTICS

*Parent Material:* mixed alluvium
*Typical Profile:*
- 0 to 6 inches: gray loam
- 6 to 35 inches: gray clay loam and clay
- 35 to 60 inches: light gray stratified sand to very gravelly sandy clay loam

*Depth Class:* very deep
*Drainage Class:* poorly drained
*Permeability:* slow
*Available Water Capacity:* low to moderate
*Potential Rooting Depth:* 20 to 40 inches
*Surface Runoff:* very slow
*Bare Soil Erosion Hazard Rating:* low
*Depth to Water Table:* 0 to 20 inches from December through June and 20 to 40 inches from July through November
*Hazard of Flooding:* frequent long flooding from March through May

### INCLUDED AREAS

- Inville very gravelly sandy loam on fans
- soils similar to Mountmed but are very gravelly throughout under lodgepole pine vegetation on stream terraces
- soils similar to Mountmed but have a thick dark surface layer
- soils similar to Mountmed but have very gravelly underlying material
- similar areas in the Honey Lake Valley but have a mean air temperature of 50 degrees F.

### MAJOR USES

*Current Uses:* livestock grazing, irrigated grass hay and pasture, and wildlife habitat

### LIVESTOCK GRAZING

*Major Management Factors:*
Slow permeability
High water table
Flooding

*Potential Plant Community:*
- perennial grasses
- sedge
- rush
- shrubs
- willow
- perennial forbs

*General Management Considerations:*
When the soil is saturated, equipment use and livestock trampling can damage the soil and vegetation.
The high water table enhances forage production and an extended green feed period. Livestock operations can be impaired by flooding in winter and spring.
If seeding is considered, species adapted to the high water table and flooding should be selected.

### *IRRIGATED AGRICULTURE*

*Major Management Factors:*
High water table
Slow permeability
Short growing season
Flooding

*General Management Considerations:*
Wetness limits the choice of plant species and increases the risk of invasion of hydrophytic plants.
Slow permeability requires proper irrigation and management to prevent stand deterioration and invasion of hydrophytic plants.
The short growing season limits crop choices and yields.
Seasonal flooding should be considered when planning stand renovation or reestablishment.

### *WILDLIFE HABITAT*

*General Management Considerations:*
This unit provides important habitat for resident and migratory waterfowl and raptors.
Waterfowl nest, rear young and graze in the spring and summer months.
Raptors hunt rodents on this unit.

### *INTERPRETIVE GROUPS*

*Capability Subclass:* Vw (21), irrigated and nonirrigated

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## 728-Penstock-Deadwood Rock outcrop complex, 30 to 50 percent slopes

### *SETTING*

*Landform:* mountains
*Elevation:* 5400 to 5800 feet
*Slope Range:* 30 to 50 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### *COMPOSITION*

*Penstock very gravelly sandy loam and similar inclusions:* 50 percent
*Deadwood very gravelly sandy loam and similar inclusions:* 20 percent
*Rock outcrop:* 15 percent
*Contrasting Inclusions:* 15 percent

### *PENSTOCK SOIL CHARACTERISTICS*

*Position on Landscape:* on back slopes
*Parent Material:* material weathered from metavolcanic rocks
*Typical Profile:*
- 0 to 12 inches: light yellowish brown very gravelly sandy loam
- 12 to 63 inches: reddish yellow very gravelly loam
- 63 inches: metavolcanic rock

*Depth Class:* very deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* low to moderate
*Potential Rooting Depth:* 60 inches or more
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* moderate

### *DEADWOOD SOIL CHARACTERISTICS*

*Position on Landscape:* on ridges
*Parent Material:* material weathered from metavolcanic rocks
*Typical Profile:*
- 0 to 9 inches: brown and yellowish brown very gravelly sandy loam
- 9 to 16 inches: yellowish brown extremely gravelly sandy loam
- 16 inches: metavolcanic rock

*Depth Class:* shallow
*Drainage Class:* somewhat excessively
*Permeability:* moderately rapid
*Available Water Capacity:* very low
*Potential Rooting Depth:* 14 to 20 inches
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* moderate
*Depth to Restrictive Layer:* 14 to 20 inches to metavolcanic rock

### *ROCK OUTCROP CHARACTERISTICS*

Rock outcrop consists of exposures of andesite or basalt bedrock. They generally are barren, but in some areas a few perennial grasses and shrubs grow between the rocks.

### *INCLUDED AREAS*

- Weste very gravelly sandy loam

- soils similar to Penstock but have a clay loam subsoil or a dark surface layer

### MAJOR USES

*Current Uses:* timber production

### TIMBER PRODUCTION

*Major Management Factors:*
Hazard of erosion
Slope of the Penstock soil
Low to moderate available water capacity of the Penstock soil
Very low available water capacity of the Deadwood soil
Rock outcrop

### PENSTOCK VEGETATION CHARACTERISTICS

*Main Tree Species:* Douglas fir, white fir, Jeffrey pine
*Mean Site Index For Stated Species:*
Douglas fir: 92 based on a 100 year site curve by McArdle
White fir: 58 based on a 50 year site curve by Schumacher
Jeffrey pine: 87 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 59
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### DEADWOOD VEGETATION CHARACTERISTICS

*Main Tree Species:* Jeffrey pine, white fir, sugar pine, Douglas fir, incense cedar
*Mean Site Index For Stated Species:*
Jeffrey pine: 64 based on a 100 year site curve by Meyer
*Dunning Site Class:* IV
*Cactos Site Index:* 46
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
The bare soil erosion hazard rating of the Penstock soil may be reduced to low by managing for approximately 40 percent cover.
The bare soil erosion hazard rating of the Deadwood soil may be reduced to low by managing for approximately 50 percent cover.
The steepness of slope limits the kinds of equipment that can be used in forest management.
The low available water capacity in the upper 24 inches of the Penstock soil reduces the survival of seedlings.
The very low available water capacity in the upper 24 inches of the Deadwood soil reduces the survival of seedlings.
Rock outcrop can interfere with felling and yarding operations.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition on the Penstock soil delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Jeffrey pine, ponderosa pine and Douglas fir.

### INTERPRETIVE GROUPS

*Capability Subclass:* VIe (22), nonirrigated

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## 770-Penstock-Scaribou complex, 5 to 30 percent slopes

### SETTING

*Landform:* mountains
*Elevation:* 5100 to 6000 feet
*Slope Range:* 5 to 30 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### COMPOSITION

*Penstock stony loam and similar inclusions:* 45 percent
*Scaribou stony loam and similar inclusions:* 40 percent
*Contrasting Inclusions:* 15 percent

### PENSTOCK SOIL CHARACTERISTICS

*Position on Landscape:* on back slopes
*Parent Material:* material weathered from metavolcanic rocks
*Important Surface Feature:* the surface is covered with duff and 10 percent stones
*Typical Profile:*
- 0 to 12 inches: light yellowish brown stony loam

- 12 to 63 inches: reddish yellow very gravelly loam
- 63 inches: metavolcanic rock

*Depth Class:* very deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* low to moderate
*Potential Rooting Depth:* 60 inches or more
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* moderate

### SCARIBOU SOIL CHARACTERISTICS

*Position on Landscape:* on back slopes
*Parent Material:* material weathered from metavolcanic rocks
*Important Surface Feature:* the surface is covered with duff and 10 percent stones
*Typical Profile:*

- 0 to 6 inches: light brown stony loam
- 6 to 17 inches: light brown very cobbly loam
- 17 to 60 inches: reddish yellow very cobbly clay loam and very gravelly clay loam

*Depth Class:* very deep
*Drainage Class:* well drained
*Permeability:* moderately slow
*Available Water Capacity:* low to moderate
*Potential Rooting Depth:* 60 inches or more
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* moderate

### INCLUDED AREAS

- Inville very gravelly loam on alluvial fans
- Aquolls in drainage ways
- soils similar to Penstock and Scaribou but have very stony loam surfaces
- soils similar to Penstock and Scaribou but are moderately deep to bedrock

### MAJOR USES

*Current Uses:* timber production

### TIMBER PRODUCTION

*Major Management Factors:*
Hazard of erosion
Low to moderate available water capacity of the Penstock and Scaribou soils

### PENSTOCK VEGETATION CHARACTERISTICS

*Main Tree Species:* Douglas fir, white fir, Jeffrey pine
*Mean Site Index For Stated Species:*
Douglas fir: 92 based on a 100 year site curve by McArdle
White fir: 58 based on a 50 year site curve by Schumacher
Jeffrey pine: 87 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 59
*Common Understory Plants:*

- manzanita
- snowbrush ceanothus
- mountain whitethorn
- sharpleaf snowberry
- needlegrass
- mountain brome

### SCARIBOU VEGETATION CHARACTERISTICS

*Main Tree Species:* white fir, Douglas fir, Jeffrey pine
*Mean Site Index For Stated Species:*
Douglas fir: 106 based on a 100 year site curve by McArdle
White fir: 59 based on a 50 year site curve by Schumacher
Jeffrey pine: 96 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 65
*Common Understory Plants:*

- manzanita
- snowbrush ceanothus
- mountain whitethorn
- sharpleaf snowberry
- needlegrass
- mountain brome

*General Management Considerations:*
The bare soil erosion hazard rating for the Penstock soil may be reduced to low by managing for approximately 60 percent cover.
The bare soil erosion hazard rating for the Scaribou soil may be reduced to low by managing for approximately 60 percent cover.
The low available water capacity in the upper 24 inches of the Penstock and Scaribou soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus, mountain whitethorn and sharpleaf snowberry limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Among the trees that are suitable for planting are Douglas-fir, Jeffrey pine and white fir

### INTERPRETIVE GROUPS

*Capability Subclass:* VIe (22) nonirrigated

## 771-Penstock-Scaribou complex, 30 to 50 percent slopes

### SETTING

*Landform:* mountains
*Elevation:* 4500 to 6300 feet
*Slope Range:* 30 to 50 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### COMPOSITION

*Penstock stony loam and similar inclusions:* 45 percent
*Scaribou stony loam and similar inclusions:* 40 percent
*Contrasting Inclusions:* 15 percent

### PENSTOCK SOIL CHARACTERISTICS

*Position on Landscape:* on back slopes
*Parent Material:* material weathered from metavolcanic rocks
*Important Surface Feature:* the surface is covered with duff and 10 percent stones
*Typical Profile:*
- 0 to 12 inches: light yellowish brown stony loam
- 12 to 63 inches: light brown and reddish yellow very gravelly loam
- 63 inches: metavolcanic rock

*Depth Class:* very deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* low to moderate
*Potential Rooting Depth:* 60 inches or more
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* high

### SCARIBOU SOIL CHARACTERISTICS

*Position on Landscape:* on back slopes
*Parent Material:* material weathered from metavolcanic rocks
*Important Surface Feature:* the surface is covered with duff and 10 percent stones
*Typical Profile:*
- 0 to 6 inches: light brown stony loam
- 6 to 17 inches: light brown very cobbly loam
- 17 to 60 inches: reddish yellow very cobbly clay loam and very gravelly clay loam

*Depth Class:* very deep
*Drainage Class:* well drained
*Permeability:* moderately slow
*Available Water Capacity:* low to moderate
*Potential Rooting Depth:* 60 inches or more
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* high

### INCLUDED AREAS

- Deadwood very gravelly sandy loam
- soils similar to Penstock but have very bouldery or extremely stony surfaces
- soils similar to Penstock but are moderately deep to bedrock
- soils similar to Scaribou but have a very stony surface
- soils similar to Scaribou but are deep to soft bedrock
- Rock outcrop

### MAJOR USES

*Current Uses:* timber production

### TIMBER PRODUCTION

*Major Management Factors:*
Hazard of erosion
Slope of the Penstock and Scaribou soils
Low to moderate available water capacity of the Penstock and Scaribou soils

### PENSTOCK VEGETATION CHARACTERISTICS

*Main Tree Species:* Douglas-fir, white fir, Jeffrey pine
*Mean Site Index For Stated Species:*
Douglas-fir: 92 based on a 100 year site curve by McArdle
White fir: 58 based on a 50 year site curve by Schumacher
Jeffrey pine: 87 based on a 100 year site curve by Meyer
*Dunning Site Index:* II
*Cactos Site Index:* 59
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- sharpleaf snowberry
- needlegrass
- mountain brome

### SCARIBOU VEGETATION CHARACTERISTICS

*Main Tree Species:* white fir, Jeffrey pine, Douglas fir
*Mean Site Index For Stated Species:*
White fir: 57 based on a 50 year site curve by Schumacher
Douglas-fir: 102 based on a 100 year site curve by McArdle
Jeffrey pine: 96 based on a 100 year site curve by Meyer

*Dunning Site Class:* II
*Cactos Site Index:* 65
*Common Understory Plants:*
- manzanita
- snowbrush ceanothus
- mountain whitethorn
- sharpleaf snowberry
- needlegrass
- mountain brome

General Management Considerations:
The bare soil erosion hazard rating of the Penstock soil may be reduced to low by managing for approximately 70 percent cover.
The bare soil erosion hazard rating may be Scaribou soil reduced to low by managing for approximately 70 percent cover.
The steepness of slope limits the kinds of equipment that can be used in forest management.
The low available water capacity in the upper 24 inches of the Penstock and Scaribou soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus, mountain whitethorn and sharp leaf snowberry limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Roads and landings can be protected from erosion by constructing waterbars
Among the trees that are suitable for planting are Douglas-fir, Jeffrey pine and white fir

### *INTERPRETIVE GROUPS*

*Capability Subclass:* VIe (22), nonirrigated

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## 772-Scaribou-Penstock-Rock outcrop complex, 50 to 75 percent slopes

### *SETTING*

*Landform:* mountains
*Elevation:* 4500 to 6000 feet
*Slope Range:* 50 to 75 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 30 to 40 inches
*Mean Annual Temperature:* 43 to 45 degrees F.
*Frost Free Period:* 60 to 80 days

### *COMPOSITION*

*Scaribou extremely stony loam and similar inclusions:* 55 percent
*Penstock very stony loam and similar inclusions:* 20 percent
*Rock Outcrop:* 15 percent
*Contrasting Inclusions:* 10 percent

### *SCARIBOU SOIL CHARACTERISTICS*

*Position on Landscape:* on west-facing back slopes
*Parent Material:* material weathered from metavolcanic rocks
*Important Surface Feature:* the surface is covered with duff, 50 percent stones and 20 percent cobbles
*Typical Profile:*
- 0 to 6 inches: light brown extremely stony loam
- 6 to 17 inches: light brown very cobbly loam
- 17 to 60 inches: reddish yellow very cobbly clay loam and very gravelly clay loam
- 60 to 70 inches: reddish yellow very gravelly clay

*Depth Class:* very deep
*Drainage Class:* well drained
*Permeability:* moderately slow
*Available Water Capacity:* low to moderate
*Potential Rooting Depth:* 60 inches or more
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* high

### *PENSTOCK SOIL CHARACTERISTICS*

*Position on Landscape:* on east-facing back slopes
*Parent Material:* material weathered from metavolcanic rocks
*Important Surface Feature:* the surface is covered with duff , 20 percent stones and 5 percent cobbles
*Typical Profile:*
- 0 to 12 inches: light yellowish brown very stony loam
- 12 to 63 inches: reddish yellow very gravelly loam
- 63 inches: metavolcanic rock

*Depth Class:* very deep
*Drainage Class:* well drained
*Permeability:* moderate
*Available Water Capacity:* low to moderate
*Potential Rooting Depth:* 60 inches or more
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* high

### *ROCK OUTCROP*

Rock outcrop consists of exposures of andesite or basalt bedrock. They generally are barren, but in some areas a few perennial grasses and shrubs grow between the rocks.

### INCLUDED AREAS

- Deadwood very gravelly sandy loam near Rock outcrop
- soils similar to Scaribou and Penstock but have very bouldery surfaces
- soils similar to Scaribou and Penstock but are deep to soft bedrock
- Rubble land

### MAJOR USES

*Current Uses:* timber production

### TIMBER PRODUCTION

*Major Management Factors:*
Hazard of erosion
Rock outcrop
Slope
Low to moderate available water capacity of the Scaribou and Penstock soils
Rock fragments on the surface

### SCARIBOU VEGETATION CHARACTERISTICS

*Main Tree Species:* white fir, Douglas-fir, Jeffrey pine
*Mean Site Index For Stated Species:*
White fir: 57 based on a 50 year site curve by Schumacher
Douglas-fir: 102 based on a 100 year site curve by McArdle
Jeffrey pine: 96 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 65
*Common Understory Plants:*

- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

### PENSTOCK VEGETATION CHARACTERISTICS

*Main Tree Species:* Douglas-fir, white fir, Jeffrey pine
*Mean Site Index For Stated Species:*
Douglas-fir: 92 based on a 100 year site curve by McArdle
White fir: 58 based on a 50 year site curve by Schumacher
Jeffrey pine: 87 based on a 100 year site curve by Meyer
*Dunning Site Class:* II
*Cactos Site Index:* 59
*Common Understory Plants:*

- manzanita
- snowbrush ceanothus
- mountain whitethorn
- needlegrass
- mountain brome

*General Management Considerations:*
The bare soil erosion hazard rating of the Penstock soil may be reduced to low by managing for approximately 50 percent cover.
The bare soil erosion hazard rating of the Scaribou soil may be reduced to low by managing for approximately 30 percent cover.
Steepness of slope and rock outcrop limits the use of wheeled and tracked equipment in skidding operations. End lining generally disturbs the soil less.
The low available water capacity in the upper 24 inches of the Scaribou and Penstock soils reduces the survival of seedlings.
Brushy plants such as manzanita, snowbrush ceanothus and mountain whitethorn limit natural regeneration of pine and fir trees.
Plant competition delays natural regeneration but does not prevent the eventual development of a fully stocked, normal stand of trees.
Rock fragments on the surface and rock outcrop can interfere with felling, yarding and other operations involving the use of equipment.
Roads and landings can be protected from erosion by constructing waterbars.
Among the trees that are suitable for planting are Douglas-fir, Jeffrey pine and white fir

### INTERPRETIVE GROUPS

*Capability Subclass:* VIIe (22), nonirrigated

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## 777-Hangtown very cobbly sandy loam, 30 to 50 percent slopes

### SETTING

*Landform:* mountain back slopes
*Elevation:* 6000 to 7470 feet
*Slope Range:* 30 to 50 percent
*Vegetation:* mixed conifers
*Mean Annual Precipitation:* 35 to 40 inches
*Mean Annual Temperature:* 41 to 43 degrees F.
*Frost Free Period:*: 60 to 80 days

### COMPOSITION

*Hangtown very cobbly sandy loam and similar inclusions:* 75 percent
*Contrasting Inclusions:* 25 percent

### HANGTOWN SOIL CHARACTERISTICS

*Parent Material:* material weathered from metavolcanic rocks

*Important Surface Feature:* the surface is covered with duff, 10 percent stones and 25 percent cobbles
*Typical Profile:*
- 0 to 9 inches: brown very cobbly sandy loam
- 9 to 58 inches: pale brown and very pale brown very gravelly sandy loam
- 58 inches: weathered metavolcanic rock

*Depth Class:* deep
*Drainage Class:* well drained
*Permeability:* moderately rapid
*Available Water Capacity:* low
*Potential Rooting Depth:* 50 to 60 inches
*Surface Runoff:* rapid
*Bare Soil Erosion Hazard Rating:* moderate
*Depth to Restrictive Layer:* 50 to 60 inches to weathered metavolcanic rock

### *INCLUDED AREAS*

- Deadwood very gravelly sandy loam on ridges
- Scaribou stony loam
- Penstock stony loam
- soils similar to Hangtown but are very deep to soft bedrock
- Rock outcrop
- soils similar to Hangtown but have bouldery surfaces

### *MAJOR USES*

*Current Uses:* timber production

### *TIMBER PRODUCTION*

*Major Management Factors:*
Hazard of erosion
Slope
Rock fragments on the surface
Low available water capacity

### *HANGTOWN VEGETATION CHARACTERISTICS*

*Main Tree Species:* California red fir, Douglas-fir, sugar pine
*Mean Site Index For Stated Species:*
California red fir: 50 based on a 50 year site curve by Schumacher
*Dunning Site Class:* III
*Common Understory Plants:*
- pinemat manzanita
- huckleberry oak
- sharpleaf snowberry
- needlegrass
- mountain brome

*General Management Considerations:*
The steepness of slope limits the kinds of equipment that can be used in forest management.
Rock fragments on the surface can interfere with felling, yarding and other operations involving the use of equipment.
The low available water capacity in the upper 24 inches of the Hangtown soil reduces the survival of seedlings.
Roads and landings can be protected from erosion by constructing waterbars.
Among the trees that are suitable for planting are red fir.

### *INTERPRETIVE GROUPS*

*Capability Subclass:* VIe (22), nonirrigated

# Soil Series Descriptions

In this section, each soil series recognized in the area of this quadrangle is described in technical detail. The descriptions are arranged in alphabetical order.

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 the standards of the Soil Survey Manual (10). Many of the technical terms used in the descriptions are defined in Soil Taxonomy (11). Unless otherwise stated, 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."

## ALMANOR SERIES

The Almanor series consists of deep, well drained soils on plateaus and mountains. These soils formed in material weathered from basalt, andesite and volcanic ash. Slopes range from 2 to 30 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

Soils of the Almanor series are medial-skeletal, frigid Typic Vitrandepts.

Typical pedon of Almanor very gravelly sandy loam in an area of Almanor-Whorled-Inville complex, 0 to 15 percent slopes; about 7 miles NE of Chester and 4.5 miles N of HWY 36 near the Lassen National Forest boundary; about 500 feet E and 400 feet S of the NW corner of Sec. 18, T.29N., R.8E. Red Cinder Quadrangle.

O—3 inches to 0; fresh and decomposed fir and pine needles, twigs and bark; abrupt smooth boundary.

A—0 to 5 inches; brown (10YR 4/3) very gravelly sandy loam, dark brown (7.5YR 3/2) moist; moderate very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine and medium roots; many very fine interstitial pores; 40 percent pebbles; sodium fluoride pH is 11.0; slightly acid (pH 6.1); clear wavy boundary.

Bw1—5 to 17 inches; brown (7.5YR 5/4) very gravelly sandy loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine and medium and common coarse roots; many very fine interstitial pores; 10 percent cobbles, 50 percent pebbles; sodium fluoride pH is 11.0; slightly acid (pH 6.1); clear wavy boundary.

Bw2—17 to 29 inches; strong brown (7.5YR 5/6) extremely gravelly sandy loam, dark brown (7.5YR 3/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine, medium and coarse roots; many very fine interstitial pores; 5 percent stones; 20 percent cobbles; 40 percent 5 to 75 mm pebbles; 10 percent 2 to 5 mm pebbles; sodium fluoride pH is 10.5; slightly acid (pH 6.1); abrupt wavy boundary.

Bw3—29 to 40 inches; strong brown (7.5YR 5/6) extremely gravelly sandy loam, dark brown (7.5YR 3/4) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine, medium and coarse roots; many very fine interstitial pores; 5 percent stones; 20 percent cobbles; 40 percent 5 to 75 mm pebbles; 10 percent 2 to 5 mm pebbles; sodium fluoride pH is 10.5; slightly acid (pH 6.1); abrupt wavy boundary.

R—40 to 44 inches; hard massive basalt; few fractures; upper one inch has few horizontal fractures with some soil and roots in fractures.

The thickness of solum and depth to bedrock is 40 to 60 inches. The 10 to 40 inch control section has 8 to 15 percent clay and 50 to 70 percent stones, cobbles and gravel.

The A horizon dry color is 10YR 4/3, 5/4 or 7.5YR 3/4. Moist color is 10YR 3/2; 7.5YR 3/2 or 5YR 3/3. It is very stony or very gravelly sandy loam. Rock fragments, mostly gravel, range from 40 to 60 percent. Sodium fluoride pH ranges from 10.5 to 11.0. Moist bulk density of the fine earth fraction ranges from 0.70 to 0.80 g/cc.

The Bw horizon dry color is 10YR 5/6; 7.5YR 4/4, 4/5, 4/6, 5/4 or 5/6. Moist color is 7.5YR 3/4 or 5YR 3/4. Sodium fluoride pH ranges from 9.6 to 11.0. Moist bulk density of the fine earth fraction ranges from 0.80 to 0.85 g/cc.

## BAILEYCREEK SERIES

The Baileycreek series consists of moderately deep, well drained soils on mountain back slopes and plateaus. These soils formed in material weathered from basalt, colluvium, andesite and volcanic ash. Slopes range from 5 to 50 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

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

Typical pedon of Baileycreek very gravelly loam in an area of Baileycreek-Weste complex, 5 to 15 percent slopes; about 2 miles east of Chester along Highway 139 to intersection of trail; north along northeast fork through road cut about 0.3 miles to intersection of another east-west trail; about 2,000 feet E and 1,600 feet S of the NW corner of Section 3, T. 28N., R. 7E. Chester Quadrangle.

O – 1 inch to 0; fresh and decomposed pine needles, twigs cones and bark; abrupt wavy boundary.

A – 0 to 3 inches; brown (7.5YR 4/2) very gravelly loam, dark brown (7.5YR 3/2) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 5 percent stones; 10 percent cobbles, 30 percent pebbles; sodium fluoride pH is 9.8; slightly acid (pH 6.1); clear wavy boundary.

BA – 3 to 9 inches; reddish brown (5YR 5/4) very gravelly loam, dark reddish brown (5YR 3/4) moist; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine and medium roots;many very fine interstitial pores; 15 percent cobbles; 40 percent pebbles; sodium fluoride pH is 9.6; slightly acid (pH 6.1); clear wavy boundary.

Bt1 – 9 to 14 inches; yellowish red (5YR 5/6) very gravelly loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, sticky and plastic; many very fine and common fine and medium roots, many very fine and fine interstitial and tubular pores; common thin clay films on peds and in pores; 20 percent 2 to 5 mm pebbles; 30 percent 5 to 75 mm pebbles; 5 percent cobbles; sodium fluoride pH is 9.2; slightly acid (pH 6.2); clear wavy boundary.

Bt2 – 14 to 30 inches; yellowish red (5YR 5/6) very gravelly loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, sticky and plastic; common very fine, fine and medium roots; many very fine and fine interstitial and tubular pores; common thin clay films on peds and in pores; 20 percent 2 to 5 mm pebbles; 30 percent 5 to 75 mm pebbles; 5 percent cobbles; sodium fluoride pH is 9.0; slightly acid (pH 6.2); clear wavy boundary.

Cr – 30 to 60 inches; soft weathered basalt; digs with spade; retains all of original rock structure and minerals.

The thickness of solum and depth to bedrock is 20 to 40 inches. Rock fragments on the surface range from 0 to 20 percent boulders, 5 to 10 percent stones, 10 to 20 percent cobbles and 20 to 50 percent gravel. Base saturation ranges from 50 to 75 percent.

The A horizon dry color is 10YR 4/2 or 7.5YR 4/2. Moist color is 10YR 2/1, 2/2; 7.5YR 2/2, 3/2 or 5YR 3/2. Texture is very gravelly, very bouldery or very stony loam with 10 to 15 percent clay. Rock fragments range from 40 to 50 percent. Sodium fluoride pH ranges from 9.8 to 10.0.

The BA horizon dry color is 7.5YR 4/4, 5/4 or 5YR 5/4. Moist color is 7.5YR 3/2; 5YR 3/3 or 3/4. Rock fragments range from 50 to 60 percent. Sodium fluoride pH ranges from 9.6 to 9.8.

The Bt horizon dry color is 7.5YR 5/4; 5YR 5/4 or 5/6. Moist color is 7.5YR 3/4; 5YR 3/4 or 4/4. It is very gravelly loam, extremely gravelly loam or very gravelly clay loam with 20 to 35 percent clay. Rock fragments range from 50 to 70 percent. Sodium fluoride pH ranges from 8.5 to 9.2.

## DEADWOOD SERIES

The Deadwood series consists of shallow, somewhat excessively drained soils on ridges. These soils formed in material weathered from metavolcanic rock. Slopes range from 9 to 50 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

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 Penstock-Deadwood-Rock outcrop complex, 30 to 50 percent slopes; about 5.1 miles E of Westwood; 0.5 mile N of Home Ranch on dirt road and 1000 feet upslope; 200 feet E and 2500 feet S of NW corner of Section 18, T.28N., R.10E. Westwood East Quandrangle.

A—0 to 4 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium angular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine interstitial pores; 30 percent 2 to 5 mm pebbles and 10 percent 5 to 75 mm pebbles; slightly acid (pH 6.5); clear wavy boundary.

Bw1—4 to 9 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, brown (10YR 4/3) moist; moderate fine and medium angular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine interstitial pores; 30 percent 2 to 5 mm pebbles and 10 percent 5 to 75 mm pebbles; slightly acid (pH 6.5); clear wavy boundary.

Bw2—9 to 16 inches; yellowish brown (10YR 5/4) extremely gravelly sandy loam, brown (10YR 4/3) moist; moderate fine angular blocky structure; hard, very friable, slightly sticky and slightly plastic; few very fine roots; common very fine interstitial pores; 50 percent pebbles; 20 percent cobbles; slightly acid (pH 6.5); abrupt wavy boundary.

R—16 inches; hard metavolcanic rock.

The thickness of the solum and depth to bedrock is 14 to 20 inches. The control section, from a depth of 10 inches to the lithic contact, has a weighted average of 10 to 20 percent clay, modified by 60 to 80 percent rock fragments.

The A horizon is 4 to 6 inches thick. Gravel content ranges from 40 to 60 percent. Reaction is slightly acid or neutral.

The B horizon contains from 60 to 75 percent rock fragments. Reaction is slightly acid or neutral.

Deadwood soils in this survey area have a mean annual soil temperature of 44 to 46 degrees F, which is lower than the temperature defined in the range for series mapped elsewhere. This difference, however, does not significantly affect their use and management.

## HANGTOWN SERIES

The Hangtown series consists of deep, well drained soils on mountain back slopes. These soils formed in material weathered from metavolcanic rocks. Slopes range from 30 to 50 percent. Mean annual precipitation is about 40 inches and the mean annual temperature is about 42 degrees F.

Soils of the Hangtown series are loamy-skeletal, mixed, frigid Dystric Xerochrepts.

Typical pedon of Hangtown very cobbly sandy loam, 30 to 50 percent slopes; about 3.5 miles S of Westwood and 1.5 miles NW of Dyer Mtn. lookout, 5000 feet S and 200 feet W of the NE corner of Sec. 31, T.28N., R.9E. Canyon Dam Quandrangle.

The surface is covered with 25 percent cobbles; boulders, 3 to 6 feet in diameter, are about 100 to 150 feet apart.

O—2 to 0 inches; decomposed fir needles.

A—0 to 9 inches; brown (10YR 5/3) very cobbly sandy loam, dark brown (10YR 3/3) moist; moderate fine granular structure, soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine interstitial pores; 30 percent pebbles and 25 percent cobbles; slightly acid (pH 6.2); clear smooth boundary.

AB—9 to 17 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine, fine and few medium roots; many very fine interstitial pores; 55 percent pebbles and 5 percent cobbles; slightly acid (pH 6.2); clear smooth boundary.

Bw1—17 to 37 inches; very pale brown (10YR 7/4) very gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very

fine, fine and few medium roots; many very fine tubular pores; 50 percent pebbles and 5 percent cobbles; slightly acid (pH 6.2); clear smoooth boundary.

Bw2—37 to 58 inches; very pale brown (10YR 7/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; many very fine tubular pores; 50 percent pebbles and 5 percent cobbles; slightly acid (pH 6.2).

Cr—58 inches; strongly weathered and fractured metavolcanic rock; fractures are 1 to 3 inches apart and are filled with soil and roots.

The thickness of the solum and depth to bedrock ranges from 50 to 60 inches. Reaction is slightly acid or medium acid. Rock fragments on the surface range from 25 to 35 percent cobbles and 0 to 2 percent boulders.

The A horizon dry color is 10YR 5/3 or 6/3. Moist color is 10YR 3/3, 3/4 or 4/3. Layers with values of 5 dry and 3 moist are less than 10 inches thick. It is 15 to 20 inches thick.

The Bw horizon dry color is 10YR 6/4, 6/6 or 7/4. Moist color is 10YR 4/4, 4/6 or 5/4. It is very gravelly sandy loam with 40 to 50 percent gravel and 5 to 10 percent cobbles.

## INVILLE SERIES

The Inville series consists of deep and very deep, well drained soils in basins on alluvial fans. These soils formed in alluvium weathered from basalt and andesite with a strong influence from volcanic ash. Slopes range from 0 to 5 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

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

Typical pedon of Inville very gravelly sandy loam, 0 to 2 percent slopes; about 7 miles NE of Chester and 1.0 mile N of HWY 36, 400 feet W of Swain Mtn. Road on road 1620, about 1800 feet W and 1600 feet S of the NE corner of Section 33, T.29N., R.8E. Westwood West Quandrangle.

0—1 inch to 0; fresh and decomposed needles, twigs and bark; abrupt smooth boundary.

A—0 to 2 inches; yellowish brown (10YR 5/4) very gravelly sandy loam, dark brown (7.5YR 3/2) moist; moderate very fine granular structure; soft, very friable, nonsticky and slightly plastic; common very fine roots; 40 percent gravel; medium acid (pH 6.0); abrupt smooth boundary.

Bw—2 to 10 inches; strong brown (7.5YR 5/6) very gravelly sandy loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine, few medium and coarse roots; many very fine tubular pores; 35 percent gravel; charcoal present; slightly acid (pH 6.5); clear smoooth boundary.

Bt—10 to 21 inches; reddish yellow (7.5YR 6/6) very cobbly loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and medium, and few coarse roots; many very fine tubular pores; common thin clay films on peds and in pores; 25 percent cobbles; 25 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

2Bt—21 to 30 inches; brownish yellow (10YR 6/6) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; single grain; loose, loose, nonsticky and nonplastic; common very fine roots continuous thin clay films bridge mineral grains; 15 percent cobbles; 55 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

3Bt—30 to 46 inches; yellowish brown (10YR 5/6) very gravelly loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; common thin clay films on peds and in pores; 40 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

3C—46 to 60 inches; reddish yellow (7.5YR 6/6) very gravelly loam, strong brown (7.5YR 4/6) moist; common fine distinct strong brown (7.5YR 5/8) mottles, moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; 5 percent cobbles; 50 percent gravel; slightly acid (pH 6.5).

Thickness of solum and depth to soft bedrock is greater than 60 inches, or 40 to 60 inches. The control section has a weighted average of 20 to 24 percent clay and 55 to 65 percent rock fragments, mostly gravel.

The A horizon is 2 to 6 inches thick. Clay content ranges from 8 to 15 percent. Gravel content ranges from 35 to 45 percent. Sodium fluoride pH is 9.6 to 9.8. Reaction is medium or slightly acid.

The Bw horizon dry color is 10YR 5/6 or 7.5YR 5/6. Moist color is 7.5YR 3/4, 4/4 or 4/6. Clay content ranges from 10 to 18 percent. Gravel content ranges from 30 to 50 percent.

The Bt horizon dry color is 10YR 5/6 or 6/6. Moist clolor is 7.5YR 3/4 or 4/4. Rock fragments range from 50 to 60 percent.

The 2Bt and 3Bt horizons moist colors are 10YR 3/4 or 4/4. Rock fragments range from 40 to 75 percent.

## MOUNTMED SERIES

The Mountmed series consists of very deep, very poorly and poorly drained soils on fans and floodplains. These soils formed in mixed alluvium. Slopes range from 0 to 3 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

Soils of the Mountmed series are fine, montmorillonitic, frigid Typic Haplaquolls.

Typical pedon of Mountmed peat, 0 to 1 percent slopes; about 4.5 miles SE of Westwood; 4.5 miles E from Pine Town on Beaty and Associates logging road at the SE corner of its intersection with the road to the Home Ranch; about 1,400 feet E and 900 feet N of the SW corner of Sec. 13, T.28N., R.9E. Westwood East Quandrangle.

Oe—0 to 6 inches; sphagnum peat; neutral (pH 6.8); abrupt smooth boundary.

A—6 to 16 inches; gray (5Y 5/1) clay, very dark gray (5Y 3/1) moist; few medium prominent light gray mottles (5GY 5/1) moist; weak coarse subangular blocky structure; very hard, very friable, very sticky and very plastic; many very fine and fine roots; few very fine interstitial pores; neutral (pH 7.0); clear wavy boundary.

Cg1—16 to 38 inches; light gray (5Y 6/1) clay, very dark gray (5Y 3/1) moist; many medium distinct greenish gray (5GY 5/1) mottles, dark greenish gray (5GY 4/1) moist; massive; very hard, very friable, very sticky and very plastic; few very fine and fine roots; few very fine interstitial pores; neutral (pH 7.0); clear wavy boundary.

Cg2—38 to 47 inches; pale yellow (2.5Y 7/4) clay loam, olive brown (2.5Y 4/4) moist; common fine prominent dark greenish gray (5GY 4/1) mottles, dry and moist; massive; very hard, very friable, sticky and plastic; few very fine and fine roots; few very fine interstitial pores; strongly effervescent; lime segregated in few medium soft filaments; mildly alkaline (pH 7.5); abrupt smooth boundary.

2C—47 to 55 inches; pale yellow (2.5Y 7/4) gravelly coarse sandy loam, light olive brown (2.5Y 5/4) moist; many medium prominent brownish yellow (10YR 6/6) mottles, dark yellowish brown (10YR 4/6) moist; massive; very hard, friable, nonsticky and nonplastic; few fine roots; many very fine interstitial pores; 20 percent pebbles; mildly alkaline (pH 7.5); abrupt smooth boundary.

3C—55 to 60 inches; light yellowish brown (10YR 6/4) sand, dark yellowish brown (10YR 4/4) moist; single grain; loose, nonsticky and nonplastic; no roots; many very fine interstitial pores; mildly alkaline (pH 7.5).

Depth to the 2C horizon varies from 40 to more than 60 inches from the surface of the mineral soil. Depth to mottles is from the base of the mollic epipedon to a depth of 40 inches. Some pedons lack an O horizon. Some pedons lack secondary lime.

The A horizon dry color is 10YR 5/1; 2.5Y 5/2; 5Y 5/1 or N 4/0. Moist color is 10YR 3/1, 2.5Y 3/2, 5Y 3/1 or N 2/0. It is loam, clay loam or clay.

The Cg horizon dry color is 2.5Y 6/2, 6/4, 7/4; 5Y 5/1, 6/1, 6/2, 7/1; 5GY 7/1 or 6/1. Moist color is 2.5Y 4/2, 4/4; 5Y 3/1, 4/2, 5/1; 5GY 5/1 or 4/1.

The 2C horizon dry color is 2.5Y 7/4 or 5G 7/1. Moist color is 2.5Y 5/4 or 5G 5/1. It is clay or coarse sandy loam modified by 5 to 20 percent 2 to 5 mm gravel and 10 to 50 percent 5 to 75 mm gravel. Reaction is neutral or mildly alkaline.

The 3C horizon dry color is 10YR 6/4 or 5GY 7/1. Moist color is 10YR 4/4 or 5GY 5/1. It is sand or sandy loam. Reaction is neutral or mildly alkaline.

## PENSTOCK SERIES

The Penstock series consists of very deep, well drained soils on mountain back slopes. These soils formed in material weathered from metavolcanic or pyroclastic rock. Slopes range from 5 to 75 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

Soils of the Penstock series are loamy-skeletal, mixed, frigid Ultic Palexeralfs.

Typical pedon of Penstock stony loam in an area of Penstock-Scaribou complex, 30 to 50 percent slopes; on Little Dyer Mountain about 2 miles E of Lake Almanor; 2.3 miles W of bridge to shallow borrow pit then 0.4 mile W on log trail to landing; about 1000 feet N and 1700 feet E of the SW corner of Sec. 15, T.28N., R.8E. Westwood West Quandrangle.

The surface is covered with 5 to 10 percent stones.

A—0 to 12 inches; light yellowish brown (10YR 6/4) stony loam, dark yellowish brown (10YR 4/4) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and many fine and medium roots; many very fine interstitial pores; 10 percent stones and 50 percent pebbles; medium acid (pH 6.0); clear wavy boundary.

BAt—12 to 27 inches; light brown (7.5YR 6/4) very gravelly loam, strong brown (7.5YR 5/6) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine, and few coarse roots; many very fine interstitial pores; few thin clay films on peds; 10 percent cobbles and 35 percent pebbles; medium acid (pH 6.0); clear wavy boundary.

Bt1—27 to 44 inches; reddish yellow (7.5YR 6/6) very gravelly loam, strong brown (7.5YR 5/6) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine tubular pores; many thin clay films on peds; 5 percent cobbles and 35 percent pebbles; medium acid (pH 6.0); clear wavy boundary.

Bt2—44 to 63 inches; reddish yellow (7.5YR 6/6) very gravelly loam, strong brown (7.5YR 5/6) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine tubular pores; many thin and common moderately thick clay films on peds; 5 percent cobbles and 30 percent pebbles of weathered rock; medium acid (pH 6.0); abrupt wavy boundary.

Cr—63 inches; moderately weathered metavolcanic rock with fractures 1/2 to 1 inch apart.

Base saturation ranges from 35 to 60 percent. The surface is covered with 0 to 25 percent stones.

The A horizon dry color is 10YR 4/3, 6/3, 6/4 or 7.5YR 6/2. Moist color is 10YR 3/2, 3/3, 4/4 or 7.5YR 4/2. It is very gravelly sandy loam, stony loam or very stony loam. Rock fragments, mostly gravel, range from 35 to 50 percent. Reaction is medium acid through neutral.

The BAt horizon dry color is 10YR 5/3, 6/3 or 7.5YR 6/4. Moist color is 10YR 4/3, 4/4 or 7.5YR 4/4 or 5/6. Rock fragments, mostly gravel, range from 35 to 50 percent. Reaction is medium acid or slightly acid.

The Bt horizon dry color is 10YR 5/4, 6/4; 7.5YR 5/6, 6/4, or 6/6. Moist color is 10YR 4/6, 5/6; 7.5YR 3/4, 4/4 or 5/6. Clay content increases with depth and ranges from 18 to 27 percent. Rock fragments, mostly gravel, range from 35 to 50 percent. Reaction is medium acid or slightly acid.

## REDRIVER SERIES

The Redriver series consists of moderately deep, somewhat excessively drained soils on plateaus. These soils formed in material weathered from basalt, andesite and volcanic ash. Slopes range from 0 to 9 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

Soils of the Redriver series are loamy-skeletal, mixed, frigid Andic Xerochrepts.

Typical pedon of Redriver stony sandy loam in an area of Redriver-Woodwest-Wafla complex, 0 to 9 percent slopes; about 1 mile N of Westwood, CA; 1.2 miles N of HWY 36 on Forest Service Road 29N08 to an old logging landing; 0.15 miles W on trail; 200 feet S of trail in a grove of large pine trees; 100 feet N and 50 feet E of the W 1/4 corner of Sec. 31, T.29N., R.9E. Westwood West Quandrangle.

Oi—1 to 0 inches; decomposed needles, cones and twigs.

A—0 to 6 inches; dark brown (10YR 3/3) stony sandy loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; common very fine, few fine and medium roots; many very fine interstitial pores; 5 percent stones, 30 percent pebbles; sodium fluoride pH is 10.0 after 2 minutes; slightly acid (pH 6.5); clear wavy boundary.

AB—6 to 16 inches; brown (7.5YR 4/4) extremely cobbly sandy loam, dark reddish brown (5YR 3/4) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; common very fine, few fine and medium roots; many very fine interstitial pores; 25 percent cobbles, 50 percent pebbles; sodium fluoride pH is 10.0 after 2 minutes; medium acid (pH 6.0); clear wavy boundary.

Bw1—16 to 22 inches; strong brown (7.5YR 4/6) extremely gravelly sandy 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, fine and medium roots; common very fine tubular and many very fine interstitial pores; 20 percent cobbles, 60 percent pebbles; sodium fluoride pH is 9.1 after 2 minutes; medium acid (pH 6.0); gradual wavy boundary.

Bw2—22 to 31 inches; strong brown (7.5YR 4/6) extremely gravelly sandy loam, dark brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; 10 percent cobbles, 60 percent pebbles; medium acid (pH 6.0); gradual wavy boundary.

R—31 to 40 inches; fractured basalt; fractures are 3 to 9 inches apart horizontally and vertically. Fractures are 1/8 inch wide and are filled with soil and roots.

The thickness of the solum and depth to bedrock is 20 to 40 inches. Rock fragments on the surface range from 0 to 10 percent stones, 1 to 10 percent cobbles and 15 to 30 percent gravel. Most pedons have a clay increase from the A to B horizon but it is insufficient to meet the requirements of an argillic horizon.

The A horizon dry color is 10YR 3/3, 4/2; 7.5YR 4/2; 5YR 4/3 or 4/4. Moist colors are 7.5YR 3/2; 5YR 3/2, 3/3 or 3/4. It is stony sandy loam or very gravelly sandy loam with 30 to 50 percent rock fragments and 5 to 12 percent clay. Reaction is neutral or slightly acid. Sodium fluoride pH is 10 to 11. Bulk density ranges from 0.8 to 0.85 g/cc.

The Bw horizon dry color is 7.5YR 4/4, 4/6, 5/4, 5/6; 5YR 4/4, 4/6, 5/4 or 5/6. Moist colors are 7.5YR 3/4, 4/4, 4/6; 5YR 3/4, 4/4 or 4/6. It is very or extremely gravelly sandy loam or very or extremely cobbly sandy loam with 50 to 75 percent rock fragments and 8 to 15 percent clay. Reaction is slightly or medium acid. Sodium fluoride pH is 8.5 to 9.6.

## SCARIBOU SERIES

The Scaribou series consists of very deep, well drained soils on mountainsides. These soils formed in material weathered from nonmarine sediments or metavolcanics. Slopes range from 5 to 75 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

Soils of the Scaribou series are loamy-skeletal, mixed, frigid Ultic Palexeralfs.

Typical pedon of Scaribou very gravelly sandy loam, 5 to 30 percent slopes; about 6.0 miles NE of Westwood; 1.5 miles N of HWY 36 on first road E of Coppervale and 250 feet W of this road; about 100 feet E and 1,000 feet S of NW corner of Sec. 19, T.29N., R.10E. Westwood E Quandrangle.

Oi—2 to 0 inches; litter of needles, twigs and cones; abrupt smooth boundary.

A—0 to 3 inches; brown (7.5YR 5/2) very gravelly sandy loam, dark brown (7.5YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine and medium roots; many very fine interstitial pores; 20 percent 2 to 5 mm

pebbles and 30 percent 5 to 75 mm pebbles; slightly acid (pH 6.5); clear wavy boundary.

BA1—3 to 12 inches; light brown (7.5YR 6/4) very gravelly sandy loam, brown (7.5YR 4/4) moist; moderate fine 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 interstitial pores; 20 percent 2 to 5 mm pebbles and 30 percent 5 to 75 mm pebbles; slightly acid (pH 6.5); clear wavy boundary.

BA2—12 to 19 inches; pink (7.5YR 7/4) very gravelly sandy loam, brown (7.5YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine, fine, medium and coarse roots; common very fine interstitial pores; 20 percent 2 to 5 mm pebbles and 30 percent 5 to 75 mm pebbles; slightly acid (pH 6.5); clear wavy boundary.

Bt1—19 to 34 inches; pink (7.5YR 7/4) very gravelly sandy clay loam, brown (7.5YR 5/4) moist; moderate coarse angular blocky structure; hard, very friable, sticky and plastic; few very fine, fine, medium and coarse roots; many very fine tubular pores; many moderately thick reddish yellow (7.5YR 6/6), strong brown (7.5YR 4/6) moist, clay films on peds; continuous thin clay films in pores; 20 percent 2 to 5 mm pebbles and 30 percent 5 to 75 mm pebbles; slightly acid (pH 6.1); clear wavy boundary.

Bt2—34 to 51 inches; reddish yellow (7.5YR 6/6) very gravelly clay loam, strong brown (7.5YR 4/6) moist; strong fine angular blocky structure; very hard, friable, very sticky and very plastic; few fine, medium and coarse roots; common very fine tubular pores; continuous thick clay films on peds and in pores; 20 percent 2 to 5 mm pebbles and 30 percent 5 to 75 mm pebbles; slightly acid (pH 6.1); clear wavy boundary.

Bt3—51 to 60 inches; reddish yellow (7.5YR 6/6) very gravelly clay loam, strong brown (7.5YR 4/6) moist; strong medium angular blocky structure; very hard, friable, very sticky and very plastic; few fine roots; common very fine tubular pores; continuous thick clay films on peds and continuous moderately thick clay films in pores; common fine black stains; 20 percent 2 to 5 mm pebbles and 30 percent 5 to 75 mm pebbles; slightly acid (pH 6.1).

Rock fragments on the surface range from 0 to 50 percent stones and 20 to 40 percent gravel.

The A horizon dry color is 7.5YR 4/4, 5/2, 5/3, 6/4 or 6/6. Moist color is 7.5YR 3/2, 4/4 or 4/6. It is very gravelly sandy loam, very gravelly loam, stony loam or extremely stony loam.

The BA horizon dry color is 7.5YR 5/4, 6/4, 6/6, 7/4 or 5YR 6/6. Moist color is 7.5YR 4/4, 5/4, 5/6 or 5YR 4/6. It is very gravelly sandy loam, or very or extremely cobbly loam with 15 to 20 percent clay and 40 to 70 percent rock fragments.

The Bt horizon dry color is 7.5YR 5/4, 5/6, 5/8, 6/6, 7/4; 5YR 6/4, 6/6 or 7/6. Moist color is 7.5YR 3/4, 4/4, 4/6, 5/4; 5YR 4/6, 5/6, 5/8; 2.5YR 4/8 or 5/8. Reaction is slightly acid or neutral. It is very or extremely gravelly clay loam, very or extremely cobbly clay loam or very gravelly sandy clay loam with 27 to 35 percent clay and 35 to 65 percent rock fragments. Some pedons have texture of very gravelly clay below a depth of 40 inches. Clay content increases with increasing depth. Base saturation of the argillic horizon ranges from 30 to 65 percent.

## SWAINOW SERIES

The Swainow series consists of deep, well drained soils on plateaus, mountain ridges and back slopes. These soils formed in material weathered from basalt, andesite and volcanic ash. Slopes range from 2 to 50 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

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

Typical pedon of Swainow very stony sandy loam in an area of Swainow-Almanor complex, 15 to 30 percent slopes; about 5 miles N of Clear Creek; at the SE corner of the NE 1/4 of the NW 1/4 of Sec. 15, T.29N., R.8E. Westwood West Quandrangle.

Oi—2 to 0 inches; decomposing fir needles and twigs.

A—0 to 3 inches; brown (7.5YR 4/4) very stony sandy loam, dark reddish brown (5YR 3/3) moist; weak fine granular structure; loose, very friable, nonsticky and slightly plastic; common very fine roots; many very fine interstitial pores; 20 percent stones, 25 percent 2 to 5 mm pebbles

and 25 percent 5 to 75 mm pebbles; sodium fluoride pH is 11.0; slightly acid (pH 6.5); clear wavy boundary.

AB—3 to 18 inches; strong brown (7.5YR 4/6) extremely stony sandy loam, dark reddish brown (5YR 3/4) moist; weak very fine subangular blocky structure; loose, very friable, nonsticky and slightly plastic; many very fine, fine and medium roots; many very fine interstitial pores; 60 percent stones and 15 percent pebbles; sodium fluoride pH is 10.0; slightly acid (pH 6.5); clear wavy boundary.

2Bt1—18 to 24 inches; yellowish red (5YR 5/6) very gravelly loam, yellowish red (5YR 4/6) moist; weak very fine subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, fine and medium roots; many very fine tubular pores, few thin clay films on peds; 5 percent cobbles, 25 percent 2 to 5 mm pebbles and 20 percent 5 to 75 mm pebbles; sodium fluoride pH is 8.6; slightly acid (pH 6.1); clear wavy boundary.

2Bt2—24 to 35 inches; strong brown (7.5YR 5/6) very gravelly loam, yellowish red (5YR 4/6) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, few fine and medium roots; many very fine tubular pores; many thin clay films on peds; 5 percent cobbles, 25 percent 5 to 75 mm pebbles and 25 percent 2 to 5 mm pebbles; slightly acid (pH 6.1); clear wavy boundary.

2BC—35 to 44 inches; yellowish brown (10YR 5/6) extremely stony loam, dark yellowish brown (10YR 4/6) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine interstitial pores; 20 percent stones, 40 percent cobbles and 20 percent pebbles; slightly acid (pH 6.1); abrupt wavy boundary.

2Cr—44 to 60 inches; moderately weathered, unfractured volcanic rock; slakes in water after soaking 24 hours.

The thickness of the solum and depth to a lithic or paralithic contact ranges from 40 to 60 inches. Rock fragments on the surface range from 5 to 20 percent stones; 0 to 10 percent cobbles and 20 to 40 percent gravel. Base saturation ranges from 50 to 75 percent. The bulk density at 1/3 bar moisture ranges from 0.9 to 1.1 g/cc.

The A and AB horizon dry color is 10YR 4/4; 7.5YR 4/2, 4/4, 4/6, 5/6; 5YR 4/6 or 5/6. Moist colors are 5YR 3/2, 3/3, 3/4 or 4/4. Rock fragments range from 5 to 60 percent stones, 0 to 5 percent cobbles and 15 to 50 percent gravel. Sodium fluoride pH ranges from 10.0 to 11.0. The moist chroma of the upper 7 inches, when mixed, is greater than 3.5.

The 2Bt horizon dry color is 7.5YR 5/4, 5/6; 5YR 5/4 or 5/6. Moist color is 7.5YR 4/4, 4/6; 5YR 4/4 or 4/6. It has 18 to 27 percent clay, modified by 40 to 70 percent rock fragments, mostly cobbles and gravel. Reaction is medium or slightly acid. Sodium fluoride pH is less than 9.0.

## TAHOMA SERIES

The Tahoma series consists of deep, well drained soils on mountain ridges, back slopes and plateaus. These soils formed in material weathered from basalt, andesite and volcanic ash. Slopes range from 2 to 30 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

Soils of the Tahoma series are fine-loamy, mixed, frigid Ultic Haploxeralfs.

Typical pedon of Tahoma gravelly sandy loam in an area of Tahoma-Swainow-Almanor complex, 2 to 15 percent slopes; about 1.8 miles N of HWY 36 along Swain Mtn. Road to intersection; then 0.25 mile N and about 100 feet N of the landing on W side of road and 120 feet E of road; about 600 feet E and 400 feet N of the SW corner of Section 28, T.29N., R.8E. Westwood West Quandrangle.

Oi—1 inch to 0; fresh and decomposing fir and pine needles; abrupt smooth boundary.

A1—0 to 3 inches; brown (7.5YR 4/3) gravelly sandy loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine interstitial pores; 20 percent pebbles; slightly acid (pH 6.5); clear wavy boundary.

A2—3 to 8 inches; reddish brown (5YR 5/5) sandy loam, yellowish red (5YR 4/6) moist; weak very fine subangular blocky structure; soft, very

friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine tubular pores; slightly acid (pH 6.5); abrupt wavy boundary.

Bt1 – 8 to 15 inches; yellowish red (5YR 5/6) gravelly loam, red (2.5YR 4/6) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine and fine roots; many very fine tubular pores; common moderately thick clay films on peds and in pores; 20 percent pebbles; slightly acid (pH 6.5); abrupt wavy boundary.

Bt2 – 15 to 24 inches; yellowish red (5YR 5/6) gravelly clay loam, red (2.5YR 4/6) moist; moderate medium subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine and fine roots; many very fine tubular pores; common moderately thick clay films on peds and in pores; 20 percent pebbles; 5 percent cobbles slightly acid (pH 6.5); clear wavy boundary.

Bt3 – 24 to 34 inches; yellowish red (5YR 5/6) gravelly clay loam, red (2.5YR 4/6) moist; strong medium subangular blocky structure; hard, friable, sticky and plastic; few very fine and fine roots; many very fine tubular pores; many moderately thick clay films on peds and in pores; 20 percent pebbles; 5 percent cobbles; slightly acid (pH 6.5); clear wavy boundary.

BCt – 34 to 46 inches; yellowish red (5YR 5/6) very gravelly clay loam, red (2.5YR 4/6) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine tubular pores; common thin clay films on peds; 10 percent stones; 50 percent pebbles; slightly acid (pH 6.5); abrupt irregular boundary.

Cr – 46 inches; moderately weathered soft volcanic rock; easily crushed in hands.

Thickness of the solum and depth to bedrock is 40 to 60 inches. Base saturation ranges from 35 to 40 percent.

The A horizon dry color is 7.5YR 4/3, 4/4, 4/6 or 5YR 5/5. Moist colors are 7.5YR 3/2; 5YR 3/2, 3/3, 3/4 or 4/6. Moist chromas of 2 or 3 occur only in the upper 6 inches. It is sandy loam or loam modified by 15 to 50 percent gravel and 0 to 25 percent stones and cobbles. Thickness ranges from 6 to 20 inches.

The Bt horizon dry color is 7.5YR 4/6, 5/6; 5YR 4/6, 5/6 or 6/6. Moist color is 7.5YR 4/4, 4/6; 5YR 4/4, 4/6 or 2.5YR 4/6. It is loam or clay loam with 25 to 35 percent clay modified by 15 to 35 percent gravel in the upper 20 inches and 35 to 50 percent gravel below. Reaction is slightly through strongly acid.

Reaction of the BCt is slightly through strongly acid.

## WAFLA SERIES

The Wafla series consists of deep and very deep, well drained soils in basins. These soils formed in stratified alluvium overlying weathered basalt. Slopes range from 0 to 9 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

Soils of the Wafla series are fine-loamy, mixed, frigid Ultic Haploxeralfs.

Typical pedon of Wafla gravelly sandy loam in an area of Redriver-Woodwest-Wafla complex, 0 to 9 percent slopes; about 1 mile NW of Westwood; on an old log deck, 75 feet W of cull log pile, 175 feet W of forest road 29NO8, 1.2 miles N of its intersection with HWY 36; 600 feet E and 1,500 feet S of the NW corner of Sec. 31, T.29N., R.9E. Westwood West Quandrangle.

Oi – 1 inch to 0; fresh and decomposed needles, twigs and bark; abrupt smooth boundary.

A1 – 0 to 6 inches; brown (7.5YR 4/4) gravelly sandy loam, dark reddish brown (5YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and common fine roots; many very fine interstitial pores; 15 percent pebbles; neutral (pH 6.6); clear smooth boundary.

A2 – 6 to 13 inches; strong brown (7.5YR 4/6) gravelly sandy loam, dark reddish brown (5YR 3/4) moist; single grain; loose, nonsticky and slightly plastic; many very fine, fine and medium roots; many very fine interstitial pores; 15 percent pebbles; neutral (pH 6.6); clear smooth boundary.

2AB – 13 to 24 inches; strong brown (7.5YR 4/6) very cobbly sandy loam, dark reddish brown (5YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and common fine and medium roots; many very fine interstitial pores; 30

percent cobbles; 25 percent pebbles; slightly acid (pH 6.5); clear wavy boundary.

3Bt—24 to 35 inches; strong brown (7.5YR 5/6) gravelly loam, reddish brown (5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine tubular pores; few thin clay films on peds and in pores; 20 percent pebbles; slightly acid (pH 6.5); clear wavy boundary.

4Bt—35 to 42 inches; strong brown (7.5YR 5/6) very cobbly loam, dark brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine, few fine, medium and coarse tubular pores; common thin clay films on peds; a stone-line consisting of 30 percent pebbles and 25 percent cobbles; slightly acid (pH 6.5); clear smooth boundary.

5Bt—42 to 52 inches; strong brown (7.5YR 5/6) loam, dark reddish brown (5YR 3/4) moist; few medium distinct manganese stains (5YR 2.5/1) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic, few very fine and fine roots; many very fine, few fine and medium tubular pores; common thin clay films on peds; 10 percent pebbles; slightly acid (pH 6.5); clear smooth boundary.

5CBt—52 to 62 inches; brown (7.5YR 4/4) saprolite, dark brown (7.5YR 3/4) moist; common medium distinct black manganese stains (5YR 2.5/1) moist; rock structure; crushes and textures to clay loam; slightly hard, firm, sticky and plastic; few very fine and fine roots; common very fine tubular pores; few thin clay films in pores; slightly acid (pH 6.5).

The thickness of the solum and depth to a paralithic contact ranges from 40 to 70 inches. The depth to the contact between the alluvial deposits the nonconforming residual material is 36 to 60 inches. The control section has a weighted average content of 20 to 27 percent clay and 25 to 35 percent rock fragments. Reaction is neutral or slightly acid. Base saturation ranges from 35 to 50 percent.

The A horizon dry color is 7.5YR 4/3, 4/4 or 4/6. Moist color is 7.5YR 3/4, 4/4; 5YR 3/3, 3/4 or 4/4. It is loam or sandy loam modified by 15 to 25 percent gravel. Layers with moist chroma of 3 are less than 7 inches thick.

The 3Bt and 4Bt horizons dry colors are 7.5YR 5/6 or 6/6. Moist colors are 7.5YR 3/4, 4/4, 6/6; 5YR 3/4 or 4/4. It is stratified with fine earth textures of loam with 20 to 27 percent clay modified by 15 to 60 percent rock fragments, mostly cobbles and gravel.

The 5Bt horizon dry color is 7.5YR 4/4, 4/6, 5/6 or 6/6. Moist color is 7.5YR 3/4, 4/4 or 5YR 3/4. It is loam with 20 to 27 percent clay and 0 to 15 percent gravel.

## WESTE SERIES

The Weste series consists of moderately deep, well drained soils on plateaus and mountain back slopes. These soils formed in material weathered from basalt, andesite and volcanic ash. Slopes range from 2 to 50 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

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

Typical pedon of Weste very gravelly sandy loam in an area of Redriver-Weste complex, 2 to 9 percent slopes; about 3 miles NE of Lake Almanor and about 3 miles N of HWY 36 near the Lassen National Forest boundary; about 2,000 feet N and 200 feet E of the SW corner of Section 24, T.29N., R.7E. Chester Quandrangle.

Oi—3 inches to 0; decomposed fir and pine needles, cones, twigs and 1 to 4 inch limbs; abrupt smooth boundary.

A—0 to 6 inches; reddish brown (5YR 4/3) very gravelly sandy loam, dark reddish brown (5YR 3/3) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine interstitial pores; 20 percent 2 to 5 mm pebbles; 20 percent 5 to 75 mm pebbles; sodium fluoride pH is 10.6; slightly acid (pH 6.5); clear wavy boundary.

BA—6 to 14 inches; red (2.5YR 5/6) very gravelly sandy loam, dark reddish brown (2.5YR 3/4) moist; weak very fine and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common coarse and very coarse roots; many very fine

interstitial pores; 20 percent 2 to 5 mm pebbles; 20 percent 5 to 75 mm pebbles; sodium fluoride pH is 9.6; slightly acid (pH 6.5).

2Bt—14 to 24 inches; yellowish red (5YR 5/6) very gravelly loam, dark reddish brown (5YR 3/4) moist; moderate fine and medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine medium and coarse roots; common very fine tubular pores; few thin clay films on peds and in pores; 10 percent cobbles; 40 percent pebbles; sodium fluoride pH is 9.0; slightly acid (pH 6.1); abrupt irregular boundary.

2R—24 to 30 inches; hard and slightly weathered massive basalt; few vertical fractures 4 to 9 inches apart; slightly weathered in a rind about 2 inches thick; some soil in fractures.

The thickness of solum and depth to bedrock is 20 to 40 inches.

The A horizon dry color is 5YR 4/3 or 7.5YR 4/2. Moist color is 5YR 3/2, 3/3 or 7.5YR 2/2. Texture is very gravelly, very bouldery or very stony sandy loam. Rock fragments range from 40 to 60 percent. Sodium fluoride pH ranges from 9.8 to 10.6.

The BA horizon dry color is 2.5YR 4/6, 5/6; 5YR 5/4 or 7.5YR 4/4. Moist color is 2.5YR 3/4 or 5YR 3/4. Rock fragments, mostly gravel, range from 40 to 60 percent. Sodium fluoride pH ranges from 9.2 to 9.6.

The 2Bt horizon dry color is 5YR 5/4, 5/6, 4/6 or 7.5YR 5/4. Moist color is 5YR 3/4 or 7.5YR 3/4. Texture is very gravelly or extremely cobbly loam with 20 to 25 percent clay and 50 to 70 percent rock fragments. Sodium fluoride pH ranges from 8.5 to 9.0.

## WHORLED SERIES

The Whorled series consists of moderately deep, well drained soils on mountains and plateaus. These soils formed in material weathered from basalt, andesite and volcanic ash. Slopes range from 2 to 30 percent.

Soils of the Whorled series are medial-skeletal, frigid Typic Vitrandepts.

Typical pedon of Whorled very gravelly sandy loam in an area of Whorled-Almanor complex, 15 to 30 percent slopes; about 7 miles NE of Chester and 5 miles N of HWY 36 near the Lassen National Forest boundary; (about 50 feet S and 100 feet W of the found W 1/16 corner on the N side of Sec. 18), about 1200 feet E and 50 feet S of NW corner of Sec. 18, T.29N., R.8E. Red Cinder Quandrangle.

Oi—3 inches to 0; fresh and highly decomposed fir and pine needles, twigs, cones and bark; abrupt smooth boundary.

A—0 to 5 inches; brown (10YR 4/3) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine, medium and coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; many very fine interstitial pores; 20 percent 2 to 5 mm pebbles; 30 percent 5 to 75 mm pebbles; sodium fluoride pH is 11.5; slightly acid (pH 6.5); clear wavy boundary.

Bw1—5 to 12 inches; yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine and medium and common coarse roots; many very fine interstitial pores; 15 percent cobbles; 20 percent 2 to 5 mm pebbles; 30 percent 5 to 75 mm pebbles; sodium fluoride pH is 11.0; slightly acid (pH 6.5); clear wavy boundary.

Bw2—12 to 27 inches; yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine interstitial pores; 20 percent cobbles; 50 percent pebbles; sodium fluoride pH is 10.5; slightly acid (pH 6.5); abrupt irregular boundary.

R—27 to 31 inches; hard massive basalt; many horizontal fractures in upper 3 inches; a few pockets 5 inches deep with very coarse roots in them and some soil material.

The thickness of solum and depth to bedrock commonly is 25 to 35 inches, but ranges from 20 to 40 inches. The control section from 10 inches to the lithic contact has a weighted average of 8 to 15 percent clay and 50 to 70 percent rock fragments, mostly gravel.

The A horizon dry color is 10YR 4/2 or 4/3 or 7.5YR 4/4. Moist color is 10YR 3/2 or 7.5YR 3/2. Rock fragments, mostly gravel, range from 45 to 55 percent. Sodium fluoride pH ranges from 10.5 to 11.5. Moist bulk density of the fine earth fraction ranges from 0.70 to 0.80 g/cc.

The Bw horizon dry color is 10YR 5/4, 6/5; 7.5YR 4/4, 5/4 or 5/6. Moist color is 10YR 3/4; 7.5YR 3/4 or 4/4. Sodium fluoride pH ranges from 10.0 to 11.0. It is very or extremely gravelly sandy loam with 50 to 70 percent rock fragments, mostly gravel. Moist bulk density of the fine earth fraction ranges from 0.80 to 0.85 g/cc.

## WOODWEST SERIES

The Woodwest series consists of shallow, somewhat excessively drained soils on plateaus. These soils formed in material weathered from basalt, andesite and volcanic ash. Slopes range from 0 to 5 percent. Mean annual precipitation is about 35 inches and the mean annual temperature is about 44 degrees F.

Soils of the Woodwest series are medial-skeletal, frigid Lithic Xerumbrepts.

Typical pedon of Woodwest very stony sandy loam in an area of Redriver-Woodwest-Wafla complex, 0 to 9 percent slopes; about 4 miles W of Westwood; about 0.5 miles N of the intersection of Swain Mountain Road and HWY 36 on Swain Mountain Road, 140 feet S of the point where the underground cable crosses the road, 60 feet W of road; 1,000 feet E and 100 feet S of the N 1/4 corner of Sec. 4, T.28N., R.8E. Westwood West Quandrangle.

The surface is covered with 15 percent stones, 10 percent cobbles and 35 percent pebbles.

A1—0 to 9 inches; dark brown (7.5YR 3/3) very stony sandy loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; common very fine, few fine and medium roots; many very fine interstitial pores; 10 percent cobbles and 30 percent pebbles; sodium fluoride pH is 11.0; slightly acid (pH 6.5); clear smooth boundary.

A2—9 to 14 inches; brown (7.5YR 4/4) extremely cobbly sandy loam, dark brown (7.5YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; few very fine, common fine and medium roots, many very fine interstitial pores, 30 percent cobbles and 30 percent pebbles; sodium fluoride pH is 10.4; slightly acid (pH 6.5); clear smooth boundary.

Bw—14 to 19 inches; strong brown (7.5YR 4/6) extremely gravelly sandy loam, brown (7.5YR 4/4) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; few very fine, fine and medium roots; many very fine interstitial pores; 15 percent cobbles and 55 percent pebbles; sodium fluoride pH is 10.4; slightly acid (pH 6.5); abrupt wavy boundary.

R—19 to 24 inches; fractured vesicular basalt with roots and soil in fractures.

The thickness of the solum and depth to bedrock ranges from 12 to 20 inches. Rock fragments on the surface range from 5 to 30 percent stones, 5 to 20 percent cobbles and 20 to 40 percent gravel. Sodium fluoride pH ranges from 10.0 to 11.0.

The A horizon dry color is 10YR 3/3, 3/4, 4/3, 4/4; 7.5YR 3/4 or 4/4, 3/3. Moist color is 10YR 2/2, 3/2; 7.5YR 3/2 or 3/3. It is sandy loam modified by 35 to 50 percent rock fragments.

The Bw horizon dry color is 7.5YR 4/4, 4/6 or 5YR 4/4. Moist color is 7.5YR 3/4, 4/4 or 5YR 3/4. It is sandy loam modified by 50 to 80 percent rock fragments and has 7 to 12 percent clay.

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# References

(1) Albright, Delmer L. 1980. An evaluation of the FMC tracked-skidder on Jackson State Forest. Calif. Dep. of Forestry, Calif. For. Note 79.

(2) California Soil Survey Committee. 1988. Erosion hazard rating computation for sheet and rill erosion. 9 pp. Unpublished.

(3) Dunning, Duncan. 1942. A site classification system for the mixed conifer selection forests of the Sierra Nevada. USDA Forest Serv. Calif. Forest and Range Exp. Sta., Forest Research Note 28. 21 pp.

(4) Haig, I. T. 1932. Second-growth yield, stand, and volume tables for the western white pine type. U.S. Dep. Agric. Tech. Bull. 323.

(5) McArdle, Richard E., Walter H. Meyer, and Donald Bruce. 1961. The yield of Douglas-fir in the Pacific Northwest. U.S. Dep. Agric. Tech. Bull. 201, 74 pp., illus.

(6) Meyer, Walter H. 1938. Yield of even-aged stands of ponderosa pine. U.S. Dep. Agric. Tech. Bull. 630.

(7) Schumacher, F. X. 1926. Normal yield tables for white fir. Calif. Agric. Exp. Sta. Bull. 407.

(8) Schumacher, F. X. 1928. Normal yield tables for red fir. Calif. Agric. Exp. Sta. Bull. 456.

(9) State of California, Resources Agency, Department of Forestry [and Fire Protection]. 1954. Field manual, Soil-Vegetation Surveys in California. 193 pp. [rev. 1980, vegetation mapping section rev. 1986].

(10) State of California, Resources Agency, Department of Forestry [and Fire Protection]. 1985. Forest Practice Rules, Northern Forest District. 98 pp.

(11) United States Department of Agriculture. 1983. National Soils Handbook. 763 pp. [Includes California supplement to the National Soils Handbook]

(12) United States Department of Agriculture. 1951. Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp.' illus. [Chapters 1-7, 9-12 reissued 1979-1985]

(13) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Conserv. Serv., U.S. Dep. Agric. Handb. 436, 754 pp., illus.

(14) Wells, Carol G., R.E. Campbell. L.F. Debano, C.E. Lewis, R.L. Fredriksen, E.C. Franklin, R.C. Froelich, and P.H. Dunn. 1979. Fire on Soil – a state-of-knowledge review. U.S. For. Serv. General Technical Report WO-7.

(15) Wensel, Lee C. and Greg S. Biging. 1984. Site index equations for young-growth mixed conifers of northern California. Univ. Calif. Berkeley, Dep. Forestry and Resource Mang., No. Calif. Forest Yield Coop., Research Note 8.

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# Glossary

**Alluvial fan.** A dynamic body of alluvium, with or without debris flow deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley into a plain.Common longitudinal profiles are gently sloping and nearly linear. Shallow braided channels, form a radial network. Subject to sheet flooding associated with major storm events. Source uplands range in relief and areal extent from mountain slopes and plateaus to gullied terrains on hill slopes and terraces.

**Alluvium.** Material, such as sand, silt, or clay, deposited on land by streams.

**Available water capacity (AWC).** 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-

| | Inches |
|---|---|
| Very low | 0 to 3 |
| Low | 3 to 6 |
| Moderate | 6 to 9 |
| High | 9 to 12 |
| Very high | More than 12 |

**Back slope.** The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Backslopes 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.

**Basin.** A broad structural lowland, commonly elongated and many miles across, between mountain ranges.

**Bedrock.** The solid rock that underlines 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.

**Browse value.** The over-all value of a particular plant species for use as browse forage by horses, cattle, sheep, and deer. Relative ratings range from very low through very high.

**Canopy.** The leafy crown of trees or shrubs.

**Coarse fragments.** Mineral or rock particles larger than 2 millimeters in diameter.

**Colluvium.** Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

**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.

**Cover class.** See vegetation cover class.

**Crown.** The upper part of a tree or shrub, including the living branches and their foliage.

**Drainage class (natural).** Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

*Excessively drained* - These soils have very high and high hydraulic conductivity and low water holding capacity. They are not suited to crop production unless irrigated.

*Somewhat excessively drained* - These soils have high hydraulic conductivity and low water holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

*Well drained* - These soils have intermediate water holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

*Moderately well drained* - These soils are wet close enough to the surface or long enough that

planting or harvesting operations or yields of some field crops are adversely affected unless artificial drainage is provided. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

*Somewhat poorly drained* - These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless artificial drainage is provided. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet seepage, or a combination of these.

*Poorly drained* - These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

*Very poorly drained* - These soils are wet to the surface most of the time. They are wet enough to prevent the growth of important crops (except rice) unless artificially drained.

**Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

**Foothill.** A steeply sloping upland that has relief of as much as 1,000 feet (or 300 meters) and fringes a mountain range or high-plateau escarpment.

**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.

**Ground water (geology).** Water filling all the unblocked pores of underlying material below the water table

**Growth habit.** The general growth form (tree, shrub, etc.) of a particular plant as it was observed in the survey area.

**Hard Rock.** Rock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

**Horizon, soil.** A layer of soil, approximately parallel to the surface

**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.

**Loam.** Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles

**Metamorphic rock.** Rock of any other origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all rocks are crystalline.

**Mottling, soil.** Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. 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 and considerable bare - rock surface. A mountain can occur as a single isolated mass or in a group forming a chain or range.

**Parent material.** The unconsolidated organic and mineral material in which soil forms.

**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 about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

**Permeability.** The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

| | |
|---|---|
| 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. For example, slope, stoniness and thickness.

**pH value.** A numerical designation of acidity and alkalinity in soil.

**Plateaus.** An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 m) above adjacent lowlands and is separated from them on one or more sides by escarpments. A comparatively large part of a plateau surface is near summit level.

**Plots (type-acre sampling plots).** A detailed soil profile description and intensive vegetative inventory are made at sites chosen to represent the more extensive combinations of soil and vegetation mapped. This information is used to develop table 2.

**Ponding.** Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

**Potential rooting depth (effective rooting depth).** Depth in 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.

**Profile, soil.** A vertical section of the soil extending through all its horizons and into the parent material.

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 degree of acidity or alkaline is expressed as -

| | pH |
|---|---|
| Extremely acid | below 4.5 |
| Very strongly acid | 4.5 to 5.0 |
| Strongly acid | 5.1 to 5.5 |
| Medium 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 |

**Ridges.** A long, narrow elevation of the land surface, usually sharp crested with steep sides and forming an extended upland between valleys. The term is used in areas of both hills and mountains relief. (less and greater than 300 m)

**Rill.** A steep side channel resulting from accelerated erosion; generally only a few inches deep.

**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.

**Rooting depth (in tables).** Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

**Runoff.** The precipitation discharge 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 the surface streams is called ground - water runoff or seepage flow from ground water.

**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 mass of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

**Series, soil.** A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

**Site classes.** A grouping of site indexes into 5 to 7 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 trees for the 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 the dominant trees that are 50 years old or are 50 years old at breast height.

**Site curve (100 years).** A set of related curves on a graph that show the average height of dominant and the co-dominant 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 the dominate 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 co-dominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

**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

**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.

**Stones.** Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 6 to 15 inches (15 to 38 centimeters) in length if flat.

**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 grained (each grain by itself, as in dune sand) or massive (the particles adhering without any regular cleavage, as in many hardpans).

**Subsoil.** Technically, the B horizon; roughly, the part of the solum below the plow depth.

**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.

**Surface layer.** The soil ordinarily move 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 A horizon

**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, silt loam, silt, sandy 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".

**Toe slope.** The outermost inclined surface at the base of a hill

**Topography.** The relative positions and elevations of the natural or man-made features of an area that describe the configuration'on its surface.

**Vegetation Cover Class.** As defined for soil vegetation mapping; percent of total woody vegetation (all trees and shrubs) exposed to the open sky as viewed from above.

**Vegetation Inventory Plot.** An approximately one square acre site selected to represent the more extensive (or sometimes unusual) combinations of soil and vegetation. A detailed soil profile description and intensive vegetation inventory are collected.

**Vegetation symbols.** As used in the Soil Vegetation Survey; Usually the first letter of the genus and the first one or two letters of the species, in combination, to represent a particular genus, species or variety of plant. Some symbols such as the Caret ^, underline _ or overline ¯ are also used.

**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.

# Appendix – Erosion Hazard Ratings

Erosion hazard, or the susceptibility of the soil to erosion, is the potential inherent in the soil itself to erode if the forces that cause erosion are applied to an area that is not adequately protected.

The erosion hazard ratings given in this report indicate the possibility of future accelerated erosion by water and refer to sheet and rill erosion only; the hazards of water erosion by other processes (i.e. gully or mass movement) are not included.

This method differs from the one specified in the California Forest Practice Act (FPA) rules (10). However, information contained here (soil texture, coarse fragments, permeability, and depth) could be used to develop ratings using the FPA method. Because the soil properties described in this report are for the central concept of the named soil, and some local variation is expected, the information should be confirmed through on-site investigation when developing erosion hazard ratings for Timber Harvest Plans required under the Forest Practice Act.

The ratings are intended to be used as a guide; they are not absolute. The ratings are provided to assist land managers in planning and evaluating management practices. A high rating, for example, would alert the report user to the likelihood for water erosion problems on the stated soil under certain site and management conditions; the user should carefully consider soil erodibility when evaluating management practice options, and might want to further investigate on-site conditions prior to finalizing decisions.

Ratings are given in the soil map unit descriptions ("Detailed Soil Map Units" section) and were determined using a method developed by the California Soil Survey Committee (2). Criteria used include (a) bare soil conditions; (b) the central concept of the named soil's properties (texture, aggregate stability, infiltration, permeability, and depth) as it occurs within the named map unit throughout the survey; (c) climatic characteristics for the survey area; (d) the mid-point of slope range for the map unit; (e) a slope length of 50 feet. If needed, a given rating could be adjusted by the user to actual on-site conditions for cover and slope using the same rating method (contact the Soil-Vegetation Survey headquarters for a more detailed description of the rating criteria).

An estimate of the organic soil cover necessary to reduce the erosion hazard rating to low is also given in the soil map unit descriptions. The term "organic soil cover" as used here includes duff, slash, grasses and low growing shrubs.

The adjective ratings given within this report indicate the degree of sheet and rill erosion hazard limitations to be considered in management, as follows:

Low – Accelerated erosion is not likely to occur following disturbance, except in the upper part of the Low EHR numerical range, or during periods of above average storm occurrence. If accelerated erosion does occur, adverse effects on soil productivity and to nearby water quality are not expected.

Erosion control measures are *usually* not needed in these areas.

*Moderate* – Accelerated erosion is likely to occur following disturbance in most years. Adverse effects on soil productivity (especially to shallow and moderately deep soils) and to nearby water quality may occur for the upper part of the Moderate EHR numerical range, or during periods of above average storm occurrence.

The need for erosion control should be evaluated for these areas. A wide selection of measures and application methods are available.

*High* – Accelerated erosion will occur following disturbance in most years. Adverse effects on soil productivity (especially to shallow and moderately deep soils) and to nearby water quality are likely to occur, especially during periods of above average storm occurrence.

Erosion control is necessary for these areas to prevent accelerated erosion. The selection of measures and methods of application are somewhat limited.

Very High – Accelerated erosion will occur following disturbance in most years. Adverse effects on soil productivity and to nearby water quality are very likely to occur, even during periods of below average storm occurrence.

Erosion control is essential for these areas to prevent accelerated erosion. The selection of measures and methods of application are limited.

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# Tables

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TABLE 1. INDEX TO VEGETATION MAPPING SYMBOLS -- PLANT NAMES AND SELECTED PLANT CHARACTERISTICS. Quad 34A-4

| Map symbol | Common name | Scientific name | Growth habit | Sprout nature 1/ | Browse value 2/ H | C | S | G | D |
|---|---|---|---|---|---|---|---|---|---|
| Aa | Western serviceberry | Amelanchier pallida | Shrub | S | 3-4 | 2-3 | 2-3 | 2 | 2-3 |
| An | Pinemat manzanita | Arctostaphylos nevadensis | Shrub | S | 5 | 5 | 4-5 | 4-5 | 4-5 |
| Ap | Greenleaf manzanita | Arctostaphylos patula patula | Shrub | S | 5 | 5 | 4-5 | 4-5 | 3-4 |
| Atv | Mountain big sagebrush | Artemisia tridentata vaseyana | Shrub | N | 5 | 4-5 | 3-4 | 3-4 | 2-3 |
| B | California black oak | Quercus kelloggii kelloggii | Tree | S | 4-5 | 2-4 | 3-4 | 3-4 | 1-2 |
| Ba | Bare ground, particles | < 2 mm. | -- | -- | -- | -- | -- | -- | -- |
| Cco | Mountain whitethorn | Ceanothus cordulatus | Shrub | S,N | 5 | 4 | 3 | 2-3 | 1-2 |
| Chv | Sticky-leaf rabbitbrush | Chrysothamnus viscidiflorus viscidiflorus | Shrub | S,N | 4-5 | 4-5 | 4-5 | 4 | 3-4 |
| Chx | Rabbitbrush | Chrysothamnus species | Shrub | S,N | 5 | 5 | 4-5 | 4 | 3-4 |
| Cno | Rubber rabbitbrush | Chrysothamnus nauseosus albicaulis | Shrub | N | 5 | 5 | 4 | 4 | 3-4 |
| Cpo | Squaw carpet | Ceanothus prostratus prostratus | Shrub | N | 5 | 5 | 4-5 | 3-4 | 2-4 |
| Cs | Bush chinquapin | Chrysolepis sempervirens | Shrub | S | 5 | 5 | 4-5 | 4-5 | 4-5 |
| Cv | Snowbrush | Ceanothus velutinus velutinus | Shrub | S | 5 | 5 | 4 | 3-4 | 3 |
| D | Douglas-fir | Pseudotsuga menziesii | Tree | N | 5 | 5 | 4-5 | 4-5 | 4-5 |
| Grp | Perennial grasses and | herbs | -- | -- | -- | -- | -- | -- | -- |
| I | Incense-cedar | Calocedrus decurrens | Tree | N | 5 | 4-5 | 4-5 | 3-5 | 3-5 |
| J | Jeffrey pine | Pinus jeffreyi | Tree | N | 5 | 5 | 5 | 4-5 | 4-5 |
| J-P | Jeffrey pine, planted | Pinus jeffreyi plantation | | | | | | | |
| J-Y | Jeffrey and Ponderosa pines | Pinus jeffreyi & P. ponderosa not mapped separately | | | | | | | |
| L | Lodgepole pine | Pinus murrayana | Tree | N | 5 | 5 | 4-5 | 4-5 | 4-5 |
| Lr | Litter-covered ground | | -- | -- | -- | -- | -- | -- | -- |
| Md | Wet meadow | | -- | -- | -- | -- | -- | -- | -- |
| Pe | Bitter cherry | Prunus emarginata | Shrub | S | 5 | 3 | 3-4 | 3 | 1-2 |
| Pt | Antelope bitterbrush | Purshia tridentata | Shrub | S,N | 2-3 | 2-3 | 1 | 1-2 | 1 |

TABLE 1 (continued) Quad 34A-4

| Map symbol | Common name | Scientific name | Growth habit | Sprout nature 1/ | Browse value 2/ H | C | S | G | D |
|---|---|---|---|---|---|---|---|---|---|
| Pvm | Black choke-cherry | Prunus virginiana melanocarpa | Shrub | S | 4-5 | 2-4 | 3-4 | 3-4 | 1-2 |
| Qv | Huckleberry oak | Quercus vaccinifolia | Shrub | S | 5 | 4-5 | 4-5 | 4-5 | 3-4 |
| R̂ | California red fir | Abies magnifica | Tree | N | 5 | 4-5 | 4-5 | 3-5 | 3-5 |
| Rk | Rock and gravels, | particles > 2 mm. | -- | -- | -- | -- | -- | -- | -- |
| Rr | Sierra gooseberry | Ribes roezlii roezlii | Shrub | S,N | 4-5 | 4 | 3 | 3 | 3-5 |
| S | Sugar pine | Pinus lambertiana | Tree | N | 5 | 5 | 4-5 | 4-5 | 4-5 |
| Scu | Spreading snowberry | Symphoricarpos acutus | Vine | U | 4 | 3-4 | 2-3 | 2-3 | 3-4 |
| Sx | Willow | Salix species | Shrub, tree | S | 5 | 4-5 | 3-4 | 3-4 | 2-3 |
| Ui | Urban/industrial areas | (vegetation not mapped) | -- | -- | -- | -- | -- | -- | -- |
| Ŵ | White fir | Abies concolor | Tree | N | 5 | 4-5 | 4-5 | 3-5 | 3-5 |
| Ŵ-P | White fir, planted | Abies concolor plantation | | | | | | | |
| Xl | Lemmon's willow | Salix lemmonii | Shrub | S | 5 | 4 | 4 | 3 | 3 |
| Y | Ponderosa pine | Pinus ponderosa | Tree | N | 5 | 5 | 4-5 | 4-5 | 4-5 |
| Y-P | Ponderosa pine, planted | Pinus ponderosa plantation | | | | | | | |

1/ Sprouting nature:

S = normally sprouts after top is killed by fire.
N = normally will not sprout after top is killed by fire (in absence of fire, some of these species will stump-sprout after cutting).
S,N = sprouts after fire in some cases and is completely killed in others.
U = sprouting nature unknown.

2/ Browse value overall ratings, including sprouts after burning or cutting:

H = horses
C = cattle
S = sheep
G = goats
D = deer

1 = very high
2 = high
3 = medium
4 = low
5 = very low

TABLE 2. PLANT SPECIES RECORDED FOR THE QUADRANGLE. Quad 34A-4

| Scientific name | Common name | Occurrence type 1/ |
|---|---|---|
| **ANNUAL GRASSES AND GRASS-LIKE PLANTS** | | |
| Bromus carinatus | California brome | P |
| Deschampsia danthonioides | Annual hairgrass | P |
| **PERENNIAL GRASSES AND GRASS-LIKE PLANTS** | | |
| Bromus orcuttianus | Orcutt brome | P |
| Carex multicaulis | Many-stem sedge | P |
| Carex rossii | Ross's sedge | P |
| Danthonia unispicata | One-spike oatgrass | P |
| Deschampsia elongata | Slender hairgrass | P |
| Elymus glaucus glaucus | Blue wildrye | P |
| Festuca idahoensis | Idaho fescue | P |
| Festuca occidentalis | Western fescue | P |
| Juncus balticus balticus | Baltic rush; wire-grass | P |
| Melica species | Melic, oniongrass | P |
| Melica aristata | Awned melic | P |
| Poa species | Perennial bluegrass | P |
| Sitanion hystrix | Squirreltail | P |
| Stipa californica | California stipa | P |
| Stipa lemmonii | Lemmon stipa | P |
| Stipa nevadensis | Nevada needlegrass | P |
| Stipa occidentalis | Western stipa | P |
| Trisetum canescens | Tall trisetum | P |
| **ANNUAL FORBS** | | |
| Arenaria species | Sandwort | P |
| Cirsium vulgare | Bull thistle | P |
| Claytonia perfoliata | Miners lettuce | P |
| Collinsia parviflora | Small-flower blue-eyed Mary | P |
| Cryptantha species | Annual cryptantha | P |
| Cryptantha affinis | Cryptantha | P |
| Erysimum capitatum | Western wallflower | P |
| Gayophytum diffusum parviflorum | | P |
| Lotus purshianus | Spanish clover | P |
| Moss and moss-like plants | Moss and moss-like plants | P |
| Navarretia divaricata vividior | Navarretia | P |
| Plagiobothrys hispidus | | O |
| **PERENNIAL FORBS** | | |
| Achillea millefolium lanulosa | Mountain yarrow | P |
| Adenocaulon bicolor | Trail plant | P |

TABLE 2 (continued) Quad 34A-4

| Scientific name | Common name | Occurrence type 1/ |
|---|---|---|
| Agoseris retrorsa | Spear-leaf mountain dandelion | P |
| Allium species | Onion | P |
| Antennaria argentea | Everlasting | P |
| Apocynum pumilum | Mountain hemp | P |
| Arnica species | | P |
| Calystegia species | Wild morning-glory | P |
| Chimaphila menziesii | Pipsissewa | P |
| Chimaphila umbellata occidentalis | Prince's pine | P |
| Cirsium foliosum | Dwarf thistle | P |
| Fragaria vesca californica | Wood strawberry | P |
| Frasera albicaulis nitida | Shining frasera | P |
| Hackelia californica | California stickseed | P |
| Hieracium albiflorum | White-flower hawkweed | P |
| Hieracium cynoglossoides | Houndstongue hawkweed | P |
| Horkelia tridentata | Three-tooth horkelia | P |
| Hydrophyllum occidentale | California waterleaf | P |
| Kelloggia galioides | Kelloggia | P |
| Machaeranthera canescens | | P |
| Monardella odoratissima pallida | Mountain mint | P |
| Osmorniza chilensis | Mountain sweet-cicely | P |
| Pedicularis densiflora | Indian warrior | P |
| Pedicularis semibarbata | Pine lousewort | P |
| Penstemon species | Penstemon | P |
| Perideridia species | Biscuit root | P |
| Potentilla glandulosa nevadensis | | P |
| Pteridium aquilinum pubescens | Bracken fern | P |
| Pterospora andromedea | Pine drops | P |
| Pyrola picta dentata | Green-vein shinleaf | P |
| Pyrola picta picta | White-vein shinleaf | P |
| Ranunculus occidentalis eisenii | Western buttercup | P |
| Sanicula species | Sanicle | P |
| Senecio aronicoides | California groundsel | P |
| Silene species | Silene, campion | P |
| Smilacina racemosa amplexicaulis | Fat solomon | P |
| Stephanomeria lactucina | Forest stephanomeria | P |
| Wyethia mollis | Mountain mule ears | P |
| SHRUBS | | |
| Amelanchier pallida | Western serviceberry | M,P |
| Arctostaphylos nevadensis | Pinemat manzanita | M,P |
| Arctostaphylos patula patula | Greenleaf manzanita | M,P |
| Artemisia tridentata vaseyana | Mountain big sagebrush | M |

TABLE 2 (continued) Quad 34A-4

| Scientific name | Common name | Occurrence type 1/ |
|---|---|---|
| Ceanothus cordulatus | Mountain whitethorn | M,P |
| Ceanothus prostratus prostratus | Squaw carpet | M,P |
| Ceanothus velutinus velutinus | Snowbrush | M,P |
| Chrysolepis sempervirens | Bush chinquapin | M,P |
| Chrysothamnus species | Rabbitbrush | M |
| Chrysothamnus nauseosus albicaulis | Rubber rabbitbrush | M,P |
| Chrysothamnus viscidiflorus viscidiflorus | Sticky-leaf rabbitbrush | M |
| Haplopappus bloomeri | Bloomer goldenbush | P |
| Penstemon species | Penstemon | P |
| Prunus emarginata | Bitter cherry | M,P |
| Prunus virginiana melanocarpa | Black choke-cherry | M |
| Purshia tridentata | Antelope bitterbrush | M |
| Quercus vaccinifolia | Huckleberry oak | M,P |
| Ribes roezlii roezlii | Sierra gooseberry | M,P |
| Ribes viscosissimum viscosissimum | Sticky flowering currant | P |
| Rosa pinetorum | Pine rose | P |
| Rubus parviflorus | Western thimbleberry | P |
| Salix lemmonii | Lemmon's willow | M |
| Symphoricarpos acutus | Spreading snowberry | M,P |
| TREES | | |
| Abies concolor | White fir | M,P |
| Abies magnifica | California red fir | M,P |
| Calocedrus decurrens | Incense-cedar | M,P |
| Pinus jeffreyi | Jeffrey pine | M,P |
| Pinus lambertiana | Sugar pine | M,P |
| Pinus murrayana | Lodgepole pine | M,P |
| Pinus ponderosa | Ponderosa pine | P |
| Pseudotsuga menziesii | Douglas-fir | M,P |
| Quercus kelloggii kelloggii | California black oak | M |
| Salix species | Willow | M |

1/ The manner in which the presence of a plant was documented in the quadrangle:

M = mapped in one or more delineations.
P = inventoried on one or more plots.
O = observed only.

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## TABLE3: WOODLAND INTERPRETATION TABLE [1/]
## SOIL AND VEGETATION SURVEY
## WESTWOOD WEST 7.5 MINUTE QUADRANGLE (34A-4)

| MAP SYMBOL AND SOIL NAME(S) | DUNNING SITE CLASS | POTENTIAL PRODUCTIVITY | | | SEEDLING MORTALITY | PLANT COMPETITION | DIFFICULTY OF REVEGETATING EXPOSED SUBSOIL WITH | | EQUIPMENT LIMITATION | DAMAGE TO SOIL BY FIRE | COMPACTION HAZARD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | COMMONLY GROWN TREES | SITE INDEX [2/] | SITE RANGE | | | GRASSES | TREES | | | |
| 405-Baileycreek-Weste complex, 5 to 15 percent slopes | | | | | | | | | | | |
| Baileycreek part | I | Jeffrey pine, white fir, sugar pine | 112 pije | 105-118 | moderate | moderate | slight | moderate | slight | slight | slight |
| Weste part | II | Jeffrey pine, white fir, sugar pine | 101 pije<br>53 abco | 87 -115<br>49 -57 | moderate | moderate | moderate | severe | slight | moderate | slight |
| 406-Baileycreek-Weste complex, 15 to 30 percent slopes | | | | | | | | | | | |
| Baileycreek part | I | Jeffrey pine, white fir | 112 pije | 105-118 | moderate | moderate | slight | moderate | moderate | slight | slight |
| Weste part | II | Jeffrey pine, white fir, sugar pine | 101 pije<br>53 abco | 87 -115<br>49 -57 | moderate | moderate | moderate | severe | moderate | moderate | slight |
| 480-Redriver-Weste complex, 2 to 9 percent slopes | | | | | | | | | | | |
| Redriver part | II | Jeffrey pine, white fir, incense cedar | 100 pije<br>51 abco | 87 -110<br>47 -56 | severe | slight | moderate | moderate | slight | moderate | slight |
| Weste part | II | Jeffrey pine, white fir, sugar pine | 101 pije<br>53 abco | 87 -115<br>49 -57 | moderate | moderate | moderate | severe | slight | moderate | slight |

*See footnotes at end of table.

## TABLE 3: WOODLAND INTERPRETATION TABLE 1/ -- CONTINUED

| MAP SYMBOL AND SOIL NAME(S) | DUNNING SITE CLASS | POTENTIAL PRODUCTIVITY | | | SEEDLING MORTALITY | PLANT COMPETITION | DIFFICULTY OF REVEGETATING EXPOSED SUBSOIL WITH | | EQUIPMENT LIMITATION | DAMAGE TO SOIL BY FIRE | COMPACTION HAZARD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | COMMONLY GROWN TREES | SITE INDEX 2/ | SITE RANGE | | | GRASSES | TREES | | | |
| 482-Redriver-Woodwest-Wafla complex, 0 to 9 percent slopes | | | | | | | | | | | |
| Redriver part | II | Jeffrey pine, white fir, incense cedar | 85 pije | 81 -90 | severe | slight | moderate | severe | slight | slight | moderate |
| Woodwest part | III | Jeffrey pine, white fir | 78 pije | 72 -85 | severe | slight | severe | severe | moderate | moderate | slight |
| Wafla part | II | Jeffrey pine, ponderosa pine, white fir | 104 pije | 102-108 | moderate | moderate | slight | slight | slight | slight | moderate |
| 483-Tahoma-Swainow-Almanor complex, 2 to 15 percent slopes | | | | | | | | | | | |
| Tahoma part | II | white fir, California red fir, Jeffrey pine | 60 abco<br>107 pije | 56 -64<br>102-112 | moderate | moderate | slight | slight | slight | slight | moderate |
| Swainow part | II | white fir, Jeffrey pine, sugar pine | 63 abco<br>94 pije | 60 -66<br>78 -91 | moderate | moderate | slight | moderate | slight | slight | moderate |
| Almanor part | II | white fir, Jeffrey pine, sugar pine, incense cedar | 61 abco<br>83 pije | 52 -70<br>76 -90 | moderate | moderate | moderate | severe | slight | moderate | slight |

*See footnotes at end of table

## TABLE 3: WOODLAND INTERPRETATION TABLE 1/ -- CONTINUED

| MAP SYMBOL AND SOIL NAME(S) | DUNNING SITE CLASS | POTENTIAL PRODUCTIVITY | | | SEEDLING MORTALITY | PLANT COMPETITION | DIFFICULTY OF REVEGETATING EXPOSED SUBSOIL WITH | | EQUIPMENT LIMITATION | DAMAGE TO SOIL BY FIRE | COMPACTION HAZARD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | COMMONLY GROWN TREES | SITE INDEX 2/ | SITE RANGE | | | GRASSES | TREES | | | |
| 485-Almanor-Whorled-Inville complex, 0 to 15 percent slopes | | | | | | | | | | | |
| Almanor part | II | white fir, Jeffrey pine, sugar pine, incense cedar | 61 abco<br>83 pije | 52 -70<br>76 -90 | moderate | moderate | moderate | severe | slight | moderate | slight |
| Whorled part | II | white fir, Jeffrey pine | 60 abco | 56 -66 | severe | slight | severe | severe | slight | moderate | slight |
| Inville part | II | Jeffrey pine, ponderosa pine | 90 pije | 83 -100 | moderate | moderate | moderate | severe | slight | slight | slight |
| 486-Whorled-Almanor complex, 15 to 30 percent slopes | | | | | | | | | | | |
| Whorled part | II | white fir, Jeffrey pine | 60 abco | 56 -66 | severe | slight | severe | severe | slight | moderate | slight |
| Almanor part | II | white fir, Jeffrey pine, sugar pine, incense cedar | 61 abco<br>83 pije | 52 -70<br>76 -90 | moderate | moderate | moderate | severe | slight | moderate | slight |
| 487-Swainow-Almanor complex, 15 to 30 percent slopes | | | | | | | | | | | |
| Swainow part | II | Jeffrey pine, white fir, sugar pine | 94 pije<br>63 abco | 78 -91<br>60 -66 | moderate | moderate | slight | moderate | moderate | moderate | slight |
| Almanor part | II | white fir, Jeffrey pine, sugar pine, incense cedar | 61 abco<br>83 pije | 52 -70<br>76 -90 | moderate | moderate | moderate | severe | moderate | moderate | slight |

*See footnotes at end of table

## TABLE 3: WOODLAND INTERPRETATION TABLE 1/ -- CONTINUED

| MAP SYMBOL AND SOIL NAME(S) | DUNNING SITE CLASS | POTENTIAL PRODUCTIVITY | | | SEEDLING MORTALITY | PLANT COMPETITION | DIFFICULTY OF REVEGETATING EXPOSED SUBSOIL WITH | | EQUIPMENT LIMITATION | DAMAGE TO SOIL BY FIRE | COMPACTION HAZARD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | COMMONLY GROWN TREES | SITE INDEX 2/ | SITE RANGE | | | GRASSES | TREES | | | |
| 490-Inville very gravelly sandy loam, 0 to 2 percent slopes | | | | | | | | | | | |
| Inville part | II | Jeffrey pine, lodgepole pine, ponderosa pine | 90 pije | 83 -100 | moderate | moderate | moderate | moderate | slight | slight | slight |
| 491-Swainow-Almanor-Tahoma complex, altered, 2 to 30 percent slopes | | | | | | | | | | | |
| Swainow part 2 | II | Jeffrey pine, white fir, sugar pine | | | moderate | moderate | slight | moderate | slight | moderate | slight |
| Almanor part 2 | II | white fir, Jeffrey pine, sugar pine incense cedar | | | moderate | moderate | slight | moderate | moderate | moderate | slight |
| Tahoma part 2 | II | white fir Jeffrey pine | | | moderate | moderate | slight | slight | slight | slight | slight |
| 728-Penstock-Deadwood -Rock outcrop complex, 30 to 50 | | | | | | | | | | | |
| Penstock part | II | Douglas fir, white fir, Jeffrey pine | 92 psme<br>58 abco<br>87 pije | 80 -110<br>52 -67<br>80 -97 | moderate | moderate | slight | moderate | moderate | moderate | slight |
| Deadwood part | IV | Jeffrey pine, white fir, sugar pine, Douglas fir, | 64 pije | 58 -74 | severe | slight | moderate | severe | moderate | moderate | slight |

*See footnotes at end of table

## TABLE 3: WOODLAND INTERPRETATION TABLE [1/] -- CONTINUED

| MAP SYMBOL AND SOIL NAME(S) | DUNNING SITE CLASS | POTENTIAL PRODUCTIVITY | | | SEEDLING MORTALITY | PLANT COMPETITION | DIFFICULTY OF REVEGETATING EXPOSED SUBSOIL WITH | | EQUIPMENT LIMITATION | DAMAGE TO SOIL BY FIRE | COMPACTION HAZARD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | COMMONLY GROWN TREES | SITE INDEX [2/] | SITE RANGE | | | GRASSES | TREES | | | |
| 770-Penstock-Scaribou complex, 5 to 30 percent slopes | | | | | | | | | | | |
| Penstock part | II | Douglas fir, white fir, Jeffrey pine | 92 psme<br>58 abco<br>87 pije | 80 -110<br>52 -67<br>80 -97 | moderate | moderate | slight | slight | slight | slight | moderate |
| Scaribou part | II | white fir, Douglas fir, Jeffrey pine | 57 abco<br>102 psme<br>96 pije | 53 -65<br>97 -112<br>88 -107 | moderate | moderate | moderate | moderate | slight | slight | moderate |
| 771-Penstock-Scaribou complex, 30 to 50 percent slopes | | | | | | | | | | | |
| Penstock part | II | Douglas fir, white fir, Jeffrey pine | 92 psme<br>58 abco<br>87 pije | 80 -110<br>52 -67<br>80 -97 | moderate | moderate | slight | moderate | moderate | slight | moderate |
| Scaribou part | II | white fir, Jeffrey pine, Douglas fir | 57 abco<br>102 psme<br>96 pije | 53 -65<br>97 -112<br>88 -107 | moderate | moderate | moderate | severe | moderate | moderate | moderate |
| 772-Scaribou-Penstock -Rock outcrop complex, 50 to 75 percent slopes | | | | | | | | | | | |
| Scaribou part | II | white fir, Douglas fir, Jeffrey pine | 57 abco<br>102 psme<br>96 pije | 53 -65<br>97 -112<br>88 -107 | moderate | moderate | moderate | severe | severe | severe | slight |
| Penstock part | II | Douglas fir, white fir, Jeffrey pine | 92 psme<br>58 abco<br>87 pije | 80 -110<br>52 -67<br>80 -97 | moderate | moderate | slight | moderate | severe | moderate | slight |

*See footnotes at end of table

## TABLE 3: WOODLAND INTERPRETATION TABLE 1/ -- CONTINUED

| MAP SYMBOL AND SOIL NAME(S) | DUNNING SITE CLASS | POTENTIAL PRODUCTIVITY | | | SEEDLING MORTALITY | PLANT COMPETITION | DIFFICULTY OF REVEGETATING EXPOSED SUBSOIL WITH | | EQUIPMENT LIMITATION | DAMAGE TO SOIL BY FIRE | COMPACTION HAZARD |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | COMMONLY GROWN TREES | SITE INDEX 2/ | SITE RANGE | | | GRASSES | TREES | | | |
| 777-Hangtown very cobbly sandy loam, 30 to 50 percent slopes | | | | | | | | | | | |
| Hangtown part | III | California red fir, Douglas fir, sugar pine | 50 abma | 50 -54 | severe | slight | slight | moderate | moderate | moderate | slight |

1/ The interpretative ratings given in this table are intended to be used as a guide to assist in planning and evaluating land management practice options. They are not absolute. They are not intended to substitute for on-site investigation where detailed site-specific information is needed.

2/ Jeffrey and ponderosa pine site indices are based on the 100-year base age curves from Meyer (1938). Douglas-fir site indices are from 100-year base age curves by McArdle & Meyer (1961). White fir and California red fir site indices are from 50-year base age curves by Schumacher (1926 and 1928 respectively). Western white pine site indices are from 100-year base age curves by Haig (1932).

3/ These map units are altered. See map unit description for explanation.

TABLE 4 – SOIL SERIES CLASSIFICATION

WESTWOOD WEST 7.5-MINUTE QUADRANGLE 34A-4

| SOIL NAME | FAMILY |
|---|---|
| Almanor | Typic Vitrandepts, medial-skeletal, frigid |
| Baileycreek | Ultic Haploxeralfs, loamy-skeletal, mixed, frigid |
| Deadwood | Dystric Lithic Xerochrepts, loamy-skeletal, mixed, mesic |
| Hangtown | Dystric Xerochrepts, loamy-skeletal, mixed, frigid |
| Inville | Ultic Haploxeralfs, loamy-skeletal, mixed, frigid |
| Mountmed | Typic Haplaquolls, fine, montmorillonitic, frigid |
| Penstock | Ultic Palexeralfs, loamy-skeletal, mixed, frigid |
| Redriver | Andic Xerochrepts, loamy-skeletal, mixed, frigid |
| Scaribou | Ultic Palexeralfs, loamy-skeletal, mixed, frigid |
| Swainow | Ultic Haploxeralfs, loamy-skeletal, mixed, frigid |
| Tahoma | Ultic Haploxeralfs, fine-loamy, mixed, frigid |
| Wafla | Ultic Haploxeralfs, fine-loamy, mixed, frigid |
| Weste | Ultic Haploxeralfs loamy-skeletal, mixed, frigid |
| Whorled | Typic Vitrandepts, medial-skeletal, frigid |
| Woodwest | Lithic Xerumbrepts, medial-skeletal, frigid |

## RESOURCE CONSERVATION DISTRICTS BENEFITING FROM THE WORK OF THE SOIL VEGETATION SURVEY

Central Modoc
Colusa County
East Lake
El Dorado County
Fall River
Georgetown-Divide
Glenn County
Gold Ridge
Honey Lake Valley
Indian- American Valleys
Lava Beds
Mendocino County
Pit
Shasta Valley
Sierra
Sotoyome-Santa Rosa
Stonyford
Tehama County
Trinity County
Western Shasta
West Lake
Yuba County

## SOIL VEGETATION MAPPING COMPLETED




**CDF/Soil Vegetation Survey**
**6105 Airport Road**
**Redding, CA 96002**
**(916)224-2441**

In line with both federal and state policies, benefits of this program are available to all, regardless of race, color, national origin, sex, religion, maritial status or age.

State of California
The Resources Agency
Department of Forestry
and Fire Protection

# SOIL VEGETATION SURVEY



**Providing detailed soil and vegetation information for California's forest and range lands for more than 40 years.**

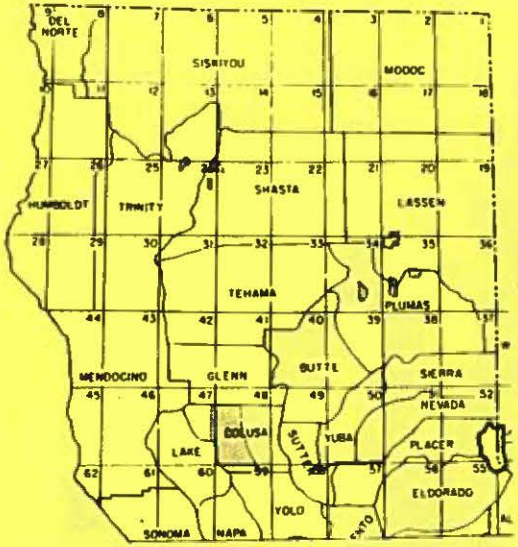
The Soil Vegetation Survey began in 1947 and has been administered by the California Department of Forestry and Fire Protection (CDF) since 1953.

**PROGRAM MISSION:**
To prepare and distribute detailed maps and descriptions of soils and vegetation in California's privately owned and state owned wildlands, emphazing commercial conifer producing areas. The maps are essential for planning the wise use and managment of California's bountiful timber, wildlife, soil and water resources.

**ACCOMPLISHMENTS:**
Soil and vegetation maps have been prepared for about 11.5 million acres. Survey work in the 1940's and 50's included areas of Humboldt, Lake, Mendocino, and Sonoma Counties. Parts of Calaveras, Butte, Del Norte, Shasta and Tuolumne Counties were mapped in the 1960's and 70's.

The last decade has brought many changes to the Soil Vegetation Survey project. Sweeping changes in map and publication format, field procedures, and program emphasis have evolved. In 1980, the survey joined the National Cooperative Soil Survey in earnest, adopting their international standards for soil resource inventory. The emphasis on small project areas has shifted to cooperation on large project areas with the USDA Soil Conservation Service (SCS) and Forest Service. Today, the project is cooperating on surveys in Colusa, Humboldt, Lassen, Plumas, Shasta and Siskiyou Counties. Cooperation on projects has resulted in cost savings, improved efficiency, electronic data transfer, eliminated duplication of efforts and combined publications.

## CURRENT MAPPING PROJECTS




## LONG RANGE PLANS




**HOW IT WORKS:**
The CDF contracts with the SCS and University of California, Davis for field personnel and program coordination. Specialists in the fields of soil science, forestry, botany and cartography combine their skills in the field, laboratory, and office to produce maps and reports. We distribute maps at a scale of 1:24,000 and reports which describe the physical features of the soils, landscape, and vegetation found in the area.

**CONDUCTING A SURVEY:**
Soil scientists traverse the landscape observing and recording the steepness, length and shape of slopes, the size of streams and drainage pattern; the kinds and abundance of native plants; and the kinds of rock. Many holes are dug to study the soil characteristics. Soil samples are collected and analyzed in the laboratory. Soil and vegetation boundaries are drawn on aerial photographs. Foresters and botanists collect timber site data and conduct detailed vegetation studies. Data from other sources ,such as test results, records, field experience and state and local specialists is consulted during the preparation of the reports. Computer resource data bases are utilized and the new data is added. A cartographer prepares maps from the aerial photographs.

**PLANS FOR THE FUTURE:**

- Continued cooperation with resource agencies and educational institutions to provide current accurate resource data and interpretations.
- Development of a Geographic Information System based map and data storage, analysis and presentation system.
- Expand ongoing research on volcanic soil properties to include research on the relationships between climax plant communities and various seral communities.

# SOIL AND VEGETATION SURVEY

Cooperating Agencies :

California Department of Forestry and Fire Protection

USDA, Soil Conservation Service

University of California, Davis

Joint puplication of :

State of California
The Resources Agency
Department of Forestry and Fire Protection

U.S. Department of Agriculture
Soil Conservation Service

1] 2/ŴRkJGrpApCco 2

2] 2/CcoRkCsÂApCpo / 3/RkJ-PChvCcoRÂGrp 3

3] 2/ŴLrRkCcoPeCs 3

4] 2/ApCcoRkJLr 3

5] 2/ŴJ-YGrpRkLPe 3

6] 2/CvApLrRrRkGrp 2

7] 2/CcoRkApLrJ-Y 4

8] 2/CcoApLrPtJ-Y 3

9] 3/BaRkGrpŴJ-Y / 2/ŴBaJ-YSCvGrpCco 2

10] 2/ApLrCvCcoJ-YGrp 2

11] 2/ŴJLrCsApGrpCsBa 2

12] 2/JRkCnoCcoApCpoGrp 4

13] 2/ŴJ-YLrCcoCpoApRk 3

14] 2/ŴRkJ-YApCcoLrGrp

15] 2/RkApPePvmJ-YGrp 3

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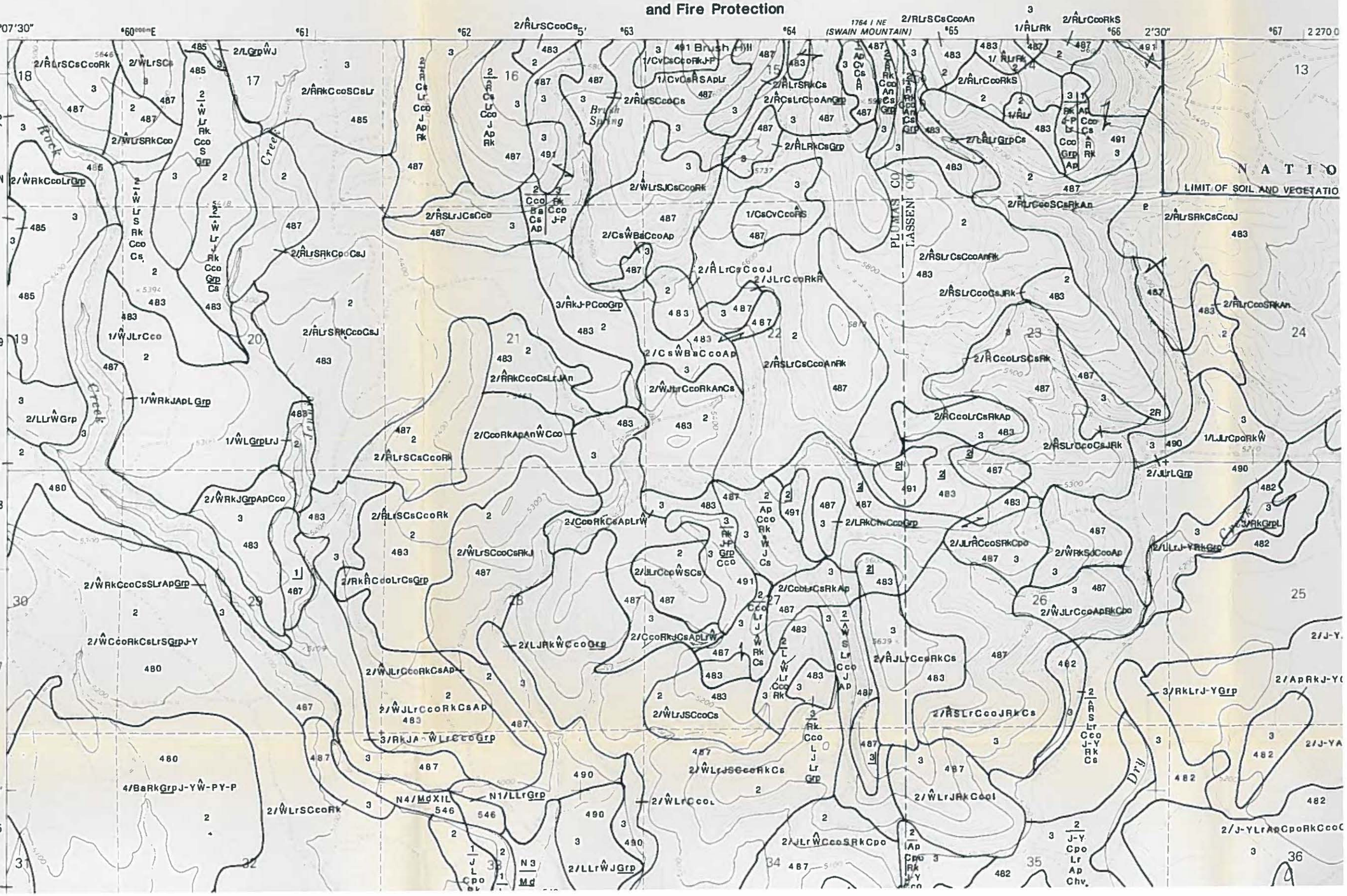
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# SOIL AND VEGETATION SURVEY

INTERIM PUBLICATION

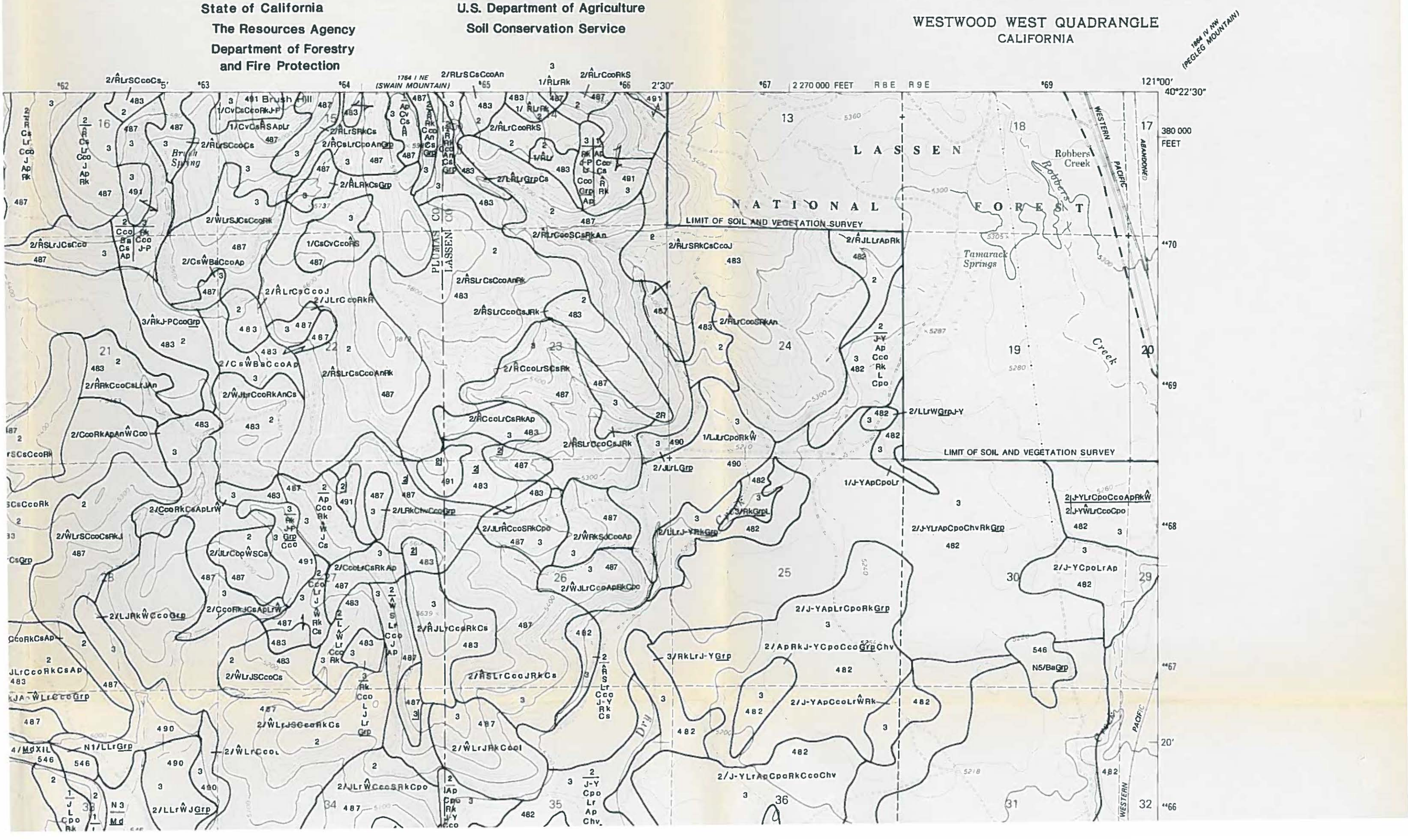
# 34A-4

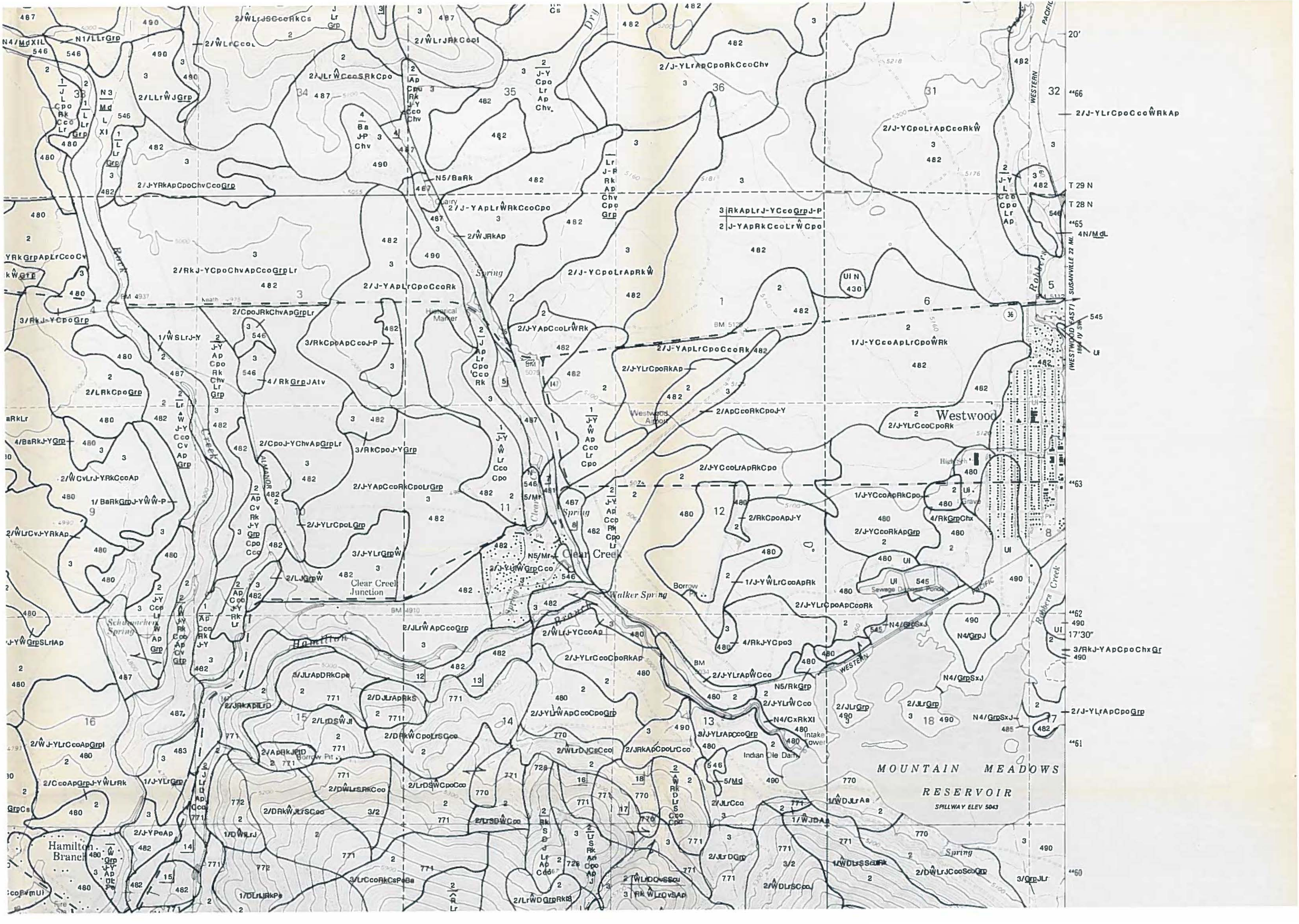
WESTWOOD WEST QUADRANGLE
CALIFORNIA

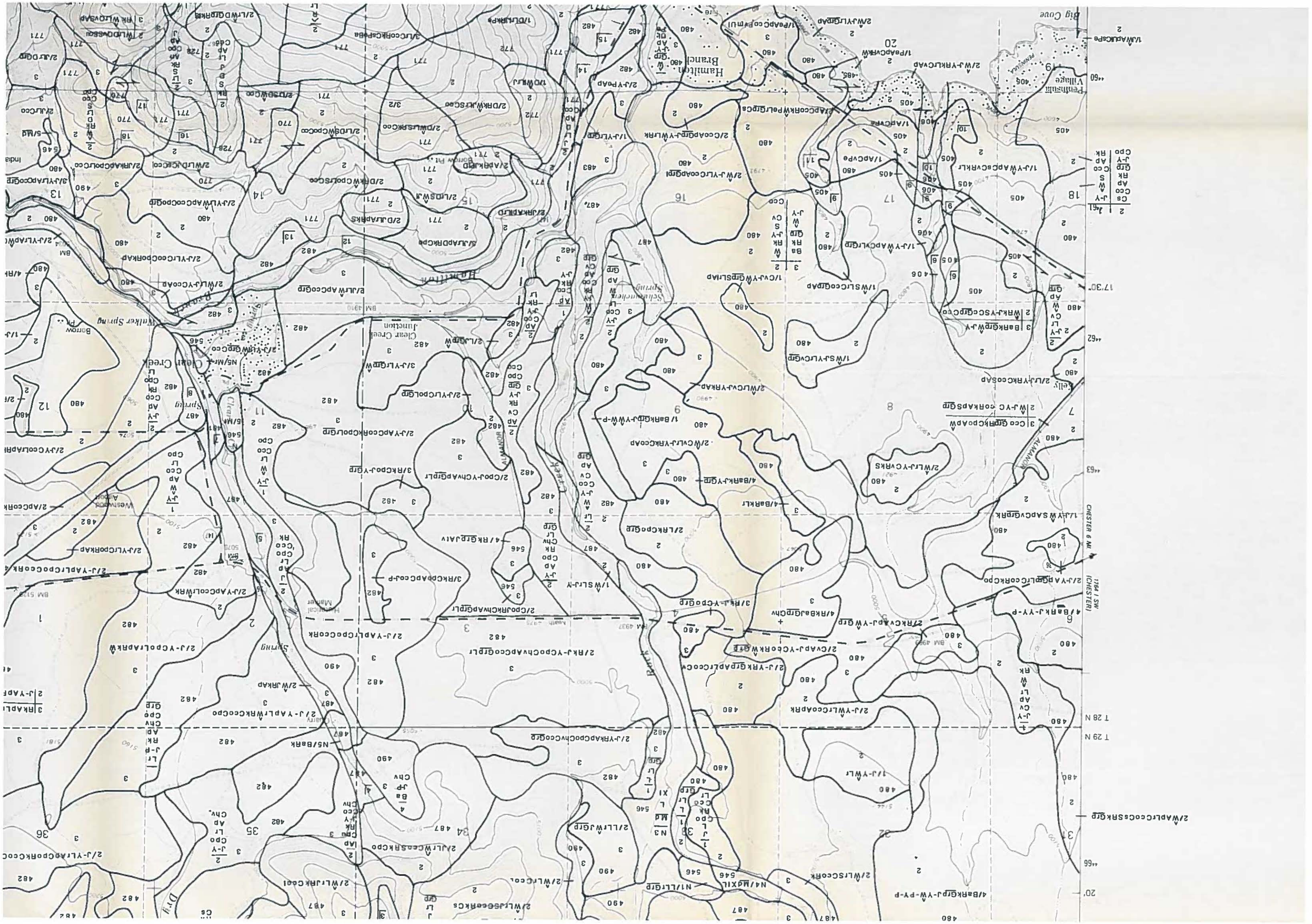
Joint publication of :

State of California
The Resources Agency
Department of Forestry
and Fire Protection

U.S. Department of Agriculture
Soil Conservation Service




Dry
Spring
Barrs Creek
Clear Creek
Clear Creek Junction
Walker Spring
Schoonchen Spring
Hamilton Branch
Rogers Creek
Quarry
Historical Marker
Westwood
Westwood Airport
Borrow Pit
Indian Ole Dam
Intake Tower
Sewage Disposal Ponds
MOUNTAIN MEADOWS RESERVOIR
SPILLWAY ELEV 5043
SUSANVILLE 22 MI.
(WESTWOOD EAST)
T 29 N
T 28 N
20'
17'30"
BM 4937
BM 5079
BM 5120
BM 4910
BM 5034
WESTERN PACIFIC


Hamilton Branch
Big Cove
Peninsula Village
Clear Creek Junction
Walker Spring
Schumacker Spring
Hamilton Spring
Cleary Creek
Dry
Weslwood Addn
Borrow Pit
Historical Marker
ALMANOR
CHESTER 6 MI
1764 / SW (CHESTER)
T 28 N
T 29 N
17.30'
20'

SCALE 1 24 000

1 MILE

MAP UNIT LEGEND DESCRIPTIONS ACCOMPANY THIS MAP.

USDA Soil Conservation Service

California Department of Forestry and Fire Protection

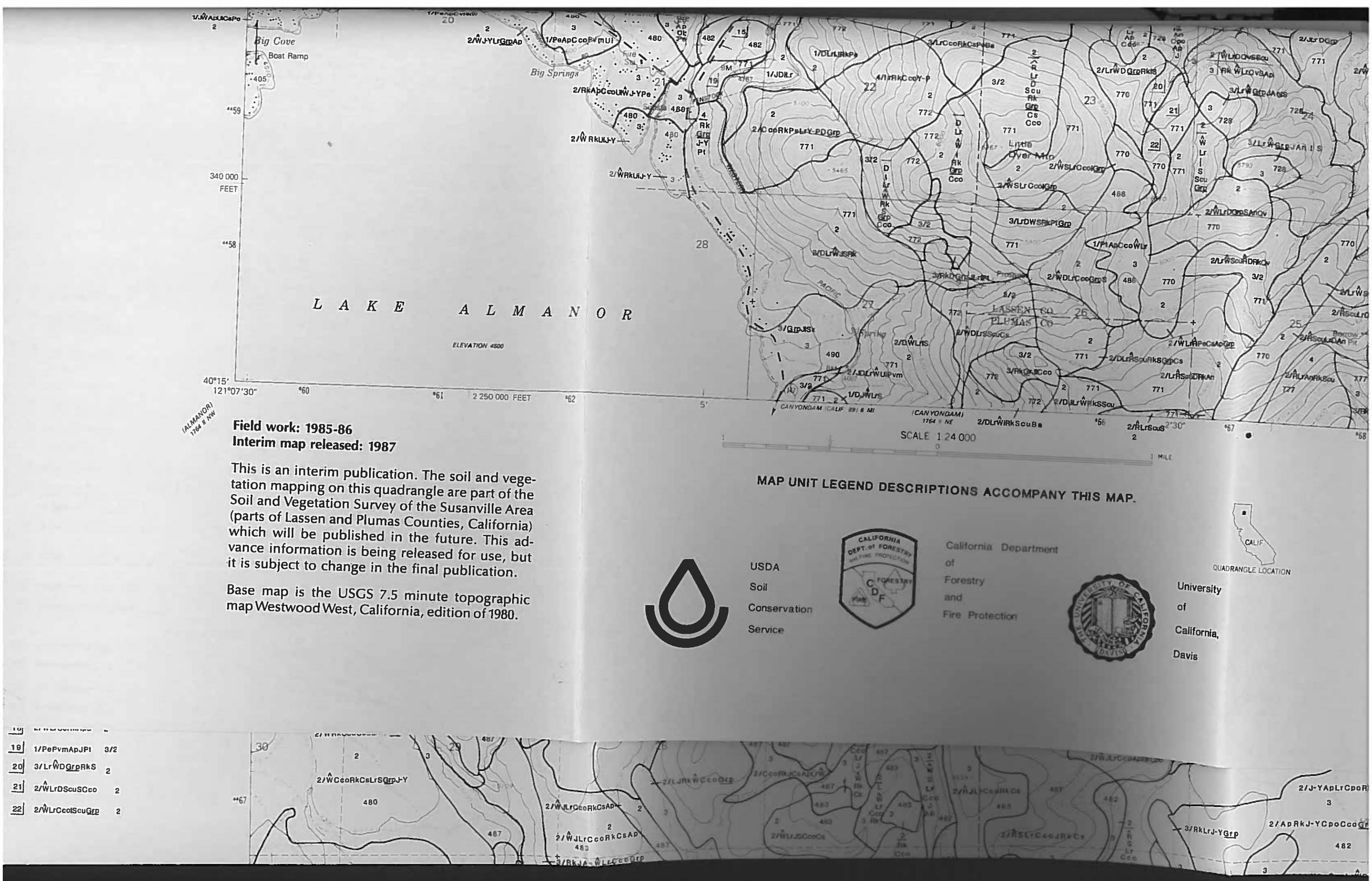
University of California, Davis

QUADRANGLE LOCATION

# 34A-4

INTERIM PUBLICATION

WESTWOOD WEST, CALIF.




**Field work: 1985-86**
**Interim map released: 1987**

This is an interim publication. The soil and vegetation mapping on this quadrangle are part of the Soil and Vegetation Survey of the Susanville Area (parts of Lassen and Plumas Counties, California) which will be published in the future. This advance information is being released for use, but it is subject to change in the final publication.

Base map is the USGS 7.5 minute topographic map Westwood West, California, edition of 1980.

**MAP UNIT LEGEND DESCRIPTIONS ACCOMPANY THIS MAP.**

USDA
Soil
Conservation
Service

California Department
of
Forestry
and
Fire Protection

University
of
California,
Davis