

IV

CONSERVATION ELEMENT APPENDIX

Explanation of Sources and Terms for Soils

Information Sources

The most complete soils information available for Calaveras County is a general soils map prepared by the U.S. Soil Conservation Service in 1966. The map was compiled from field observations and detailed soil maps available at the time. The different soils types found in an area are the result of many years of weathering base rock material, and as such they do not vary over relatively short periods of time. The descriptions of the soils noted in the 1966 report will still, therefore, be accurate.

However, the soil type names will not be accurate. In most areas of the state, the Soil Conservation Service has prepared detailed soil maps that use a uniform naming system. The naming system used in the 1966 report will not correspond to the national names. For this reason, we have avoided specifically naming the soils groups. The discussion is generalized around groups of similar soils and their approximate location as noted on Soil Types map, Conservation Element, Page VII-6.

Soils Classifications

The Soil Conservation Service classifies each soil type according to its ability to support cultivation. In general, Class I soils have few limitation that restrict their use. Class II soils have some limitation that reduce the choice of plants or require moderate conservation practices.

Class III soils are suitable for cultivated crops but require additional conservation practices to offset or overcome inherent soil limitations. The choice of plants may also be restricted. Soils in Class IV have very severe limitations that restrict the choice of plants, require very careful management, or both.

Soils classified as Class V, VI, VII, or VIII are generally not suitable for cultivation. Class V soils have little or no erosion hazard, but have other limitations that are impractical to remove. Class VI and Class VII soils have severe limitations that make them generally unsuited for cultivation. Class VIII soils have limitations that restrict their use for recreation, wildlife, water supply, or aesthetic purposes.

Limitations for Septic Tank Use

Almost all the soils in the county have severe limitations for septic tank use. This assessment is based on factors such as soil depth, slope, permeability, percolation rate, water table, soil drainage, and overflow or flooding hazards. With careful design, soils with severe limitations can generally still support septic tanks at a density of one dwelling unit per acre.¹ Applicants for new subdivisions outside of wastewater treatment service areas should provide soils and engineering

¹ Sites with steep, rocky slopes may have difficulty engineering a suitable septic system on a one-acre parcel. The County Health Department may be able to assist the Planning Department in identifying areas in the county that routinely have difficulty in providing adequate septic systems.

reports to show that all newly created lots can be adequately served by a septic system. The classifications for septic tank limitations are the following:

Slight. Soils with slight limitations have a permeability rate greater than 1.0 inches per hour; a percolation rate faster than 45 minutes per hour; effective soil depth below tile trench floor greater than four feet; a seasonal water table below four feet; drainage somewhat better than some-what poorly drained; slopes less than five percent; no overflow hazard; and hard rock or permanent water table more than six feet.

Moderate. Soils with moderate limitations have a permeability rate greater than 0.63 inches per hour; a percolation rater faster than 75 minutes per hour; effective soil depth below tile trench floor two to four feet; a seasonal water table between two and four feet; drainage better than poorly drained; slopes less than nine percent; an overflow problem of no more than once in 10 years; overflow duration less than 48 hours; and hard rock or permanent water table between four and six feet.

Severe. Soils with severe limitations have a permeability rate less than 0.63 inches per hour; a percolation rate slower than 75 minutes per hour; effective soil depth below tile trench floor less than two feet; a seasonal water table above two feet; drainage class of poor or very poor; slopes greater than nine percent; overflow problems one year in five; overflow duration greater than 48 hours; and hard rock or permanent water table less than four feet.

Soil Shrink-Swell Behavior Classes

All soils will change in volume with a change in moisture content; this is referred to as the shrink-swell characteristic. The change in volume is influenced by the kind and amount of clay in the soil. The limitations are ranked as low (mostly sand and silt), moderate (silty clay loam and heavy silt loams with some clay materials), and high (clay loams and clays). Shrinking and swelling of soils can cause damage to building foundations, basement walls, roads, and other structures unless special designs are used. A high shrink-swell potential indicates that special designs may be needed as part of building construction.

Soil Corrosiveness

Soil corrosiveness relates closely to the physical, chemical, and biological characteristics and quality of the soil. Structural materials such as metal or concrete pipe, will corrode when buried, but the rate of corrosion will depend on the nature of the soil.

The degree of soil limitation for each soil group is expressed as slight, moderate, or severe. *Slight* indicates soils that are generally favorable for the specified use. *Moderate* indicates that limitations, although unfavorable, can be overcome by special planning and design. *Severe* indicates that construction limitation are unfavorable or difficult to overcome.

1.0 Soils

Figure 6 shows nine soil groups for Calaveras County. This section briefly describes the characteristics of the soil groups according to their value as agricultural lands, erosion hazard,

ability to support septic tank leach fields, shrink-swell characteristics, and corrosiveness. For an explanation of sources and terms, refer to the conservation element appendix.

Descriptions of Soils Groups

Group 1

The Group 1 soils are areas dominated by very deep alluvial soils. These pockets of deep alluvial soils are found mostly in the western portion of the county. The soils have good to moderately good drainage and slight to moderate erosion hazard. These soils are generally fertile and suitable for cultivation.

A thin finger of Group 1 soil borders Highway 26 as it enters the county from the west. The soil is rated as Class I. There are severe limitations on septic tank use and shrink-swell behavior is moderate. Corrosiveness is also moderate.

Another finger begins farther north and parallels Highway 26 until it intersects with Highway 12. This soil is not of the same quality and is rated as Class IV. There are severe limitations on septic tank use, shrink-swell behavior is moderate, and corrosiveness for untreated steel pipe is low.

A third area, classified as Class II soil, is currently used for agriculture production. This pocket can be found in the flat area just east of Salt Spring Valley Reservoir. These soils are severely limited for septic tank applications. There are moderate limitations on septic tank use. The shrink-swell behavior is moderate, and corrosiveness is moderate also.

Group 2

Group 2 denotes areas dominated by shallow, well-drained gravelly soils with finer subsoils. Almost all of these soils can be found at the north west corner of the county, and continuing south along the San Joaquin County and Stanislaus County borders. The soils have good natural drainage and a slight to moderate erosion hazard. This group is designated as Class VI soils.

The areas north of Highway 12 and south of Highway 26 can support perennial grasses and can be used for rangeland. Rocky areas will limit, but not prevent, use of the soil for crop cultivation. Adequate plant residue must be left to maintain high production levels and prevent active erosion. Typical uses are rangeland and orchards. The area roughly bounded by Highway 12 and Highway 26 is generally not as fertile, although it is still suitable for rangeland.

The soils in this group have severe limitations on septic tank use. Shrink-swell behavior is moderate and corrosiveness is low to moderate.

Group 3

Group 3 soils are moderately deep and moderately coarse textured materials over sandstones and volcanic ash. These soils are only on the western border of the county just south of Highway 12 as it enters the county. The soils have good natural drainage and a slight to moderate erosion hazard. Much of this land is used for cattle range. Where water is available, this land can be used for irrigated crops such as deciduous orchards and irrigated pastures. This land requires careful

irrigation management because the soils are strongly sloping to moderately steep, are only moderately deep, and have a slow surface permeability.

Septic tank limitations are severe, shrink-swell behavior is low, and corrosiveness is low.

Group 4

The Group 4 soils form a wide band that roughly parallels the western county border. The soils are shallow and have a rocky texture. The base rock is slate and serpentine. Currently, these soils support annual grasses and some oaks and brush. The soils have good natural drainage and a slight to moderate erosion hazard. Most of the soils in this group are rated as Class IV. The soil does not hold much water and requires frequent, light watering. This soil is used mostly as rangeland.

There are severe limitations on septic tank use. However, shrink-swell behavior and corrosiveness are low.

Group 5

The Group 5 soils support a cover of annual grasses and oaks, although scattered conifers can sometimes be found on north-facing slopes. These soils are deep to shallow, well-drained, slightly acid, and rocky. There are occasional outcroppings of rock. The base rock can be greenstones, limestones, volcanic rock, or granite. Drainage is good with slight to moderate erosion hazard.

The soils in this group are classified as VII. The soil is very stony or very rocky and is moderately fertile at best. The soils are, however, suitable for rangeland. Limitations on septic tank use are severe, and the shrink-swell behavior is high. Corrosiveness for untreated steel pipes is moderate.

Group 6

The central portion of the county is typified by acid, rocky, or stony soil over slate rock. Conifers grow well in this soil, although there will be occasional pockets of oaks, shrubs, and grasses. The soils in this group have severe limitations on septic tank use. The shrink-swell behavior is moderate, and corrosiveness is moderate.

The northern half of this soils group is ranked as Class VI, while the southern half is ranked as Class VII. The Class VI soils can be used for annual range and irrigated orchards (where water is available). Class VII soils are shallow, rocky, and hold very little water. Erosion hazard is moderate to severe. These soils are best suited to open rangeland, although usable forage production is low. This soil is not suitable for producing timber.

Group 7

The northeastern portion of the county is dominated by bands of Group 7 and Group 8 soils. Group 7 has course to moderately course, acid soils over weathered granite. The soils support a cover of conifers, oak, cedar, brush, and scattered perennial grasses. Natural drainage is good, but erosion hazard is moderate to high.

The soils in this group have severe limitations on septic tank use. The shrink-swell behavior is low and corrosiveness is low.

Group 8

The soils of this association are formed from volcanic rocks, cobbles, and ash that had been cemented together. They are moderately deep, well-drained, acid soils that contain cobbles. The soils are generally on moderately sloping to moderately steep lava caps. The soils support conifers, oaks, brush, and scattered perennial grasses. Natural drainage is good, but erosion hazard is moderate to high. These soils are ranked as Class VI and are best suited for timber production.

The limitations on septic tank use are severe, but the shrink-swell potential and corrosiveness are low.

Group 9

The final group of soils are actually rocky outcroppings, where the soil mantle is less than 2 inches thick. There may be more than 50 percent exposed rock or partly weathered rock. Erosion hazard is very high and fertility is extremely low. These areas are suited to watershed and wildlife and recreation use. The limitations on septic tank use are severe. Shrink-swell potential and corrosiveness are low.

MINERALS FOUND IN CALAVERAS COUNTY

Asbestos

DMG data indicate that there are two mining operations whose principal product is asbestos, located southeast of Copperopolis near the Tuolumne County border. These mines are operated by Calaveras Asbestos, Ltd.; however both operations are currently listed as idle. Earlier information indicates that several small asbestos prospects existed northwest of San Andreas; however, there is no current information about these sites.

Chromite

Several chromite operations exist in Calaveras County; however, according to DMG, all 13 of the operations are currently idle. The mines are located in three general areas; five to 10 miles southeast of Copperopolis, about five miles north of Copperopolis, and about five miles northeast of Angles Camp.

Copper

As noted above, copper has played a significant role in the mineral history of Calaveras County, particularly during the Civil War era, and more recently during World War II. Calaveras County has been the leading producer of copper within the region known as the Sierran Foothill copper belt.

DMG information lists three existing copper mines that are presently classified as idle. The North Keystone mine is located about 10 miles southeast of Copperopolis, near the Tuolumne

County border. Pacific Mine lies about halfway between the North Keystone mine and Copperopolis. The Penn mine is about 15 miles northwest of San Andreas, just south of the Mokelumne River.

Gold

As discussed above, gold has been the most sought-after mineral resource in Calaveras County. Literally hundreds of gold mining operations have occurred in the county in the past; many were simply small panning claims from the gold rush days. DMG information indicates more than 20 existing gold mines in the county, although 10 are listed as currently idle. Placer gold² mining operations exist north and east of Angels Camp, as well as the area north of San Andreas.

Several lode gold operations exist in the vicinity of West Point in northern Calaveras County, as well as the southwestern portion of the county near Copperopolis. There are also a few lode gold mines in the central portion of the county (see Mine Locations map, Conservation Element, Page IV-13). Many of the gold mines produce other minerals, such as silver and copper, as by-products.

Nickel

Nickel silver has been found in small amounts in Calaveras County. Two principal areas having geologic characteristics favorable to the existence of nickel are located just north of Valley Springs and southeast of Copperopolis. There are two nickel mines listed by DMG in the county: Copperopolis Nickel Prospect and Valley Springs Nickel Prospect. The operational status of both mines is unknown.

Sand, Gravel and Stone

While gold has been the most important mineral resource in the past, sand and gravel operations have recently become more prominent, particularly in the western part of the county. Sand and gravel is used primarily in the construction industry as a base for concrete and asphalt. DMG information shows at least four producing sand and gravel operations, and several other idle operations.

Several stone quarry operations operate in Calaveras County, primarily producing construction base rock, portland cement concrete, shale, and limestone. Calaveras Cement Company, also known as Genstar, owns five stone quarries in the vicinity of San Andreas that provide base materials for the manufacture of cement; all are presently idle. From the 1950s to 1980, Calaveras Cement Company was the major mining operation in the county, at times employing more than 400 people.

Other Minerals

Small amounts of other mineral resources have been produced in Calaveras County, including manganese, silica, and talc. The two talc mines, located near Angels Camp, are presently producing.

²

Placer gold refers to gold found in alluvial deposits such as river rocks. Lode gold refers to gold that occurs as veins within other types of rock.

DMG employs a classification system that estimates the potential for various mineral resources. This rating system is used to evaluate the potential of various minerals based on their genetic origin, i.e., volcanic processes. Industrial mineral deposits (such as carbonate rock, asbestos, talc, and silica) are classified as a group rather than on a genetic basis (California Department of Conservation Division of Mines and Geology, 1989).

MRZ-1. Areas where available geologic information indicates there is little likelihood for the presence of mineral resources.

MRZ-2a. Areas that contain significant measured or indicated reserves.

MRZ-2b. Areas where geologic information indicates that significant inferred resources or demonstrated sub-economic resources are present.

MRZ-3a. Areas likely to contain undiscovered mineral deposits similar to known deposits in the same producing district of region (hypothetical resources).

MRZ-3b. Areas judged to be favorable geologic environments for mineral resource occurrence, but where mineral discoveries have not been made in the region (speculative resources).

MRZ-4. Areas where geologic information does not rule out either the presence or absence of mineral resources.

EXISTING MINES IN CALAVERAS COUNTY

The following table lists mines in Calaveras County registered with the California Division of Mines and Geology (DMG). The information has been extracted from the MINEFILE.DBF computer database maintained by DMG, and has been updated. The data include the mine name, company operating the mine, its main products, and the current operating status of the mine; however, the database does not contain complete information for all mines.

TABLE 1-9				
MINERAL OPERATIONS				
Calaveras County, 1991				
Map #	Name of Mine	Operator	Products	Status
1	All Rock Quarry	McLaughlin	Stone	Producing
2	Alta Mine		Chromite	Idle
3	Altaville Drift Mine	Miller Mining	Gold, sand, gravel	Abandoned
4	Alto Gold Prospect	Glamis Gold	Gold, silver	Reclaimed
5	Big Seven Mine	Seremin	Gold, sand, gravel	Exploration
6	Black Bear Manganese Prospect		Manganese	Idle
7	Blackstone Mine	U.S. Gold Mines	Gold, silver	Intermittent
8	Blazing Star Mill	Troy Gold	Gold, silver	Abandoned
9	Bowie Estate		Chromite	Idle

TABLE 1-9
MINERAL OPERATIONS
 Calaveras County, 1991

Map #	Name of Mine	Operator	Products	Status
10	Broglia Quarry	Rhyolite Products	Stone	Idle
11	Calaveras Central Mine	Miller Mining	Gold, sand, gravel	Idle
12	Calaveras Shale Quarry No. 2	Calaveras Cement	Shale, stone	Idle
13	Calaveras Shale Quarry No. 6	Calaveras Cement	Shale, stone	Idle
14	Calaveras Shale Quarry No. 7	Calaveras Cement	Shale, stone	Idle
15	Camp Connell Quarry	Claude C. Wood	Stone	Idle
16	Campo Seco Silica Sand Pit	Calaveras Cement	Specialty sand	Idle
17	Carson Hill Mine	Hill Gold Mining	Gold, silver, uranium	Reclaiming
18	Cassinelli Mine	Gutenberger	Gold, sand, gravel	Idle
19	Cataract Quarry	Calaveras Cement	Limestone	Idle
20	Chili Gulch Pit	Wolin and Sons	Sand, gravel, gold, silver	Producing
21	Clary Chromite Prospect		Chromite	Idle
22	Collier gold Mine		Gold, silver	Idle
23	Copperopolis Mill	Calaveras Asbest.	Asbestos	Abandoned
24	Copperopolis Nickel Prospect		Nickel	Undetermined
25	Copperopolis Quarry	Calaveras Asbest.	Asbestos	Idle
26	Coyote Creek Pit	Charles I. Baldwin	Sand, gravel	Abandoned
27	Davis Mine		Chromite	Idle
28	Dogtown Pit	Dogtown Sand & Gravel	Sand, gravel, gold	Undetermined
29	Ellingwood Chromite Prospect		Chromite	Idle
30	Ellingwood Mine	Stockton Water	Chromite	Idle
31	Flume House Mine	Flume House Mining	Gold, sand, gravel	Undetermined
32	Garnet Hill Mine		Tungsten	Idle
33	Golden River Mine		Gold, sand, gravel	Idle
34	Green Quarry	Sonora Aggreg.	Decorative rock, stone	Idle
35	Hesseltine Pit	Teichert	Sand, gravel	Reclaimed
36	Hinch Mine	John R. Leimback	Chromite	Idle
37	Holbrook Chromite Prospect		Chromite	Idle
38	Holland Mine		Gold, silver	Idle
39	Jack Rabbit Mine	Miller Mining	Sand, gravel, gold	Exploration

TABLE 1-9
MINERAL OPERATIONS
Calaveras County, 1991

Map #	Name of Mine	Operator	Products	Status
40	K.R. Mine	Cyprus Western	Talc	Exploration
41	Lee Acres Sand Pit	Charles I. Baldwin	Sand, gravel	Reclaimed
42	Liberty Mine		Chromite	Idle
43	Lloyd Mine	Huje Enterprises	Gold, silver	Unknown
44	Main Lode Gold Prospect	Fike & Menter	Gold, silver	Proposed
45	Mangante Pit	Jim Mangante	Sand, gravel, gold	Idle
46	Mayflower Chromite Prospect		Chromite	Idle
47	McCarty Sand Pit	Ford Construction	Sand, gravel	Producing
48	Mokelumne Hill Pit	Sport Hill Sand and Gravel	Sand, gravel	Producing
49	Mole Hill Gang Prospect	Joseph Folsom	Gold, silver	Undetermined
50	Monahan Pit	Teichert	Sand, gravel	Reclaimed
51	Napoleon Mine		Gold, silver, copper	Idle
52	Nesler Gravel Pit	William A. Nesler	Sand, gravel	Undetermined
53	New Hogan Quarry	Ford Construction	Stone	Producing
54	North Keystone Mine		Copper, gold, silver	Idle
55	Pacific Mine		Copper, gold, silver	Idle
56	Penn Mine	New Penn Mines	Copper, gold, silver	Idle
57	Pennsylvania Gulch Pit	Sierra Rock	Sand, gravel	Idle
58	Quail Hill Mine		Gold, silver	Idle
59	Red Hill Quarry	Cyprus Western	Talc	Producing
60	Robie Ranch Pit	Teichert	Sand, gravel	Idle
61	Royal-Mountain King Mine	Meridian Gold	Gold, silver	Reclaiming
62	Sheep Ranch Mine	Cal-Am Corp.	Gold, silver	Incommunicado
63	Snyder Ranch Quarry	Rhyo-Roc	Stone, pumice	Producing
64	Stockton Jenny Lind Pit	Stockton Sand & Gravel	Sand, gravel	Proposed
65	Teichert Jenny Lind Pit	Teichert	Sand, gravel, gold	Reclaimed
66	True Blue Chrome Mine	Sheppard	Chromite	Idle
67	Union-Rathgeb Mine	Joe Folsom	Gold, silver, uranium	Idle
68	Valentine Mine	John Valentine	Gold, sand, gravel	Idle
69	Vallecito Quarry	Don Wilson	Limestone	Undetermined
70	Valley Springs Nickel Prospect		Nickel	Undetermined

TABLE 1-9				
MINERAL OPERATIONS				
Calaveras County, 1991				
Map #	Name of Mine	Operator	Products	Status
71	Vogelgesang Mine		Chromite	Idle
72	W R Mine	Walter Gabrys	Gold, silver	Producing
73	Wallace Pit	Tony Meath	Sand, gravel	Abandoned
74	Wallace Pit No. 1	Teichert	Sand, gravel	Idle
75	Wallace Pit No. 2	Teichert	Sand, gravel	Idle
76	Ward Chromite Prospect		Chromite	Idle
77	Yellow Aster Mine	Yellow Aster Mining	Gold, Silver	Intermittent
78	Gwin Mine		Gold	Abandoned

Source: California Division of Mines and Geology, 1991.