

CONSERVATION ELEMENT

1.0 Introduction

The Conservation Element addresses the identification, conservation, development and utilization of the County's natural resources. The Element promotes proper management of both finite and renewable resources in the following categories: soils, agriculture, forests, minerals, and waters resources. Important uses of these resources are summarized, and an evaluation of the issues surrounding the protection of the resources is discussed. The protection of Calaveras County's fisheries and wildlife are discussed in the Open Space Element.

1.1 Legal Authority

Section 65302(d) of the California Government Code requires the County to adopt a Conservation Element for the purposes of conservation, development, and utilization of natural resources including waters, harbors, fisheries, wildlife, minerals and other natural resources. The State advises that the Element should promote the "protection, maintenance, and use of natural resources, prevent the wasteful exploitation, destruction and neglect of natural resources, and recognize that natural resources must be maintained for their ecological value as well as for their direct benefits to people".

1.2 Relationship to Other General Plan Elements

The Conservation Element provides policies to protect natural resources and their uses. Many of the issues covered in this Element directly overlap those required in the Open Space, Land Use, and Safety Elements. The Conservation and Open Space Elements are closely related. While the Conservation Element discusses various uses and preservation of natural resources, the Open Space Element addresses ecological resource areas; cultural, historic, and scenic resources; and recreation areas. Both elements are integrated with the Plan's policies regarding Land Use and Safety.

2.0 Soils

Soil Types map, Page IV-2, shows nine soil groups for Calaveras County. This section briefly describes the characteristics of the soil groups according to their value as agricultural lands. A more detailed explanation of sources and terms, erosion hazard, ability to support septic tank leach fields, shrink-swell characteristics, and corrosiveness is contained in the Conservation Element Appendix.

Group 1

The Group 1 soils are areas dominated by very deep alluvial soils with good to moderately good drainage. These soils are generally fertile and suitable for cultivation.

Group 2

Group 2 denotes areas dominated by shallow, well-drained gravelly soils with finer subsoils. Typical uses are rangeland and orchards.

Soil Types map

Group 3

Group 3 soils are moderately deep and moderately coarse textured materials over sandstones and volcanic ash. The soils have good natural drainage. 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.

Group 4

The Group 4 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. This soil is used mostly as rangeland.

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. The soils are, however, suitable for rangeland.

Group 6

The Group 6 soils are 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 can be used for annual range and irrigated orchards (where water is available).

Group 7

Group 7 has coarse to moderately coarse, acid soils over weathered granite. The soils support a cover of conifers, oak, cedar, brush, and scattered perennial grasses. Natural drainage is good.

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 and are best suited for timber production. Natural drainage is good.

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. These areas are suited to watershed and wildlife and recreation use.

3.0 Agricultural Lands

3.1 Agricultural Production

Agriculture is an important part of the Calaveras County economy. Agricultural products include fruit and nut crops, field crops, vegetable crops, nursery crops, livestock and poultry, and timber (which is discussed in more detail in Section 3.0 of this element). Timber production is the largest single component, making up over half the total production value.

Table IV-1 shows the value of agricultural production in Calaveras County from 1990 to 1993. Table IV-2 shows the value of livestock, poultry, and apiary (bees) and associated products.

Table IV-3 goes into greater detail about the exact type of crops found in the County in 1993. The table also shows the acreage, overall production, and value of the crops.

According to the yearly information compiled by the County Agriculture Commissioner, there are almost 420,000 acres of agricultural land in Calaveras County. Almost all of this area, 412,000 acres, is rangeland and another 2,000 acres is irrigated pasture (see Table IV-3). The leading farm commodity in the county is cattle and calves (see Table IV-2). Poultry farms and livestock and poultry products are also important commodities.

Aside from range and pasture land, the next largest area (731 acres) under cultivation is walnuts. However, compared to other crops, the value per ton is relatively low. Other fruit, vegetable, and field crops use a little over 1,300 acres combined.

TABLE IV-1 VALUE OF AGRICULTURAL PRODUCTION Calaveras County, 1990-1992			
Item	1992	1991	1990
Fruit and Nut Crops	\$1,344,700	\$1,241,900	\$989,000
Field Crops	4,415,800	4,404,200	4,406,800
Vegetable Crops	191,600	167,000	130,000
Nursery Crops	470,700	458,000	442,000
Timber	15,621,000	13,900,000	30,320,000
Livestock and Poultry	7,125,200	8,935,300	8,467,400
Livestock and Poultry Products	1,342,000	1,935,400	2,602,600
Apiary Products	532,700	536,300	326,700
TOTAL	\$31,043,700	\$31,578,100	\$47,684,500

Source: County of Calaveras Department of Agriculture and Weights and Measures, *Report of Agriculture, 1992*.

TABLE IV-2			
LIVESTOCK PRODUCTION AND VALUE			
Calaveras County 1993			
Livestock and Poultry	Number of Head	Total Live Weight	Value
Cattle and Calves	12,700	72,200	\$5,3683,600
Sheep and Lambs	900	950	61,800
Swine	1,500	1,950	94,800
Poultry (includes game birds, squab, rabbits, etc.)	—	—	1,597,600
Other Livestock (goats, emus, llamas, etc.)	—	—	160,000
Livestock Products (milk, eggs, wool, mohair, etc.)	—	—	2,008,000
Bee Products	—	—	532,700
TOTAL	14,050	66,840	\$8,999,900

Source: County of Calaveras Department of Agriculture and Weights and Measures, *Report of Agriculture, 1993*.

TABLE IV-3			
CROP ACREAGE, PRODUCTION, AND VALUE			
Calaveras County, 1993			
Crop	Bearing Acres	Production	Value
Fruit and Nut Crops			
Almonds	31	18 tons	\$5,400
Walnuts	731	290 tons	406,000
Apples	140	250 tons	75,000
Wine Grapes	260	625 tons	362,500
Olives	250	500 tons	190,000
Other Fruit Crops (cherries, berries, pears, peaches, etc.)	—	—	350,000
Field Crops			
Grain Hay	300	450 tons	36,000
Legume Hay	30	80 tons	7,200
Native Hay	150	75 tons	3,400
Irrigated Pasture	2,000	—	220,000
Rangeland	412,000	—	4,120,000
Other Field Crops (wheat, safflower, beans, etc.)	—	—	25,000

Vegetable Crops			
Vegetable Crops (tomatoes, corn, peppers, melons, asparagus, etc.)	—	—	193,000
Nursery Crops			
Christmas Trees	—	18,000 trees	360,000
Nursery Products	—	—	225,000
Timber			
Timber Production	—	82,429 mbf ¹	35,110,600
TOTAL	415,982	NA	41,689,101.0 0

Notes: ¹ mbf = million board feet.

Source: County of Calaveras Department of Agriculture and Weights and Measures, *Report of Agriculture*, 1993.

3.2 Williamson Act Lands

The California Land Conservation Act, commonly known as the Williamson Act, was enacted by the state legislature in 1965 to encourage the preservation of agricultural lands. Under the Act, property owners may enter into contracts with the County to keep their lands in agricultural production for a minimum of 10 years, in exchange for property tax adjustments. Lands covered by Williamson Act contracts are assessed based on their agricultural value instead of their potential market value under non-agricultural uses.

There are over 125,000 acres of land in Calaveras County in agricultural preserves. The largest mass of these lands are in the southwestern portion of the county near the Stanislaus County border. The remaining sites tend to be scattered throughout the middle of the county. There are only a few agricultural preserve areas in the northwest portion of the county, where the soil tends to be very rocky. Nearly 90 parcels have applied for non-renewal, which will remove almost 7,000 acres from the agricultural preserves by the year 2002.

Important Farmlands

The California Department of Conservation supplements the Soil Conservation Service soil survey with its Important Farmland Mapping and Monitoring Program. The program identifies five categories: Prime Farmlands, Farmlands of Statewide Importance, Unique Farmlands, Farmlands of Local Importance, and Grazing Lands.

Prime farmland has the best combination of physical and chemical characteristics for crop production. *Farmland of statewide importance* is not quite as good as prime soil, though still has supported crop production for at least the three preceding years. *Unique* farmland ranks below prime and statewide important farmlands, though is still capable of producing high economic value crops such as avocados and grapes. Finally, *farmland of local importance* ranks below the other three, yet may be important to the local economy due to its productivity (Department of Conservation, *Important Farmland Categories*).

High Capability Agriculture Lands map

Although there have been no prime agricultural lands identified in Calaveras County, many lands are capable of supporting agriculture. In general, lands with less than 30 percent slopes and soil depths of two or more feet are suited for agricultural use.

Potential Agricultural Areas

As shown on High Capability Agriculture Lands map, Page IV-7, there are some areas of the county that are currently not farmed, but that are arable and may be suitable for agricultural production. The largest parcels are toward the center of the county, in fairly remote areas. The existing vegetation on this central portion is mostly conifers with some hardwoods and grass lands. Timber production and some rangeland may be suitable for this area. The arable areas nearer to the San Joaquin County border are mostly grass lands and shrubs. Again, rangeland may be suitable in this area. If water is available, some fruit or field crops may also be possible.

GENERAL PLAN RECOMMENDATIONS

Goal IV-1: Preserve and encourage the use of land for agriculture purposes.

Policy IV-1A: Allow resource production lands to remain available for agriculture and rural use.

Policy IV-1B: Encourage Williamson Act contracts on lands outside of Community Centers, Residential Centers, Community, Special and Specific Plan Areas, and Mixed Use/Master Project Areas.

Implementation Measure IV-1B-1: Cooperate with the County Agriculture Commissioner when considering land use for lands within Williamson Act contracts.

Implementation Measure IV-1B-2: Require Community and Special Plans adopted after January 1, 1996, to address agriculture resources, and allow densities on resource lands within those Plan areas to reflect area preferences.

Goal IV-2: Protect legally established agriculture from encroachment by incompatible land uses.

Policy IV-2A: Review development proposals for possible encroachment upon legally established agriculture.

Implementation Measure IV-2A-1: Enforce "right to farm" provisions of the County Zoning Code.

4.0 Forest Resources

Forests are a significant natural and economic resource for Calaveras County. The forest lands provide for open space, recreation, and natural habitats, which is discussed in the Open Space element. In addition, these lands are utilized for timber production.

4.1 Timber Production reversed

Timber consists of trees of any species, whether planted or naturally occurring, which are maintained for eventual harvest. Timber includes Christmas trees, but does not include nursery stock. Areas receiving the Timber Production Lands designation are identified as highly capable of supporting timber growth and harvesting. The soil information developed by the California Department of Forestry (CDF) Cooperative Soil Vegetation Survey identifies soil classifications capable of supporting timber. Lands containing soils in the Arvanitis and Palley Site classes 3 through 7 (medium to very high) are most capable of timber production. These lands were included as part of the lands shown on the High Capability Timberlands Map, Page IV-10.

Most timber production occurs in the eastern section of the county on or near the Stanislaus National Forest lands. Lands in Calaveras County are estimated as capable of producing about 60 million board feet of lumber per year with some 20 million board feet coming from the Stanislaus National Forest.

The Stanislaus National Forest administers 75,072 acres within the county, which comprises approximately eleven percent of the county. As of 1986, American Forest Products Company controlled an estimated 67,000 acres in the eastern portion of the county. Fiberboard Corporation (a subsidiary of Louisiana Pacific), Snider Lumber Products Company, and Yuba River Lumber (a subsidiary of Bohemia Lumber Company) each controlled minor acreage (less than 1,000 acres each) within the county's boundaries.

1992 figures from the County Agriculture Commissioner indicate that 75,893 or 12 percent of the total land area is held in Timber Production Zone (TPZ) pursuant to the Forest Taxation Reform Act of 1976. See High Capability Timberlands Map, Page IV-10.

Timber production is allowed outside of those areas identified in the General Plan as Timber Production Lands. It is not the intent of the Plan to restrict timber practices to lands receiving the timber production designation.

GENERAL PLAN RECOMMENDATIONS

Goal IV-3: Preserve and encourage the expansion of high capability timber lands for timber protection and harvest.

Policy IV-3A: Allow lands located within high capability timberlands to remain available for timber production.

Implementation Measure IV-3A-1: Allow a maximum density of one dwelling per 20 acres on high capability timber lands outside of Community Centers, Residential Centers, Community, Special and Specific Plan areas, and the City of Angels sphere of influence.

Implementation Measure IV-3A-2: Utilize Timber Production Zones and contracts with private property owners under the California Timber Productivity Act of 1982, and the Forest Taxation Reform Act of 1976.

High Capability Timberlands Map

Goal IV-4: Maintain and increase timber land productivity.

Policy IV-4A: Encourage sustained yield timber production and harvest.

Implementation Measure IV-4A-1: Utilize applicable provisions of the Forest Improvement Act of 1978 (Public Resources Code section 4790 *et seq.*).

5.0 Mineral Resources

Areas receiving the Mineral Resource Lands designation have naturally occurring deposits of chemical elements or compounds formed from inorganic processes and organic substances. Mineral lands include both surface and subsurface deposits.

5.1 Mining History

The Gold Rush of the mid-1800's provided the major attraction to Calaveras County and the rest of the Mother Lode. Since that time, mining has been a major component of the County's economy and livelihood. Between 1880 and 1962, the recorded value of minerals produced in Calaveras County amounted to over \$200 million. Of that total, gold, limestone and copper accounted for the greatest amount. Although production figures are not available for the large quantities of gold that were mined before 1880, it is documented that the largest single piece of gold ever found in the Western Hemisphere -- weighing close to 150 pounds -- was unearthed at Carson Hill on November 22, 1854. Other minerals extracted in quantity in the past include quartz crystal, copper, zinc, silver, lead, chromite, clay, sand, gravel and stone. At least 26 minerals have been produced commercially within the County. In more recent years, limestone, asbestos, sand and gravel, industrial minerals, and gold have accounted for most of the County's mining industry.

Even with increases in recycling of mineral products, a large demand remains for newly mined materials. New mineral discoveries are being made; however, development of new mines is a long process, often requiring several years and substantial investment before operation begins.

5.2 Mining Operations

The California Department of Conservation Division of Mines and Geology (DMG) maintains a database of mines and mining activity throughout the state. This source identifies 77 mines in Calaveras County; however, more than half are presently classified as idle. The location of these mines is shown in Mine Location map, Page IV-12. A detailed description of the products and a list of the name, operating company, the main products and operational status of each mine is contained in the Conservation Element Appendix.

5.3 Potential Mineral Resources

The history of mineral production and recent surveys suggest that much of Calaveras County has the potential for further mineral resource development. As mining technology and processes improve over time, sites that were economically infeasible in the past may again become lucrative. Mineral Resource map, Page IV-13 shows potential mineral resources areas in the county.

Mine Location map

Mineral Resource map

Asbestos and Chromite

Asbestos and chromite reserves are located in three general areas. As indicated above, the two existing, though abandoned, asbestos sites in the county are located southeast of Copperopolis just north of the Tuolumne County border. Small reserves of asbestos and chromite are thought to exist north of Angels Camp, east of Highway 49. Additional small reserves are known northwest of San Andreas, near Valley Springs.

Gold

Deposits of gold-bearing rock are distributed over most of Calaveras County. The history of gold in the region suggests that significant reserves may yet exist. DMG information suggests that reserves of lode gold exist in the Royal Mountain King Mine area just north of Copperopolis and the Carson Hill mine located south-southeast of Angels Camp.

Potential placer gold deposits exist through out the county. Placer gold occurs primarily in river deposits; thus, most major drainages will have potential for such deposits. In particular, the Mokelumne River drainage in the northwestern part of the county and the drainages east of Angels Camp are believed to contain placer gold deposits.

Finally, several placer gold deposits are thought to exist in the eastern portion of the county; however, the significance of such deposits is not clear.

DMG information points out that remnants of ancient river channels that have been covered by volcanic or other geologic occurrences may yet contain significant placer gold deposits. Although many such areas have been prospected in the past, so-called "auriferous gravels" remain a potential source of economically viable placer gold.

Limestone

Significant reserves of limestone have been classified in the Kentucky House, Calaveritas, and Cave City deposits, located south of San Andreas. In addition, small limestone deposits have been identified generally east-southeast of San Andreas. Additional limestone deposits lie both west and south of Murphys, near the Tuolumne County border. Some of the potential limestone deposits also have the potential for talc and silica deposits as well.

Sand and Gravel

The primary sand and gravel deposits lie in the northwestern portion of Calaveras County, generally west of Valley Springs. See Mineral Resource map, Page IV-13.

At a more detailed level, the State Department of Mines and Geology (DMG) conducts surveys of important mineral resource areas throughout the state. These surveys are based on United States Geologic Survey (USGS) 15 minute quadrangle maps. The most recent survey in Calaveras County was of the San Andreas Quadrangle, in the central-western portion of the county. A summary of this survey and classification system can be found in the Conservation Element Appendix.

The DMG survey notes five classes of minerals that are judged to be, or likely to be, present in the San Andreas Quadrangle. These classes are:

1. Base and precious metals (deposits formed by hydrothermal processes).
2. Copper, zinc, gold, and associated metals (deposits formed by volcanogenic processes).
3. Carbonate rock, asbestos, talc, and silica (industrial mineral deposits formed by diverse processes).
4. Chromite (deposits formed by magmatic concentration).
5. Placer gold (deposits formed by residual and mechanical concentrations).

5.4 Land Use Compatibility and Reclamation

Mineral deposits are rare occurrences, occupying a very small part of the earth's surface. Calaveras County is unique in that both metallic and nonmetallic deposits are widespread throughout the County. Unlike many other land uses, mineral extraction is limited to the physical site where the minerals occur. As a result, mineral resource lands do not coincide with the boundaries of Community Centers, Residential Centers, Community Plans, Special Plans, or Specific Plans.

In the last three decades, the County has experienced tremendous population growth. Many people, especially those moving into the County or buying recreation properties, have concerns about the impacts of mining operations on neighboring property.

In enacting the Surface Mining and Reclamation Act of 1975 (Public Resources Code §2710 *et seq.*), the State Legislature declared that mineral extraction is essential to the economic well-being of the state and to the needs of society. The Legislature also recognized that reclamation of mined lands is necessary to mitigate the environmental effects of mining and to protect the public health and safety. Reclamation permits continued mining as well as protection and future beneficial use of mineral lands after mining is completed.

Reclamation plans specifically provide for control of erosion and flooding, waste disposal, and protection of water quality and watershed. The County Zoning Code requires a County-approved reclamation plan for all commercial mining operations. Because mining takes place in diverse areas in the County, reclamation operations may vary according to the geologic, topographic, climatic, biologic and social conditions present.

5.5 Mineral Resource Designation

The General Plan divides the County's mineral resource areas into four categories, which are depicted on the Potential Mineral Resource Area Map, Page IV-16, and explained in Table IV-4. Mineral extraction may occur in any of the four areas, but significant deposits are more likely to occur in Areas 2A and 2B.

Potential Mineral Resource Areas map

Local study and evaluation of the County's mineral resource lands considered lands of potential local significance as well as those of potential state and regional significance. Local evaluation is performed in addition to studies and designation made by the State Geologist.

TABLE IV-4 MINERAL RESOURCE AREAS	
MRA1: Mineral Resource Area 1	Lands not known to contain significant mineral deposits. Isolated mineral occurrences may occur within this area.
MRA2A: Mineral Resource Area 2A	Lands that are being, or have been, intensively mined, and/or that have promise of further mineral production.
MRA2B: Mineral Resource Area 2B	Lands that have had some mineral production in the past and/or that may be expected to have some mining in the future.
MRA3: Mineral Resource Area 3	Lands that might contain minable deposits, but that up to now have not yet been sufficiently developed to demonstrate this.

GENERAL PLAN RECOMMENDATIONS

Goal IV-5: Preserve and manage the production of minerals to meet society's needs.

Policy IV-5A: Encourage the development of mining uses on lands containing commercially valuable mineral resources.

Policy: IV-5B: Allow owners of land containing commercially valuable mineral resources outside of Mineral Resource Areas 2A and 2B to apply for appropriate mineral extraction zoning.

Implementation Measure IV-5B-1: Utilize the Mineral Extraction combining zone to identify lands with commercial mineral potential.

Implementation Measure IV-5B-2: Investigate the establishment of a Mineral Advisory Committee to make recommendations to the County regarding mineral resources potential.

Goal IV-6: Protect mineral resources from encroachment by incompatible land uses.

Policy IV-6A : Allow placement of the Mineral Extraction combining zone on lands identified for residential, commercial or industrial uses.

Implementation Measure IV-6A-1: Utilize the Mineral Extraction combining zone to identify property on which future mining activities may be proposed.

Policy:IV-6B: Allow alternative uses and reduced parcel sizes on lands in Mineral Resource Areas 2A and 2B which do not contain commercially valuable mineral resources, if consistent with mining on nearby or adjacent properties.

Implementation Measure IV-6B-1: Consult the local mining association for recommendations when considering less than one dwelling unit per 20 acres on lands in Mineral Resource Area 2A outside of Community Centers, Residential Centers, Community and Special Plan areas, and the City of Angels Sphere of Influence.

Implementation Measure IV-6B-2: Consult the local mining association for recommendations when considering less than one dwelling unit per 10 acres on lands in Mineral Resource Area 2B outside of Community Centers, Residential Centers, Community and Special Plan areas, and the City of Angels Sphere of Influence.

Implementation Measure IV-6B-3: Develop regulations for permitting mining uses within Community Centers, Residential Centers, Community, Special and Specific Plan areas.

Goal IV-7: Balance the interest of the County's mining industry and residence.

Policy IV-7A: Review proposed mining activities for potential negative impacts such as noise, dust and traffic.

Implementation Measure IV-7A-1: Require buffer areas or other mitigation measures for new mining activities locating near existing residential uses.

Implementation Measure IV-7A-2: Require a use permit for all new mining operations in the County, except for small mines less than or equal to 5 acres or mines located in the M2 zone.

Goal IV-8: Protect public health and safety, and enable mined lands to be put to subsequent beneficial use.

Policy IV-8A: Review proposals for mineral extraction to assure minimal disturbance to the environment.

Implementation Measure IV-8A-1: Require that newly mined lands are reclaimed for open space, conservation, agriculture, recreation or other beneficial uses.

Implementation Measure IV-8A-2: Support and apply the Surface Mining and Reclamation Act of 1975 (Public Resources Code section 2710 *et seq.*).

6.0 Water Resources

The quantity, quality, and availability of water is vital to natural processes and human activity. Water is essential to develop housing, commerce, and industry; to maintain high quality fish and wildlife habitats; and to provide recreational uses.

Extending from the eastern part of California's Central Valley to the west slope of the Sierra Nevada Mountain Range, Calaveras County contains an abundance of water resources including surface water resources in the form of rivers, streams, and lakes, as well as reserves of groundwater. Significant hydrological features include three major rivers and numerous smaller streams, all flowing

in a generally southwestern direction. In addition to these natural channels, there are several main water supply ditches operated by water districts and public utilities. There are few flood plains, and the only large lakes are reservoir impoundments.

6.1 Precipitation

Because of the great difference in elevation from west to east in the county, precipitation varies. Average precipitation is 20 inches a year in the western region to 60 inches in the northeast. The rainy season is October 1 through May 1. Precipitation increases with altitude including both snow and rain in the higher elevations. Snow accounts for much of the precipitation in the higher elevations (up to 300 inches per year), while snowfall is rare in the foothills.

6.2 Surface Water Resources

Three significant rivers are the Calaveras, the Stanislaus, and the Mokelumne. These rivers carry the runoff of the west slope of the Sierra Nevada from east to west across Calaveras County, and into the Central Valley. These rivers provide significant habitat for wildlife. All three rivers are dammed in one or more places. The lower stretches of the rivers provide irrigation water for valley agriculture and are used as municipal water supplies.

Calaveras River originates in the Sierra Nevada mountains and extends west-southwest approximately 60 miles toward and through the Stockton metropolitan area, terminating at the San Joaquin River, outside of Calaveras County. The basin encompasses about 590 square miles, of which 227 lie below New Hogan Dam.

In the portion of the basin above New Hogan Dam and within the county, the primary tributaries are Esperanza, Jesus Maria, Calaveritas, San Antonio, and San Domingo Creeks. Below New Hogan Dam, the main tributaries in the county conveying runoff are the Cosgrove, Indian, and South Gulch.

The Stanislaus River drains a narrow basin of about 980 square miles above the foothills on the western slope of the San Joaquin River, forming the southern boundary of the county. Elevations range from 15 feet above sea level at the river mouth to 10,000 feet at the crest of the drainage area. There are three tributary forks (North, Middle and South) of the Stanislaus which join above New Melones Lake, about 3 miles north of Parrots Ferry. North Fork is located within the county; Middle and South are in Tuolumne County.

The Mokelumne River runs in three forks (North, Middle, and South) at the base of the Sierra Nevada in Alpine County. It flows southwest with the forks all joining near Lodi, then turns northwest to end in the Sacramento River delta lands, emptying into the San Joaquin river about 20 miles north of Stockton. The Mokelumne drains an area of about 661 square miles.

The river forms the county's northern boundary with neighboring Amador County, and was considered the division between the southern and northern mining districts during the Gold Rush.

Lakes and Reservoirs

No naturally-occurring lakes of notable size are located in the county, although some smaller, mountain lakes are found in the Sierra Nevada. The six major reservoirs are described below, and their features are summarized in Table IV-5. The locations of the reservoirs are shown on Water Resources map, Page IV-21.

Camanche Reservoir. Owned by the East Bay Municipal Utility District, this reservoir on the Mokelumne River was completed in 1963, with additional recreational and power uses added in 1983. Capacity is 431,500 acre-feet. There are developed recreation areas at both the north shore (located in Amador County) and the south shore (located in Calaveras County). The lake can be used for swimming, fishing, boating, camping, and motel accommodations; RV hook-ups are available. Undeveloped lands are used for grazing. Camanche Reservoir is a source of municipal and industrial water supplies, as well as providing flood control.

TABLE IV-5 MAJOR RESERVOIRS Calaveras County, 1993						
Reservoir Name	Capacity (acre-feet)	Uses of Reservoir				
		Municipal Supply	Irrigation	Flood Control	Power	Recreation
Camanche	431,500	■		■	■	■
New Hogan	325,000		■	■		■
New Melones	2,400,000		■	■	■	■
Pardee	210,000	■		■	■	■
Salt Springs	140,000				■	■
Tulloch	50,000	■	■			■

New Hogan Reservoir. New Hogan Reservoir was completed by the Army Corps of Engineers in 1964 for purposes of flood control and water supply, and is located 28 miles northeast of Stockton along the Calaveras River. Storage capacity is 325,000 acre-feet. It is currently owned and managed by the Corps. The reservoir supplies irrigation water to the Stockton East Water District and the Calaveras County Water District. The reservoir provides multiple recreation uses, but is not as developed as Camanche. Substantial recreational use includes fishing, boating, swimming, camping, and sightseeing.

New Melones Reservoir. One of California's largest reservoirs, New Melones on the Stanislaus River was completed in 1978 by the U.S. Bureau of Reclamation with a capacity for 2,400,000 acre-feet. New Melones provides irrigation water, flood control, recreational opportunities, and hydroelectric power.

Water Resources Map

Pardee Reservoir. Also owned by East Bay Municipal Utility District, Pardee straddles the Mokelumne River above Camanche. Completed in 1929, its capacity is 210,000 acre-feet. Water in this reservoir is subject to strict water quality standards because it is a domestic drinking water supply, so it is not used as intensively for recreational uses as other county reservoirs. Pardee Reservoir provides municipal and industrial water, flood control, recreation opportunities, and hydroelectric power.

Salt Springs Reservoir. Located along the North Fork of the Mokelumne River on the Calaveras/Amador County border. Capacity is about 140,000 acre-feet. The reservoir was completed in 1931. Owned and operated by Pacific Gas and Electric (PG&E), its primary purpose is to supply hydroelectric power, with fishing and recreation being secondary uses.

Tulloch Reservoir. The Tulloch Reservoir was developed as part of the Tri-Dam Project in the 1950s by the Oakdale and South San Joaquin Irrigation Districts, and is currently managed by them. Tulloch Reservoir is located on the lower Stanislaus River below New Melones Reservoir. Capacity is about 50,000 acre-feet. The water is used for irrigation and domestic water purposes. Recreational opportunities include swimming and boating.

In addition to the reservoirs described above, a number of smaller, older reservoirs built for irrigation and flood control purposes are found throughout the county. These include Hunter Reservoir (which provides drinking water to the City of Angels), Salt Springs Valley Reservoir (operated by the Rock Creek Irrigation District), Tiger Creek Reservoir, Calaveras Reservoir, Emery Reservoir, Schaads Reservoir, Old McCormick Reservoir, Copperopolis Reservoir, and the Goodwin Diversion Dam.

Major Streams and Diversion Canals

The following are the county's 22 major streams and diversion canals; lesser perennial and seasonal creeks are not listed.

Angel's Creek	Coyote Creek	Murray Creek
Bear Creek	Esperanza Creek	Rock Creek
Big Meadow Creek	Forest Creek	San Antonio Creek
Blue Creek	Indian Creek Jesus Maria Creek	San Domingo Creek
Calaveras Public Utility Ditch	Littlejohns Creek	Slate Creek
Calaveritas Creek	Love Creek	Utica Ditch
Cherokee Creek	Mill Creek	Youngs Creek
Cosgrove Creek	Moore Creek	

Wetlands

Surface water resources located throughout Calaveras County include a variety of wetlands. Typically they are found at the margins of ponds, lakes and streams, in low-lying areas that collect precipitation, and in areas where groundwater intercepts the ground surface. Wetlands may be seasonal or perennial. There are many constructed ponds (stockponds, etc.) throughout the county.

Wetlands are highly productive natural habitats used for foraging and nesting by many types of wildlife. These areas are given a high priority for protection by the California Department of Fish and Game and the U.S. Fish and Wildlife Service.

Because of the widespread extent and the relatively small size of wetlands in Calaveras County, they are not shown on Figure 1. The biological resource function types and the general location of wetlands are identified in more detail in the biological resources section.

Groundwater

Groundwater resources in Calaveras County are highly variable with respect to quantity, dependability, depth, and quality. Groundwater Potential map, Page IV-24, shows groundwater potential areas as defined by the (earlier) County General Plan. These areas range from high potential in the east-central portion of the county, to moderate potential east of Highway 49 and west of Valley Springs. Low potential areas are found in the eastern uplands and the foothill valleys west of Highway 49. Pockets of very low yield groundwater or mineralized groundwater are found in roughly a north-south line extending from Pardee Reservoir to New Melones Reservoir.

Flooding

Flood plains in Calaveras County are very minor due to the deep ravines which have been cut by the rivers and the presence of flood control dams at the major reservoirs. Streamside flooding, slow surface drainage areas, and dam inundation areas (from the potential failure of existing dams) are a concern.

See the Safety Element for a more complete discussion of flooding concerns.

Water Quality

Water quality data sources for both surface and groundwater resources in Calaveras County are scattered. Data is available for some reservoirs, and for rivers and streams near proposed major county or commercial projects such as landfills and mines. Groundwater data from domestic or monitoring wells is also available mainly from these same areas. The U.S. Forest Service also has qualitative and some quantitative data on surface and groundwater quality for the 11 percent of the county that lies within the Stanislaus National Forest.

Surface water quality is generally satisfactory to good, improving in quality (relative to drinking standards) at higher elevations. Available data indicate that the major rivers and reservoirs are significantly better in quality than the small streams. However, this may partially be due to the fact that the available stream data is from the southwestern area of the county which contains soil and rock formations high in mineral content.

Groundwater is generally within most drinking water standards, although some areas of the lower foothills appear to be very high in iron content as well as in certain other minerals in specific locations. This is due to the slow movement of groundwater through mineralized rock formations and is to be unexpected in a mineral-rich region such as Calaveras County.

Groundwater Potential map

6.3 Public Water/Utilities

Six different public utilities currently supply water to approximately two-thirds of the County's population, as shown in Table IV-6.

TABLE IV-6 PUBLIC AGENCY WATER PURVEYORS Calaveras County, 1993	
Water Agency	Area Served
Angels Camp Utilities	City of Angels
Calaveras County Water District (CCWD)	Ebbetts Pass, Copperopolis, Copper Cove, West Point, Wilseyville, Sheep Ranch, LaContenta/ Rancho Calaveras
Calaveras Public Utility District (CPUD)	San Andreas, Mokelumne Hill, Glencoe, Rail Road Flat, Paloma
Murphys Union Public Utility District	Murphys, Douglas Flat, Vallecito
Pacific Gas and Electric (PG&E)	Sells water wholesale to public utility districts from a system of four reservoirs located outside the county.
Valley Springs Public Utility District (VSPUD)	Valley Springs

The Calaveras County Water District (CCWD) is the major supplier of water to large areas of the county, while three public utility districts and the City of Angels supply their respective local areas.

Mutual Water Companies

In addition to the public water purveyors listed above, there are a growing number of mutual water companies. These are owned and operated by private property owner associations and are listed in the following table.

TABLE IV-7 MUTUAL WATER COMPANIES Calaveras County, 1993	
Water Company	Area Served
Blue Lake Springs Mutual Water Company	Blue Lake Springs Subdivision, Arnold
Fly-In Acres Water Company	Fly-In Acres Subdivision, Ebbetts Pass
Lili Valley Water Company	West Point area
Mineral Mountain Estates	Avery/Sheep Ranch Road
Sherman Acres	Ebbetts Pass area
Showshoe Springs Water Company	Snowshoe Springs Subdivision, Ebbetts Pass area

Water Rights

In most cases, the water suppliers in Calaveras County have sufficient water rights to meet expected requirements in the County. The more immediate problem is the generation of capital to develop the storage and distribution facilities needed to use the water.

GENERAL PLAN RECOMMENDATIONS

Goal IV-9: Preserve the County's current water rights and additional water rights necessary to support the County's full development potential.

Policy IV-9A: Support the development of water projects in the County for domestic and irrigation purposes.

Implementation measure IV-9A-1: Pursue available funding sources for the development of water projects in the County.

Goal IV-10: Provide for adequate domestic water supplies.

Policy IV-10A: Encourage continued cooperation among water suppliers in meeting the water needs for the County as a whole.

Implementation Measure IV-10A-1: Achieve orderly expansion of water districts in the County through Local Agency Formation Commission (LAFCO) review.

7.0 ENERGY SYSTEM

The energy system in Calaveras County is a complex system not only dependent on local resources but also upon state, national, and international resources.

Fossil fuels (oil, natural gas, and coal), which supply most of the world's current energy use, are now realized to be finite and virtually non-renewable.

The County's energy system operating today relies heavily upon imported fossil fuels which in time will become even more scarce and ever increasing in cost.

One solution to energy supply problem rests in making a "transition" to a more efficient energy system plus one that relies on alternative energy sources. Significant energy and dollars can be saved through various conservation measures. Additionally, Calaveras County is fortunate to have an abundance of alternative energy sources. The combined potential of indigenous energy sources such as hydro, solar, wind, and biomass exceeds current and projected energy needs for the County's future.

Conversion Factors

Energy is measured in British Thermal Units (BTU's). One BTU represents the quantity of heat required to raise the temperature of one pound of water one degree Fahrenheit. For comparison purposes, the following conversion factors are provided:

Cubic Foot of natural gas	1,000 BTU
Kilowatt Hour (KWH) of electricity (at the outlet)	3,423 BTU
Kilowatt Hour of electricity (at the generating plant)	10,500 BTU
Gallon of propane	91,500 BTU
Therm of natural gas	100,000 BTU
Gallon of regular gasoline	119,000 BTU
Gallon of diesel fuel	136,000 BTU
Barrel of aviation fuel	5,048,000 BTU
Cord of Wood	20,000,000 BTU

Leadership at the local level can assist a smooth transition to an efficient, renewable energy-based economy. Realizing the energy opportunities available locally will require commitment and involvement from the entire community.

GENERAL PLAN RECOMMENDATIONS

Goal IV-11: Provide for a smooth transition for the use of renewable resources.

Policy IV-11A: Encourage the reduced use of fossil fuels through conservation efforts and the use of alternative forms of energy.

Implementation Measure IV-11A-1: Continue a program to provide energy conservation and development information for agencies, developers, and the general public.

Policy IV-11B: Promote the capability of solar energy use by future residential subdivisions.

Implementation Measure IV-11B-1: Implement the State's Solar Rights Act and Shade Control Act.

Goal IV-12: Reduce the use of non-renewable energy in both the transportation and stationary sector.

Policy IV-12A: Encourage energy savings in all buildings through modifications in building and equipment operation and design.

Implementation Measure IV-12A-1: Investigate the development of local energy standards for all new buildings in the County as a compliment to State standards.

Policy IV-12B: Promote the use of carpooling, walking, and bicycling.

Implementation Measure IV-12B-1: Investigate the establishment of a formal ridesharing program in the County.

Implementation Measure IV-12B-2: Strive to develop facilities to encourage bicycling and walking in the County.

Goal IV-13: Provide for development of hydro, solar, wind, and biomass resources to serve local residents, businesses, and industry.

Policy IV-13A: Promote the development of hydro-electric facilities in the County.

Policy IV-13B: Encourage the use of solar energy especially in regard to space conditioning and domestic water heating in all new buildings.

Policy IV-13C: Encourage the use of biomass energy in the forest products industry, and solid and municipal waste management activities.

Policy IV-13D: Encourage the use of wind for mechanical power and electrical power.

Implementation Measure IV-13D-1: Solicit assistance in the development of alternative energy resources from federal and State governments, utilities, municipalities, and the development community.