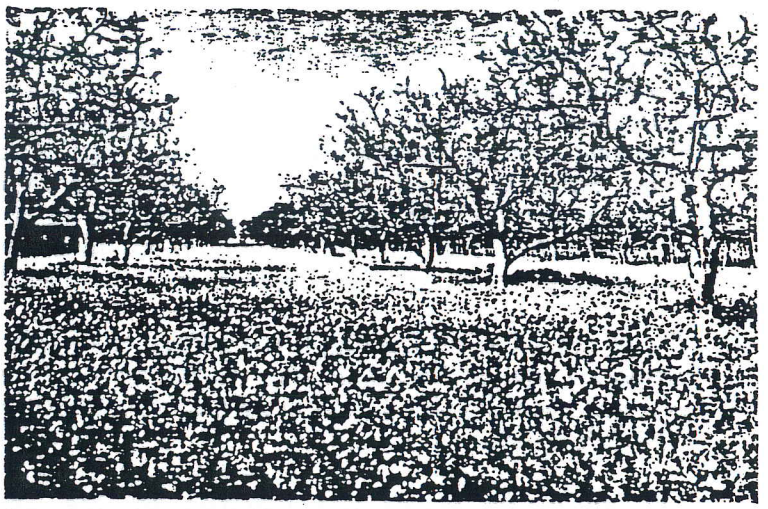


# Conservation Element

# CONSERVATION ELEMENT

"We feel like crowing--not over the defeat of anyone, for we would never do that, but over what we sincerely believe to be the greatest stride ever made for the prosperity of the Sacramento Valley--271 for irrigation to 51 against. We believe that an era of prosperity is to dawn on Colusa County such as she has never seen before.

Colusa Sun Herald
December 3, 1887

## ORGANIZATION OF THIS ELEMENT

The Conservation Element addresses the preservation, management, and utilization of the County's natural resources. Colusa County's economy is supported by its abundant natural resource base: agriculture is the county's leading industry and depends heavily on flat topography, good soils and an abundance of water. Beneath the ground in the eastern portion of the county lie producing natural gas fields, making Colusa County the second largest natural gas producer in the state. Careful management of the County's resources will assure the availability of those resources to future generations and the realization of their full economic potential now and in the future, avoiding detrimental effects on other resources.

This element contains provisions for the conservation and protection of forests, water, rivers, soils, minerals, and air, and the preservation of agricultural uses, wildlife and fisheries. Its issues are closely linked to those of the Land Use, Open Space and Safety elements. The focus of the Conservation Element is on preservation and managed production of natural resources. These issues are addressed in the Open Space Element, but with a primary emphasis on outdoor recreation. Many of the conservation issues - water quality, for example, are also directly related to public health and safety. Development intensity and compatibility issues related to resource protection or production are discussed in the Land Use Element.

The Conservation Element identifies the types of uses which are compatible with resource utilization, specifies measures necessary for the protection of human life and ecological values, and provides for recreational uses and the preservation of the county's scenery.

The following issues are covered by the Conservation Element: landform and physiography; soils and geology; water and water quality; air and air quality; vegetation; wildlife refuges; fish and wildlife; agriculture; timber; minerals; geothermal energy; natural gas; and cultural resources. Many of these issues are discussed from a regional or statewide perspective. The activities in much of the Sacramento Basin can affect resources (such as water or air) which cross jurisdictional boundaries. The use of other resources, such as minerals or natural gas, are strategically important on a regional or statewide level. Colusa County's diverse supply of natural resources establishes its role in the region.

# NATURAL RESOURCE PROFILE

## LANDFORM AND PHYSIOGRAPHY

Colusa County's landforms can be broadly assigned to two major types: the alluvial plains of the Central Valley, and the foothills, ridges, and valleys of the Coast Ranges. The eastern one-third of the County, bordered by the Sacramento River and Butte Creek, is essentially flat with a gently increasing elevation gradient towards the northwest, where the central third of the county is typified by level or gently rolling valley lands. The western boundary lies along high, steep ridges of the Coast Ranges. These mountains run along a north-south axis and are bisected by a series of deep and spectacular alluvial valleys, the most prominent of which include Bear Valley, Indian Valley, and Antelope Valley (see Figure CO-1). Elevations range from about 40 feet above sea level in the eastern portion of the county to 7,056 feet at the summit of Snow Mountain in the northwestern corner of the county.

A few of the streams which flow from the foothills have cut deep trenches in the ground. Sediments have been deposited in many of the original stream channels, causing the paths of the streams to migrate and form low ridges in the vicinity. The Colusa Basin forms a low trough, separated into sections by these channels, between the alluvial fans of the foothills and the slightly elevated Sacramento River flood plain. The Colusa Basin extends as far north as Orland, in Glenn County. Its southern boundary is the town of Knights Landing, which is located atop a low ridge separating the Colusa and Yolo Basins. Much of the area between the Sacramento River and Butte Creek has received recent sediment deposits from flooding.

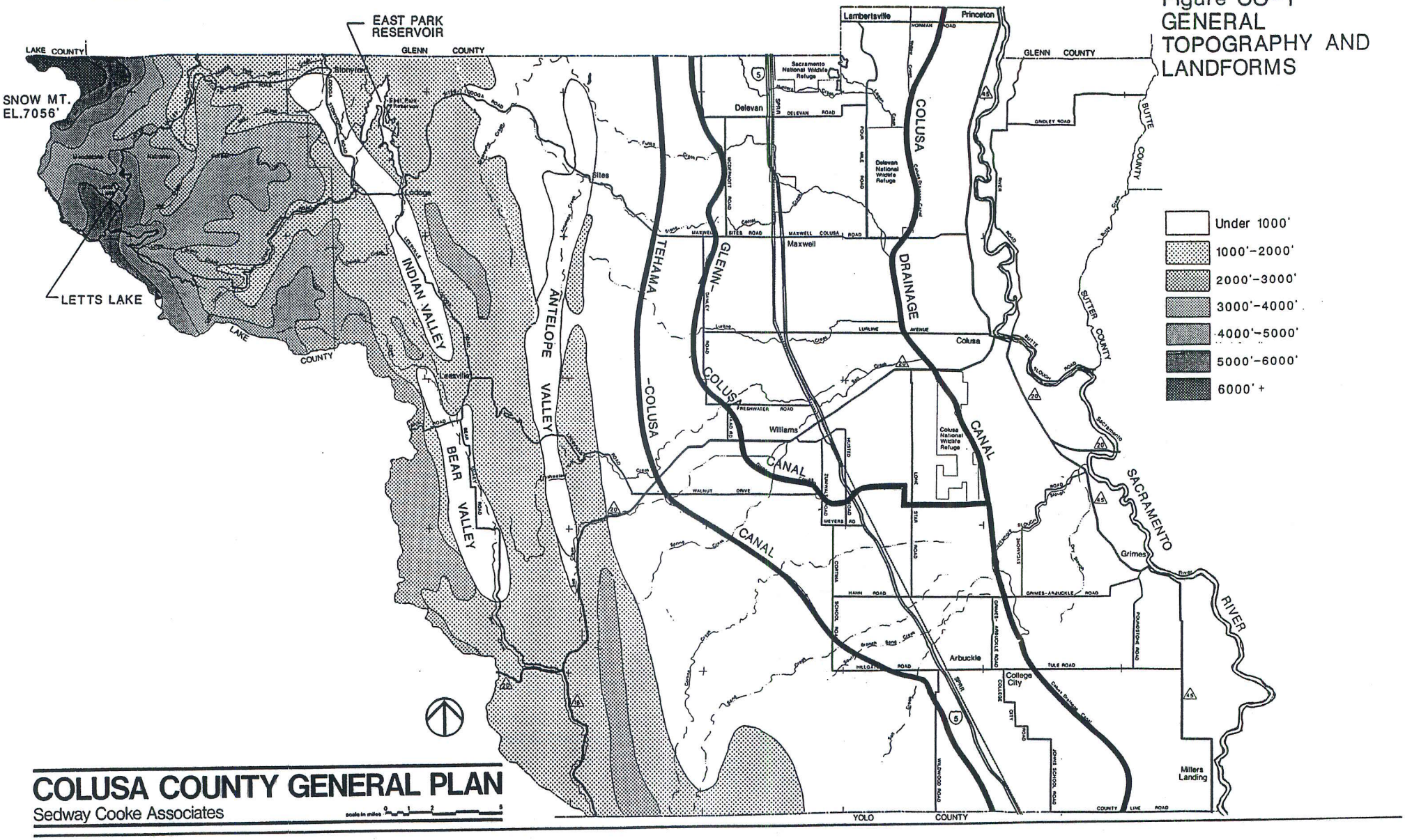
## GEOLOGY AND SOILS

The geologic history of Colusa County includes a mixture of ancient marine and alluvial deposits, uplifting of the Coast Ranges along clearly defined faults, and volcanic activity. About 300 million years ago, the valley and upland areas of Colusa County were occupied by a vast sea. Up to about 155 million years ago, periods of volcanic activity and uplifting were followed by periods of uplifting and folding which formed the Coast Ranges (Harradine 1948). These periods ended about 3-4 million years ago when sediments of the Tehama Formation were deposited from Coast Range streams onto the valley floor (CSU Foundation 1981).

The floor of the Sacramento Valley, which was formed by the uplift of the mountains surrounding it, is a structural trough which has been filled with a thick sequence of marine and alluvial sediments ranging in age from 135 million years to recent. It is suggested that these sediments may overlie a deep bed of volcanic or metamorphic rocks which were formed up to 350 million years ago (California Department of Mines and Geology 1966). The sediments may reach depths of up to 6 miles.

The Sutter Buttes, which are located just east of Butte Creek in adjacent Sutter County, were formed approximately 7 million years ago by volcanic activity which pushed andesite rock up through the valley floor. The sediments have since eroded, leaving the current landform. Some of the sediments now form portions of the deep soil layers of Colusa County's agricultural lands.

# Figure CO-1
# GENERAL TOPOGRAPHY AND LANDFORMS




**COLUSA COUNTY GENERAL PLAN**

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The historic sedimentary processes are directly related to the formation of the soils of the region. Most of the soils of the valley floor are alluvial silt loams, clays, and sands formed from the sedimentary igneous and metamorphic rocks deposited by the Sacramento River and various side channels (Harradine 1948). The sedimentary deposits on the valley floor form some of Colusa County's prime agricultural soils; however, some sediments are poorly drained and pose limitations for agricultural crops. The suitability of soils for agriculture are discussed further in a later section of this element.

Soils in the western foothills include undifferentiated loams and adobes which may contain fragments of the sandstones and shales from which they were made. Higher in the foothills, soils are very broken, deeply dissected, and rocky, limiting their use for agriculture. Some serpentine outcrops (exposed rock) are present in the southwestern corner of the county and on the ridge between Indian and Bear Valleys (California Division of Mines and Geology 1975; Holmes, et al., 1915).

## WATER AND WATER QUALITY

### Water Supply

The Colusa Basin Watershed in Colusa County includes the eastern slopes of the inner Coast Range, the trough of the Colusa Basin, and the Sacramento River. The county's precipitation averages 10 to 20 inches annually. Five major drainage areas (termed "Detailed Analysis Units" or DAU) are defined by the California Department of Water Resources according to topography. Figure CO-2 shows these drainage areas. Within each DAU are several smaller watersheds.

The surface water system in the county is made up of natural and man-made drainage systems. The Sacramento River is the most prominent natural water feature in the county. It flows in a general southerly direction, and ultimately drains the entire Sacramento Valley toward the San Francisco Bay. Numerous creeks and streams in the western portion of the county drain part of the Coast Ranges, including Stony Creek, Salt Creek, Little Stony Creek, Mill Creek, and Bear Creek.

The Stony/Elder Creek DAU drains north into Glenn County. Little Indian Creek and Indian Creek converge just south of Lodoga and flow north through Lodoga to East Park Reservoir, the only major impounded water body in the county, with a storage capacity of 50,900 acre-feet, a surface area of 1,820 acres, and a 43 mile shoreline. Frenzel Creek, Little Stony Creek and Hyphus Creek flow eastward out of the Mendocino National Forest to East Park Reservoir. Stony Creek flows just north of Stonyford, into Glenn County. Bear Creek, part of the Cache Creek DAU, drains Bear Valley, flowing southward to empty into Cache Creek in Yolo County, which flows westward from Clear Lake.

Hunters Creek, Stone Corral Creek, Freshwater Creek, Lurline Creek, and Salt Creek are among the watercourses which drain the lower foothills into the wetlands and rice fields of the Colusa Basin, an elongated catchment area lying parallel to and below the elevation of the Sacramento River. This water continues to flow as subsurface water which ultimately reaches the Sacramento River south of Colusa County.

Some runoff from the foothills and water from the Sacramento River is channeled into the Glenn-Colusa Canal, Tehama-Colusa Canal and the Colusa Drainage Trough (the 2047 Canal). These canals serve as the primary sources of irrigation water as well as flood control channels. Surplus water drains south, eventually entering the Sacramento River at the Knights Landing Ridge.

Most of the irrigation water for the county comes from the Glenn-Colusa Canal, which takes its principal supply from the Sacramento River at Hamilton City and a limited supplemental supply from Stony Creek. The canal is now managed by the Glenn-Colusa Irrigation District, the largest irrigation district in Northern California. In 1980, an estimated 462,600 acre-feet of water were transported and delivered to Colusa County via the Glenn-Colusa Canal. Water for the Tehama-Colusa Canal, located west and parallel to the Glenn-Colusa Canal, comes from the Sacramento River at the Red Bluff Diversion Dam. Management of the irrigation water supply is discussed in the Community Services Element of this Plan.

**Water Project Proposals**

The Bureau of Reclamation has considered the reformulation of the West Sacramento Canal unit, which includes the Tehama-Colusa Canal. A 1964 feasibility study proposed an extension of the Tehama-Colusa Canal through Yolo County, in order to supply additional water to portions of Napa, Solano and Yolo Counties. The project also proposed several storage facilities, including a reservoir at Sites.

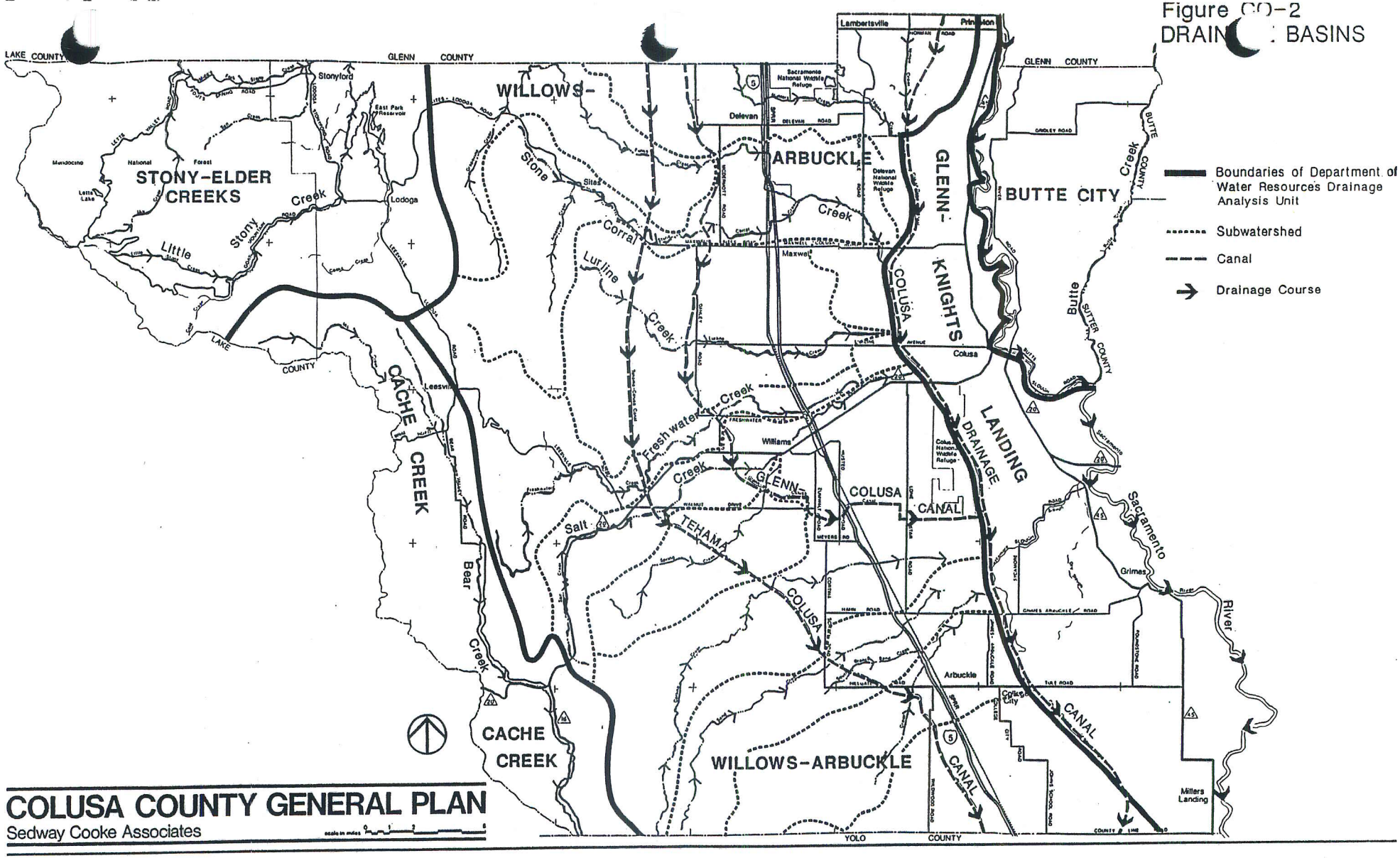
Work on this project was suspended for a time, and a 1981 feasibility study concluded that the project was not justified economically. Municipal and industrial demand for the project was justified, but demand for irrigation water was not. The 1981 study did conclude, however, that the Sites Reservoir could be used for Central Valley Project Water Storage, to be used to meet flow commitments in the Sacramento-San San Joaquin Delta and for future growth. The study estimated that the reservoir could contain more yield than would be required before the year 2010.

The proposal would involve delivery of surplus flows from the Tehama-Colusa Canal into the existing 1,170-acre-foot Funks Reservoir near Maxwell. This water would then be pumped to the proposed Sites Reservoir, which would hold 1,665,000 acre-feet of water (active capacity) for release during the dry season. The Sites Reservoir would have a maximum capacity of 1.8 million acre-feet, and would require a minimum of 135,000 acre-feet. Water would be contained by two dams and 12 dikes.

During a critical drought period (estimated using an extended dry period from May 1928 to December 1934), average annual runoff into Sites Reservoir would be only about 4,000 acre-feet, all of which would be needed to meet downstream commitments.

The Bureau of Reclamation makes no mention of water deliveries to Colusa County. Construction of the reservoir would eliminate the town of Sites, and would require relocation of the Sites-Lodoga Road. The lack of benefits for Colusa County, together with the project's obvious social and environmental effects, suggest that the County should not support its construction. Furthermore, there is no demonstrated need for the project at this time.

Figure CO-2
DRAIN[illegible] BASINS




# COLUSA COUNTY GENERAL PLAN

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## Groundwater

Groundwater is contained in underground formations called aquifers. The easterly portion of Colusa County is part of the Sacramento Basin, an extensive groundwater body. The principal sources of groundwater in the basin are geologic formations known as the Plio-Pleistocene Tehama Formation and the overlying Quaternary alluvium. The alluvium consists of recent alluvium to a depth of 100 feet, underlain by Pleistocene channel deposits to a depth of 200 feet. Groundwater in this area is generally unconfined, which means that it is free-flowing. The recent alluvium is saturated much of the year, as it absorbs water from rainfall and the overflow of small creeks. Areas of older alluvium and the Cretaceous rocks of the foothills do not bear much water.

Groundwater flows from the north in a southeast direction to the Sacramento River. In the winter groundwater recharge occurs primarily by deep percolation of precipitation and stream water. Groundwater levels in the county usually drop during the summer but are recharged during the rainy season. Most recharge occurs in the northern Sacramento Valley, in Glenn and Tehama Counties where rainfall is more abundant. During the summer, applied irrigation water also infiltrates to the groundwater basin, raising questions about groundwater quality.

## Water Use

The Department of Water Resources, which analyzes water statewide, has assembled data regarding agricultural and urban water use in Colusa County. Agriculture is the greatest water user in the county. Most agricultural operations are supplied with water from the Glenn-Colusa and Tehama-Colusa Canals, which is less expensive than pumping groundwater. Urban water is entirely pumped groundwater.

Agricultural Use. Table CO-1 lists the amount of irrigated land for certain crops in the county. Rice accounts for nearly half of the county's irrigated farmland, which totals 287,700 acres. The Willows-Arbuckle Detailed Analysis Unit (see Figure CO-2) accounts for most of the irrigation. Glenn-Knights Landing DAU and Cache Creek DAU together contain an insignificant amount of irrigated land.

Table CO-2 illustrates expected future irrigated lands by crop. According to this source, irrigated acreage is expected to increase slightly during the period covered by the General Plan. However, the acreage actually dropped in 1985, due partly to decreased demand for rice. Because much of the rice-growing lands are poorly drained and not well suited to other crops, the decreased demand for irrigated land in the Colusa Basin could continue. This decrease may be offset by increased demand for Tehama-Colusa Canal water on the west side of the valley.

Municipal and Industrial Use. Groundwater is the source for all urban water use in Colusa County. As shown in Table CO-3, municipal and industrial water use totaled 3,400 acre-feet in 1980. This figure is not expected to increase significantly; it is important to note, however, that the Department of Water Resources projection of water use for 2010 is based on a population of just over 17,000 (less than the General Plan projection) and decreased per-capita figures (see Table CO-4). Nevertheless, groundwater supplies are expected to be adequate to meet future demand.

Table CO-1: Colusa County Irrigated Acreage, 1980 (in 1,000s)

| Crop | Drainage Analysis Unit | | | | | County Total |
|---|---|---|---|---|---|---|
| | DAU 139[1] | DAU 163[2] | DAU 164[3] | DAU 167[4] | DAU 175[5] | |
| Grain | 0.2 | 29.0 | 30.0 | 4.7 | 0 | 63.9 |
| Rice | 0 | 92.0 | 30.0 | 16.0 | 0 | 138.0 |
| Sugar Beets | 0 | 3.5 | 3.0 | 0.5 | 0 | 7.0 |
| Corn | 0 | 8.9 | 2.9 | 1.0 | 0 | 12.8 |
| Other Field[6] | 0 | 15.8 | 12.4 | 4.0 | 0 | 32.2 |
| Alfalfa | 0 | 2.6 | 3.0 | 0.3 | 0 | 5.9 |
| Pasture | 0.5 | 3.7 | 1.0 | 0.1 | 0 | 5.3 |
| Tomatoes | 0 | 2.6 | 2.4 | 1.0 | 0 | 6.0 |
| Other Truck[7] | 0 | 9.1 | 1.5 | 1.4 | 0 | 12.0 |
| Almonds | 0 | 16.3 | 0.1 | 0 | 0 | 16.4 |
| Other Deciduous[8] | 0 | 1.4 | 5.5 | 3.7 | 0 | 10.6 |
| Grapes | 0 | 0.1 | 0 | 0 | 0 | 0.1 |
| Total Crop Acres | 0.7 | 185.0 | 91.8 | 32.7 | 0 | 310.2 |
| Double Crop | 0 | 12.0 | 7.0 | 3.5 | 0 | 22.5 |
| TOTAL IRRIGATED LAND AREA | 0.7 | 173.0 | 84.8 | 29.2 | 0 | 287.7 |

[1]Stony-Elder Creek (139)

[2]Willows-Arbuckle (163)

[3]Glenn-Knights Landing (164)

[4]Butte City (167)

[5]Cache Creek (174)

[6]includes milo, sudan, dry beans, safflower, and sunflower

[7]primarily melons, squash, cucumbers, and onions

[8]primarily prunes and walnuts

Source: Department of Water Resources, Land and Water Use in Colusa County, April 1987.

Table CO-2: Colusa County Historic and Projected Irrigated Acreage (in 1,000s)

| Crop | 1960 | 1972 | 1980 | 1990 | 2000 | 2010 |
|---|---|---|---|---|---|---|
| Grain | 0 | 5.0 | 63.9 | 59.2 | 60.2 | 61.2 |
| Rice | 73.9 | 90.0 | 138.0 | 153.0 | 153.0 | 153.0 |
| Sugar Beets | 10.1 | 16.0 | 7.0 | 7.2 | 7.2 | 7.5 |
| Corn | 0.2 | 0.3 | 12.8 | 12.2 | 12.4 | 12.7 |
| Other Field[1] | 19.9 | 24.7 | 32.2 | 33.3 | 34.4 | 36.3 |
| Alfalfa | 16.8 | 6.3 | 5.9 | 6.9 | 6.9 | 7.0 |
| Pasture | 15.1 | 5.7 | 5.3 | 4.8 | 4.4 | 4.1 |
| Tomatoes | 1.8 | 4.2 | 6.0 | 6.5 | 6.6 | 6.7 |
| Other Truck[2] | 1.0 | 6.3 | 12.0 | 13.0 | 14.0 | 15.0 |
| Almonds | 13.1 | 16.4 | 16.4 | 14.8 | 14.8 | 14.8 |
| Other Deciduous[3] | 7.8[4] | 11.1 | 10.6 | 11.2 | 11.2 | 11.2 |
| Grapes | 0 | 0 | 0.1 | 0 | 0 | 0 |
| Total Crop Acres | 159.7 | 186.0 | 310.2 | 322.1 | 325.1 | 329.5 |
| Double Crop | 0 | 2.0 | 22.5 | 26.5 | 28.5 | 31.5 |
| TOTAL IRRIGATED LAND AREA | 159.7 | 184.0 | 287.7 | 295.6 | 296.6 | 298.0 |

[1] includes milo, sudan, dry beans, safflower, and sunflower

[2] primarily melons, squash, cucumbers, and onions

[3] primarily prunes and walnuts

[4] includes 56 acres of olives

Source: Department of Water Resources, Land and Water Use in Colusa County, April 1987.

**ble CO-3: Population, Municipal Water Use, and High Water Using Industrial Water Use in Colusa County (in 1,000s or 1,000s of acre-feet)**

| Drainage Analysis Units | Population[1] | Gross Water Use[2] | Net Water Use[3] | Population | Gross Water Use | Net Water Use | Population | Gross Water Use | Net Water Use | Population | Gross Water Use | Net Water Use |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Stony-Elder Creek (139) | 0.2 | 0.1 | 0.1 | 0.2 | 0.1 | 0.1 | 0.3 | 0.1 | 0. | 0.4 | 0.1 | 0.1 |
| Willows-Arbuckle (163) | 6.5 | 1.6 | 0.8 | 6.9 | 1.6 | 0.8 | 7.3 | 1.6 | 0.8 | 8.1 | 1.7 | 0.9 |
| High Water Using Industrial: | | 0.1 | 0.1 | | 0.2 | 0.1 | | 0.2 | 0.1 | | 0.2 | 0.1 |
| Glenn-Knights Landing (164) | 5.6 | 1.4 | 0.7 | 6.5 | 1.6 | 0.8 | 7.2 | 1.6 | 0.8 | 8.0 | 1.7 | 0.9 |
| High Water Using Industrial: | | 0.1 | 0.1 | | 0.1 | 0.1 | | 0.1 | 0.1 | | 0.1 | 0.1 |
| Butte City (167) | 0.4 | 0.1 | 0.1 | 0.4 | 0.1 | 0.1 | 0.5 | 0.1 | 0.1 | 0.5 | 0.1 | 0.1 |
| Cache Creek (174) | 0.0[4] | -- | -- | 0.0[4] | -- | 0 | 0.1 | 0.0[4] | -- | 0.1 | 0.0[4] | -- |
| Subtotal: | | | | | | | | | | | | |
| Municipal: | | 3.2 | 1.7 | | 3.4 | 1.8 | | 3.4 | 1.8 | | 3.6 | 2.0 |
| High Water Using Industrial: | | 0.2 | 0.2 | | 0.3 | 0.2 | | 0.3 | 0.2 | | 0.3 | 0.2 |
| TOTAL | 12.7 | 3.4 | 1.9 | 14.0 | 3.7 | 2.0 | 15.4 | 3.7 | 2.0 | 17.1 | 3.9 | 2.2 |

[1] reflects Department of Finance projections

[2] gross water use calculated by multiplying total population by established per-capita water use values (see Table CO-4)

[3] net water use is an estimate of consumptive use and irrecoverable losses

[4] less than 50

Source: Department of Water Resources, Land and Water Use in Colusa County, April 1987

Table CO-4: Per-Capita Municipal Water Use Values and Annual High Water Using Industrial Water Use Values for Colusa County

| | Municipal Water Use[1] | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1980 | | 1990 | | 2000 | | 2010 | |
| Drainage Analysis Units | GPCD[1] | AFPCY[2] | GPCD | AFPCY | GPCD | AFPCY | GPCD | AFPCY |
| Stony-Elder Creek (139) | 200 | 0.223 | 190 | 0.212 | 180 | 0.201 | 170 | 0.190 |
| Willows-Arbuckle (163) | 220 | 0.246 | 210 | 0.234 | 200 | 0.223 | 190 | 0.212 |
| Glenn-Knights Landing (164) | 220 | 0.246 | 210 | 0.234 | 200 | 0.223 | 190 | 0.212 |
| Butte City (167) | 220 | 0.246 | 210 | 0.234 | 200 | 0.223 | 190 | 0.212 |
| Cache Creek (174) | 200 | 0.223 | 190 | 0.212 | 180 | 0.201 | 70 | 0.190 |

| | High Water Using Industrial[4] | | | |
|---|---|---|---|---|
| | 1980 acre-feet | 1990 acre-feet | 2000 acre-feet | 2010 acre-feet |
| Willows-Arbuckle (163) | 100 | 200 | 200 | 200 |
| Glenn-Knights Landing (164) | 100 | 100 | 100 | 100 |

[1]Municipal water use includes all commercial, residential, and light industrial water use within a drainage analysis unit. It does not include high water using industrial.

[2]GPCD = gallons per capita per day

[3]AFPCY = acre-feet per capita per year

[4]High water using industrial is calculated on an annual basis.

Source: Department of Water Resources, Land and Water Use in Colusa County, April 1987.

Table CO-5 illustrates water inflow and outflow for the largest drainage analysis units in the county. The important point to note from this table is the large amount of outflow from the county, which implies there is excess water capacity yet to be utilized. However, it should also be noted that this excess capacity could be easily consumed if large-scale industrial development occurs in the county. The DEIR for Williams Industrial Properties, which represents just one-fifth of the land designated for industry in the county, indicated that the project could consume 2.7 million gallons of water per day when fully developed. This is equivalent to the average daily water consumption of the entire city of Colusa during the peak month of July.

Wildlife Refuges. The Sacramento Valley wetlands, including Colusa County's wildlife refuges, comprise a critical part of the Pacific Flyway. The refuges receive a limited amount of water from the Bureau of Reclamation's Central Valley Project canals. Because the Bureau does not recognize wildlife as a "beneficial use" of its water, and because the Bureau is not legally committed to supply that water, the future of these wintering grounds is not assured. This is true throughout California, where each wetland area is critical to the annual migration. The amount of wetlands in the state have diminished considerably in this century, and only a small portion of the remaining wetlands are publicly owned.

The three wildlife refuges in Colusa County encompass 12,000 acres, or 1.6 percent of the county. The US Fish and Wildlife Service has proposed that some 5,000 acres of additional land be acquired as part of a new 18,000-acre refuge along the Sacramento River. Their proposal has met strong local opposition, primarily because of its impact on agriculture.

## Water Quality

In general, Colusa County's surface water and groundwater supplies are thought to be of good quality for agricultural and domestic use. Several studies have been conducted on water supplies downstream and upstream of the county to determine the effects of agriculture herbicides and pesticides, and to assure that drinking water is safe. Although these studies have uncovered isolated problems, water quality on the whole is good.

Surface Water. Contamination of irrigation runoff with residues of rice-growing herbicides has led to concern over downstream water quality in the Sacramento River. These herbicides--Ordram, Bolero, and Basagran--are commonly used by rice-growers for weed abatement purposes. Monitoring studies conducted by the Department of Fish and Game and others have shown that fish losses in the Colusa Basin Drain and chemical residues in drinking water are due in part to contamination from the herbicides. In 1982, various state agencies and the Rice Industry began efforts to mitigate these problems. The Departments of Health Services and Fish and Game set action guidelines to protect public health and aquatic life, while the Department of Food and Agriculture (DFA) established a rice herbicide control program, which is administered by the local Agricultural Commissioner.

In 1986 Basagran was detected in Sacramento River water for the first time. Residues of this herbicide were also found in Sacramento city tap water. In response, the DFA strengthened its herbicide control program, and expanded it to include Basagran. The program basically limits herbicide sales and requires irrigation water holding periods.

**Table CO-5: Water Supply and Use** (TAF = Thousands of Acre-Feet)

| Drainage Analysis Unit/Supply | | Depletion | | Outflow | |
|---|---|---|---|---|---|
| **Willows-Arbuckle (163)** | | | | | |
| **Total Supply:** | **774.1** | **Total Depletion:** | **499.6** | **Total Outflow:** | **274.5** |
| o Surface Supply | 602.6 | o E-T of Applied Water | 398.4 | o Yolo County | 274.5 |
| -- Tehama-Colusa Canal | (50.3) | o Riparian & Conveyance E-T | 35.1 | -- DAU 163 | (174.5) |
| -- Wildlife Refuge | (44.4) | o Percolation | 66.1 | -- DAU 164 | (100.0) |
| -- Sacramento River Diversions | (498.2) | | | | |
| o Ground Water | 96.5 | | | | |
| o Drainage Inflow (DAU 163 Glenn County) | 75.0 | | | | |
| **Glenn-Knights Landing (164)** | | | | | |
| **Total Supply:** | **381.1** | **Total Depletion:** | **241.5** | **Total Outflow:** | **139.5** |
| o Surface Supply | 215.6 | o E-T of Applied Water | 195.7 | o Yolo County and Colusa Basin Drain | 139.5 |
| -- Wildlife Refuge | (7.0) | o Riparian & Conveyance E-T | 4.3 | | (174.5) |
| -- Sacramento River Diversions | (208.6) | o Percolation | 41.5 | | |
| o Ground Water | 84.3 | | | | |
| o Drainage Inflow (DAU 163 Glenn County) | 81.1 | | | | |
| **Butte City (169)** | | | | | |
| **Total Supply:** | **213.1** | **Total Depletion:** | **102.7** | **Total Outflow:** | **110.4** |
| o Surface Supply | 80.3 | o E-T of Applied Water | 85.5 | o Butte Creek | 110.4 |
| -- Sacramento River Diversion 1004 | (62.9) | o Riparian & Conveyance E-T | 8.9 | -- (with 89.8 TAF from Butte Creek DAU 166; outflow to Sutter Co. DAU 165 or 166 is 105.3 TAF; spill to Butte Creek outfall is 94.9 TAF) | |
| -- Small Sacramento River Diversion | (17.4) | o Percolation | 8.3 | | |
| o Ground Water | 15.8 | | | | |
| o Drainage Inflow | 117.0 | | | | |
| -- DAU 166 Glenn County | (43.0) | | | | |
| -- DAU 166 Butte County | (56.4) | | | | |
| -- DAU 167 Glenn County | (17.6) | | | | |

Note: DAUs 139 and 174 are not included

Source: Department of Water Resources, Land and Water Use in Colusa County, April 1987.

Also in 1986, California voters passed Proposition 65, the Safe Drinking Water and Toxics Enforcement Act, which prohibits businesses from discharging chemicals that cause cancer or reproductive damage into the drinking water supply, unless the business can prove that the chemical doesn't pose a significant risk. The Governor has compiled a list of 29 known chemicals, which was to be published in 1988. The effects of Proposition 65 on agriculture remain to be seen.

The State Water Resources Control Board has been studying the Sacramento River since 1984 through its toxic substances monitoring program. Molinate and Thiobencarb, which are associated with rice herbicides, were detected in various places, particularly north of Sacramento. Heavy metals were also detected. These were attributed to runoff from inactive mines on a tributary of the river near Redding.

The Central Valley Regional Water Quality Control Board recently performed an assessment of the water quality within its jurisdiction (Beneficial Use Assessment Final Report, 1986). This study noted the presence of pesticides, PCBs, and excessive sediments in the Sacramento River drainage system in Colusa County. The presence of the pesticides was attributed to agricultural runoff. Erosion of the surrounding foothills was seen as the cause of sedimentation. Rice herbicide control programs have reduced the levels of pesticides in the water, but the source of the PCBs is unknown.

Groundwater. Groundwater quality in the Sacramento Valley as a whole is considered good for irrigation and domestic uses. The State Department of Water Resources (DWR) monitors domestic and agricultural wells for mineral content, primarily naturally occurring heavy metals. The DWR's primary concern relative to water quality in Colusa County is high concentration of boron in some irrigation water and high concentrations of nitrates and chloride in some domestic water. The DWR has found that areas with higher than normal concentrations of nitrates are generally associated with sewage effluent as opposed to pesticides and herbicides. According to the DWR there are presently no critical water quality problems in the County. The Central Valley RWQCB found no confirmed evidence of groundwater contamination in drinking water well tests that were recently conducted. However, higher than normal concentrations of several constituents have been found in certain areas of the county, including the area along the Sacramento River between Colusa and Grimes which contained high concentrations of sodium and sulfate (USGS and DWR, Investigation 77-133). In other instances, particularly where domestic wells are in close proximity to septic systems, nitrate contamination has been recorded by the Environmental Health Department.

Injection Wells. There are currently two active injection wells located in Colusa County. These wells are used to dispose of saline water which is drawn up during the extraction of natural gas. Due to the uncertainty over potential groundwater contamination from these wells, the County Planning Commission is requiring further environmental analysis prior to allowing further development of injection wells. Two additional wells have been approved, but will be subject to a series of mitigating measures specified by the county.

Wildlife Refuges. There is a high potential for future water quality problems in the refuges due to their proximity to agricultural uses and to the naturally occurring mineral content of the soil. The Fish and Wildlife Service rates the water quality conditions of National Wildlife Refuges on a scale of A to D. A rating of "A" indicates that serious on-site water quality problems at a refuge have been docu-

mented and that immediate attention to water quality problems is necessary. A rating of "D" indicates that no water quality problems exist and there is little potential for future water quality problems. The three refuges in Colusa County are given a rating of "C," indicating that there is "on or off-site circumstantial evidence indicating priority need for additional reconnaissance monitoring." The Fish and Wildlife Service is currently planning for this monitoring; however, no plans have actually been implemented.

## AIR QUALITY

Colusa County is located within the Sacramento Valley Air Basin, as designated by the California Air Resources Board (ARB). Air quality problems in the county are primarily related to the practice of rice burning. The Air Pollution Control District office in Sacramento decides how much burning to allow in the valley throughout the year. This agency notifies each county of the number of acres which may be burned. The Director of Colusa County's local Air Pollution Control District relays the information to the local fire departments. Burn days and no-burn days are designated according to regional weather patterns and pollutant levels. Most of the burning occurs during a 3-month period in spring and a 3-month period in fall. Fire officials have a list of rice farmers who have requested permission to burn their fields. The Colusa County Board of Supervisors is currently reviewing a county burning law which will both fine and jail illegal burners.

Dust from agricultural operations such as rice driers also contributes to overall pollutant levels in the County. This activity often occurs at the same time as the autumn burn period. Wildfires in the forests of the Sierra Nevada and the Mendocino National Forest also affect Colusa County's air quality. Nevertheless, overall air quality in the County is relatively good.

The Air Resources Board operates three monitoring stations within the County. Two are within the city of Colusa, and one is located in Arbuckle. Pollutant levels measured in the two communities are similar. Countywide levels are fairly low. The only pollutants currently monitored at these stations are ozone, ten-micron[1] particulates, ten-micron sulfate, and 10-micron nitrate (see Table CO-6).

## VEGETATION

Colusa County supports five major plant communities: wetlands, including vernal pools and riparian vegetation, valley grassland, chaparral, foothill woodland, and pine-fir forest (Munz and Keck 1968). In addition, there are scattered pockets of mature riparian forests, and northern interior cypress forests. Figure CO-3 shows the general distribution of vegetation in the county.

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[1] At least 10 microns in diameter.

**Table CO-6: Colusa County Air Quality Data 1984-85**

| Pollutant | State Standards | National Standards |
|---|---|---|
| Ozone | .10 ppm.[1] hourly | .12 ppm. hourly |
| Ten-micron particulates ($pm_{10}$) | 50 micrograms per cubic meter, 24-hour | none |
| Sulfates | 25 micrograms per cubic meter, 24-hour | none |
| Ten-micron $NO_3$ ($nitrate_{10}$) | 25 micrograms per cubic meter total $SO_4$, 24-hour | none |

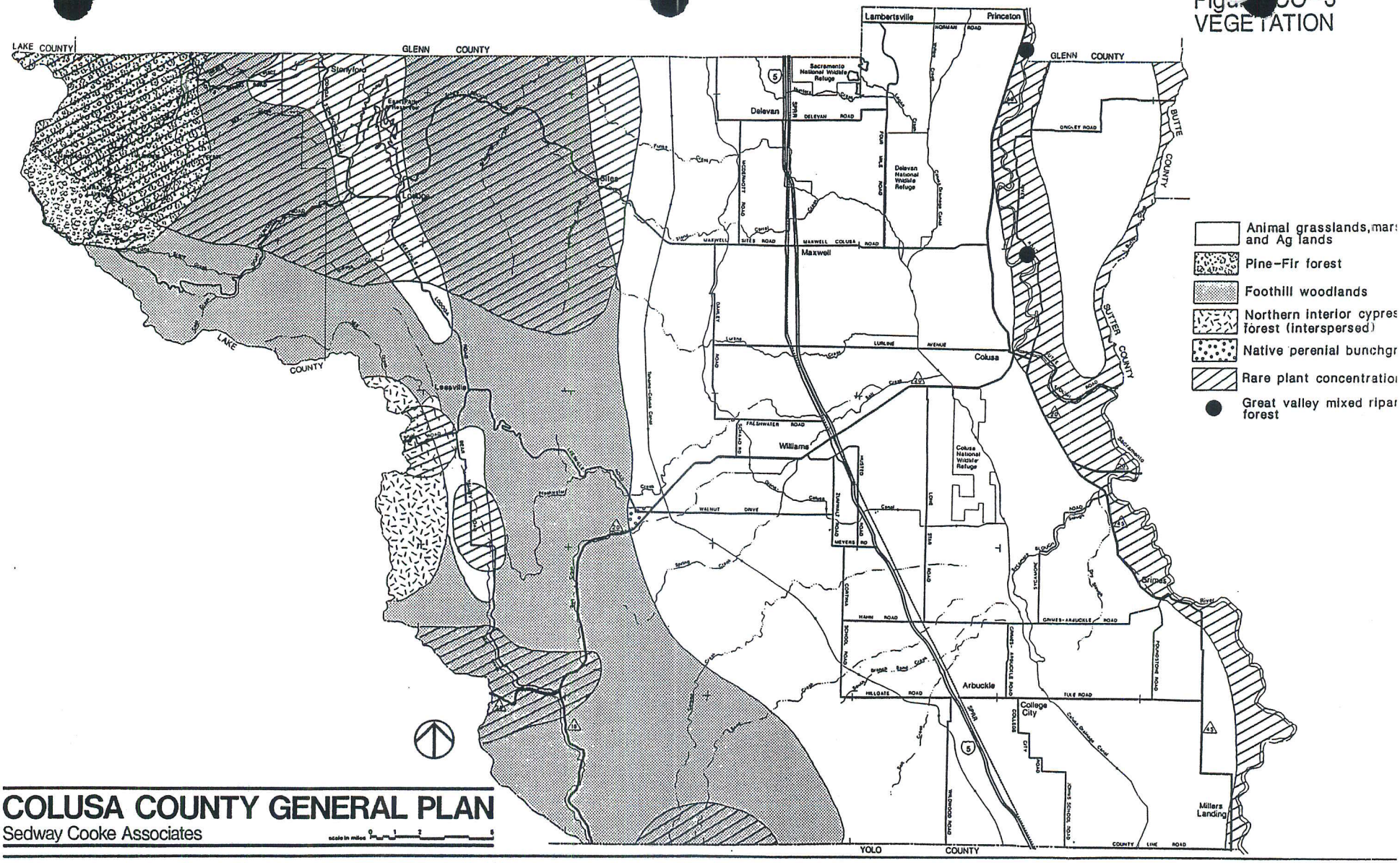
| Ozone | 1984 | 1985 |
|---|---|---|
| Daily Maximum Hourly Concentration | .11 | .11 |
| Mean Concentration of All Hours | .034 | .030 |

| Ten-Micron Pollutant | Highest Annual 24-hour concentration | Number of Samples Greater than 50[2] |
|---|---|---|
| $Particulates_{10}$ | 90 | 2 |
| $Sulfate_{10}$ | 1.7 | -- |
| $Nitrate_{10}$ | 2.3 | -- |

[1] parts per million

[2] micrograms per cubic meter

Figure CO-3
VEGETATION

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## Wetlands

Freshwater wetlands and marshes are primarily found along the Sacramento River and in the National Wildlife Refuges, flooded rice fields also serve as wetlands during parts of the year. Seasonally wet pockets of vegetation can be found throughout the county. Known as vernal pools, they are local depressions which fill with water in the winter and dry slowly in the spring and summer. They are of considerable scientific and aesthetic interest because they often support rare plants or unique wildlife species. Spectacular displays of spring color can be observed at the edges of the pools as they dry. Northern hardpan vernal pools are listed on the California Natural Diversity Data base (CNDDB) as a priority B1.2 natural community. This indicates that these communities are rare and threatened.

Riparian woodlands are located along stream channels and river courses. These areas were once very plentiful but have been diminished by cultivation of the flood plain and alteration of the river. Only 12,000 acres of the original 800,000 acres of riparian woodland in the Sacramento Valley remain today. Riparian vegetation is often lush in comparison to surrounding areas, and may form a corridor as narrow as a few yards or as wide as several hundred yards occupied by oak and cottonwood trees or shrubs such as blackberry and wild rose. These areas are very important in providing nesting and feeding sites for wildlife. Flood control and channelization activities have decreased the extent of these habitats throughout the Central Valley and have adversely affected the hydrological conditions which contribute to their existence.

Currently there are two good stands of mixed riparian forest remaining along the Sacramento River in Colusa County, one of which also includes stands of alluvial and riparian herbs. The CNDDB priority rating for this community is BU, indicating that it is possibly threatened. Minor pockets of riparian forest and herbs may be found along other portions of the Sacramento River and along several of the County creeks and drainage canals.

## Valley Grassland

Valley grassland communities originally occupied much of the entire Central Valley and included various perennial bunch grass species such as needle grass, bunch or blue grass, and three-awn (Stipa pulchra, Stipa cernua, Poa scabrella, and Aristida divaricata). The valley grassland community is characterized by a lack of trees and flat or rolling topography. This plant community occupies lands which have since been cultivated or grazed. Consequently, most of the perennial grasses have been eliminated, and the native species have been replaced with introduced annual species such as brome (Bromus spp.), fescue (Festuca spp.), and oats (Avena spp.). Only one area of the native valley grassland community is known in Colusa County. This occurs along Salt Creek, about 10 miles west of Williams, as shown on Figure CO-3. Because of its greatly diminished range, this native plant community is of great botanical interest. All other grassland communities in the county are heavily infused with non-native annual grasses and forbs.

## Foothill Woodland

The foothill woodland community is present throughout most of the western half of the county, up to an elevation of about 4,500 feet. It is characterized by scattered

trees with an undergrowth of grasses and shrubs. Common tree species include blue oak (Quercus douglasii), interior live oak (Quercus wislizenii), digger pine (Pinus sabiniana) and California buckeye (Aesculus californicus). Buck brush (Ceanothus coneatus), poison oak (Rhus diversiloba), and bush lupine (Lupinus sp.) are common shrubs.

### Chaparral

The chaparral community appears in Colusa County interspersed with the foothill woodland community. It typically occurs where local soil conditions are not favorable for significant tree growth (often on serpentine soils), and at lower elevations. Chaparral is characterized by shrubs such as chaparral pea (Pickeringia montana), chamise (Adenostoma fasciculatim), manzanita (Arctostaphylos spp.), and toyon (Heteromeles arbutifolia). Interior live oak (Quercus wislizenii), scrub oak (Quercus dumosa), fescue grasses (Festuca spp.), poison oak (Rhus diversiloba), California lilac (Ceanothus parryi), sagebrush (Artemisia douglasiana), and coyote brush (Baccharis pilularis) are also part of the chaparral community.

### Pine-fir Forest

The northwest corner of the county contains pockets of mixed pine and fir forest. Major tree species are ponderosa pine (Pinus ponderosa), sugar pine (P. lambertiana), douglas fir (Pseudotsuga menziesii), white fir (Abies concolor), and black oak (Quercus kellogii). Small pockets of northern interior cypress forest are located near the Lake County border in the vicinity of Baldy Mountain.

### Rare Plant Species

There are several rare, endangered, or candidate plant species which are present in Colusa County[1]. These include:

- Indian Valley brodiaea, Brodiaea coronaria
- Palmate-bracted bird's beak, Cordylanthus palmatus
- Brandegee's eriastrum, Eriastrum brandegeae
- Tracy's eriastrum, Eriastrum tracyi
- Erigonum nervulosom, Erigonum nervulosum
- Diamond-petaled California poppy, Eschscholzia rhombipetala
- Adobe lily, Fritillaria pluriflora
- Drymaria-Lake dwarf flax, Hesperolinon drymariodides
- California hibiscus, Hibiscus Californicus
- Few-flowered navarretia, Navarretia pauciflora
- Colusa grass, Neostapfia colusana
- Lake County stonecrop, Parvisedum leiocarpum
- San Francisco campion, Silene verecunda ssp. verecinda

Table CO-7 shows the status of each of these plants (Smith and York 1984, U.S. Fish and Wildlife Service 1984a, 1985b; California Department of Fish and Game 1984,

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[1] These plants have actually been located in the county; their specific locations have been plotted on USGS Quad Sheets by the State Dept. of Fish & Game.

Table CO-7: Status of Plant Species of Special Concern Found in and Around Colusa County

| | STATUS | | | |
|---|---|---|---|---|
| | Federal | State | CNDDB Priority | CPNS List |
| Brodiaea coronaria ssp. Rosea Indian Valley brodiaea | C2 | E | B1.1 | IB |
| Cordylanthus palmatus Palmate-bracted bird's beak | C1 | E | A1.1 | IB |
| Eriastrum tracyi Tracy's eriastrum | C2 | - | B1.2 | IB |
| Erogonum nervulosum Erogonum nervulosom | C2 | R | B3.1 | IB |
| Eschscholzia rhombipetala Diamond-petaled California poppy | C2 | - | A1.1 | IB |
| Fritillaria pluriflora Adobe lily | C2 | - | B2.1 | 3 |
| Hesperolinon drymariodides Drymaria-like dwarf-flax | -- | - | B1.1 | IB |
| Hibiscus californicus California hibiscus | C2 | - | B1.1 | IB |
| Lupinus milo-baker milo Baker's lupine | T | | | |
| Navarretia pauciflora Few-flowered navarretia | C2 | - | A1.1 | IB |
| Neostapfla colusana Colusa grass | C2 | E | B1.1 | IB |
| Parvisedum Leiocarpum Lake Co. stonecrop | C2 | - | A2.1 | IB |
| Silene vercunda ssp. Verecunda San Francisco campion | C2 | - | BU | IB |

Federal: Ci = Candidate Endangered, Category 1; C2 = Candidate Endangered, Category 2

State: E = Endangered; T = Threatened; R = Rare

CNDDB PRIORITY: A1.1 = Extremely rare, endangered, and unprotected species

A1.2 = Extremely rare and threatened species

A2.1 = Very rare, endangered, and unprotected species

A2.2 = Very rare, and threatened species

B1.1 = Rare and endangered species or extremely rare, endangered or threatened subspecies

B1.2 = Rare and threatened species or very rare, endangered or threatened subspecies

B2.1 = Uncommon and threatened species or rare and endangered subspecies

B2.2 = Rare and not threatened, or peripheral and endangered in California only, species or rare and threatened subspecies

B3.1 = Uncommon and declining, or peripheral and threatened in California only, species or uncommon and threatened, or peripheral and endangered in California only, subspecies

B3.2 = Wide-spread and declining species or uncommon and declining, or peripheral and threatened in California only, subspecies

BU = Possibly threatened, needs more information

CNPS LIST: 1 = Plants rare and endangered in California and elsewhere; 3 = Plants about which we need more information

CNDDB 1986). Three species, Indian Valley brodiaea, palmate-bracted bird's beak, and Colusa grass are listed as endangered by the State of California. Tracy's eriastrum is listed as rare. All other plants listed are candidate species which are not currently provided legal protection but which may be listed in the near future. Rare plant concentration areas include the serpentine outcrops of the west county, the Sacramento River, Butte Creek, and the National Wildlife Refuges.

## WILDLIFE REFUGES

There are three National Wildlife Refuges (NWR) in Colusa County: Colusa NWR, Delevan NWR, and Sacramento NWR. Butte Sink, located just across the Sutter-Colusa County border, is also an important area for waterfowl. The refuges represent a small portion of the vast grasslands, seasonal marshes, and swamps that were once common in the Sacramento Valley. In the mid-19th century, California had over 5 million acres of wetlands. By the 1920s, the number fell to 1.2 million acres. Today, there ae only 410,000 acres, of which 300,000 acres are privately owned and 80,000 acres are in state and federal wildlife refuges. The refuges in Colusa County total about 12,000 acres--15 percent of the State's refuge total--and are administered by the U.S. Fish and Wildlife Service.

Many of the ducks and geese wintering in the Sacramento Valley are reared in Alaska and the midwest region of North America. Most of the geese migrate from Alaska and the Canadian Arctic. Ducks begin arriving in increasing numbers in August and are joined by geese in September and October. Numbers may exceed 2 million by December, after the wetland areas of the Klamath Basin and other areas to the north become frozen. Pintails, mallards, widgeon, northern shoveler, green-winged teal, and snow, Ross, white-fronted, and cackling Canada geese are most commonly seen during these months, but the careful observer can find many others. Waterfowl numbers gradually decline in February and March, leaving a few hundred mallards and cinnamon teal, and a smaller number of wood ducks, ruddy ducks, and several species of shorebirds to rear young during the summer months.

The marshes, with readily available fish and invertebrates, are also attractive to grebes, white pelicans, egrets, herons, and bitterns. Shorebirds can be seen any month of the year. Raptors find an abundance of rodents or small birds on which to feed. Woodpeckers, warblers and other passerine birds can be seen in the cottonwoods and willows bordering irrigation ditches and creeks. Although managed mainly for migratory waterflow, the refuges are attractive to other forms of wildlife, including 29 known species of mammals, four species of reptiles, two species of amphibians, and 12 species of fishes.

Rice farms also provide some habitat for migrating birds. Many of the farms are flooded after harvest and leased to duck-hunting clubs. Rice is also grown on the wildlife refuges, partly to deter migrating birds from feeding on privately-owned rice farms before harvest. The rice on refuges and the stubble left on farms after harvest does provide food for water birds. However, many of the wetlands are only flooded during the hunting season, which does not permit the growth of other plants which are essential food source.

## General

Colusa County's plant communities support a variety of wildlife habitats, as shown in Figure CO-4. The annual grassland habitats support bird species such as the red-tailed hawk (Buteo jamaicensis), American kestrel (Falco sparverius), American crow (Corvus brachyrhynchos), yellow-billed magpie (Pica nuttalli), and a variety of songbirds. Common mammals include the deer mouse (Peromyscus meniculatus), striped skunk (Mephitis mephitis), California ground squirrel (Spermophilus beecheyi), and Botta's pocket gopher (Thomomys bottae).

Foothill woodland and chaparral habitats support species such as the screech owl (Otus asio), acorn woodpecker (Melanerpes formicivorous), opossum (Didelphis marsupalis), and western rattlesnake (Crotalus viridis).

Game birds, mammals and furbearers found in Colusa County include California quail (Callipepla californica), ring-necked pheasant (Phasianus colchicus), wild turkey (Meleagris gallopavo), western gray squirrel (Sciurus griseus), bobcat (Lynx rufus), raccoon (Procyon lotor), and gray fox (Urocyon cinereoargenteus). The marshes and refuges of the Sacramento River basin provide habitat for numerous species of migrating waterflow including Mallard (Anas platyrynchos), pintail (Anas acuta), and American widgeon (Anas americana). The range of the East Park-Capay deer (Odocoileus hemionus columbianus) stretches the length of the county and encompasses the grasslands west of Interstate 5 to the Lake County border.

Tule elk (Cervus elaphus nannoides) were transplanted into the Cortina Ridge area in 1922 in a statewide effort to increase their numbers. At that time, there were only about 200 Tule Elk known to exist in the state. Their numbers have since increased significantly, and they currently inhabit the steep canyons of the southwest county. Nonetheless, the Tule Elk is still a candidate for protection in California. Tule Elk have created some problems for local ranchers, and the California Department of Fish and Game has been studying the problem.

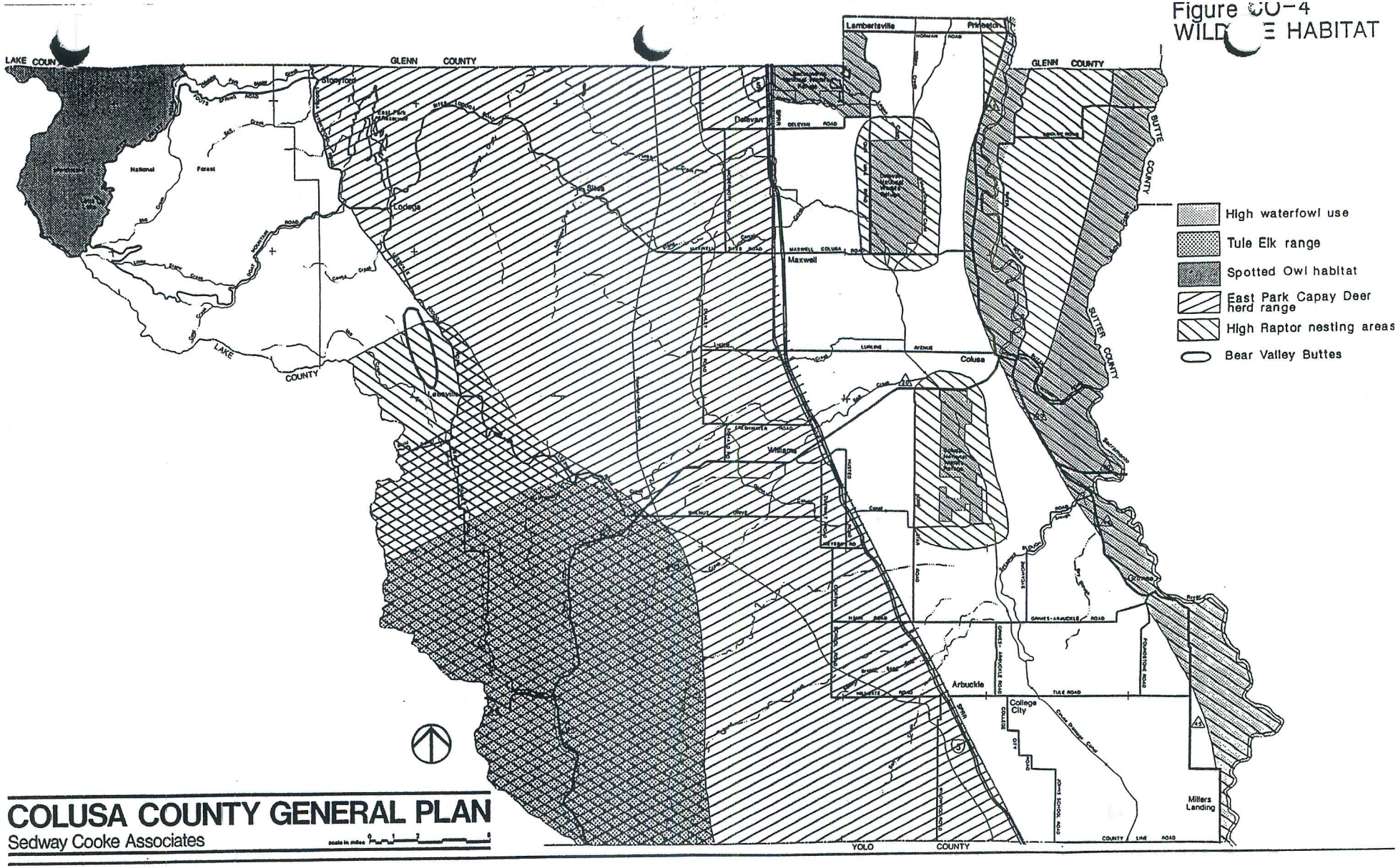
There are several areas of high raptor nesting in the county including the National Wildlife Refuges, the Sacramento River Corridor, and the Bear Valley Buttes.

## Threatened and Endangered Wildlife

Several known and candidate threatened or endangered wildlife species can be found in Colusa County. The following is a list of these species with the listing agency's designation in parenthesis:

- Valley elderberry longhorn beetle, Desmocerus californicus dimorphus, (FT)
- Giant garter snake, Thamnophis couchi gigas, (ST, FC)
- Western pond turtle, Clemmys marmorata, (FC)
- Aleutian Canada goose, Branta canadensis leucopareia, (FE)
- Greater sandhill crane, Grus canadensis tabidia, (ST)
- Swainson's hawk, Buteo swaonsoni, (FC, ST)
- Golden eagle, Aquila chrysaetos, (SC)
- Bald eagle, Haliaeetus leucocephalus, (FE, SE)

Figure CO-4
WILDLIFE HABITAT

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- Peregrine falcon, Falco peregrinus, (FE, SE)
- Prairie falcon, Falco mexicanus, (SC)
- Cooper's hawk, Accipiter cooperi, (SC)
- Spotted owl, Strix occidentalis, (SC, FSS)
- Yellow-billed cuckoo, Coccyzus americanus occidentalis, (ST, FC)
- Bank swallow, Riparia riparia, (SC)
- Purple martin, Progne subis, (SC)
- Lesser kangaroo rat, Dipodomys californicus eximus
- San Joaquin pocket mouse, Perognathus inornatus, (FC)
- Tule elk, Cervus elaphus nannoides, (SC)

(FE - Federal Endangered; FT - Federal Threatened; FC - Federal Candidate; FSS - Forest Service Sensitive Species; ST - State Threatened; SE - State Endangered; SC - State Candidate; U.S. Fish and Wildlife Service 1984, 1985; Department of Fish and Game 1985; Remsen 1978).

Most of these species are associated with riparian or wetland areas of the valley floor or foothills. The raptors can be found throughout the county, but also typically nest near creeks or streams. The spotted owl is found in the northwest corner of the county in the pine-fir forests. The small mammals, including the lesser kangaroo rat and San Joaquin pocket mouse, are found in remnant patches of native grassland.

## Fisheries

The Colusa County Area is within the Central Valley Subsystem of the Sacramento-San Joaquin Province. Fishes endemic to this region include several anadromous salmonids and trout, now greatly reduced in numbers due to flow diversions and upstream damming. Bank alteration has also been a significant factor in the reduction of spawning habitat for species such as king salmon (Oncorhynchus tshawytscha) and steelhead (Salmo gairdneri). To mitigate these problems, fish screens at pumping plants in the Sacramento River are designed to move anadromous fish upstream without being sucked into the pumping plant. However, a poorly designed fish screen, such as the one for the Glenn-Colusa Irrigation District near Hamilton City, has resulted in non-renewal of a dredging permit by the U.S. Corp of Engineers. This issue was resolved in 1987 when the Glenn-Colusa I.D. signed a memorandum of understanding with the California Dept. of Fish and Game to conduct a study for long-term solutions for river meander and fish screening problems at the pumping plant.

A few anadromous species are also found in other waterways in the county, including the Pacific lamprey (Entosphenus tridentatus) and white sturgeon (Acipenser transmontanus). Several native non-anadromous species present in the Colusa area are also found elsewhere. These include the Sacramento squawfish (Ptychocheilus grandis), hard-head (Mylopharodon conocephalus), and Sacramento sucker (Catostomas occidentalis). Introduced species form a major part of many of the fisheries, with striped bass (Morone saxatilis) being the dominant anadromous species. Various species of the sunfish family, such as largemouth bass (Micropterus salmoides), comprise the major resident species. Three introduced catfish species are also present. Carp (Cyprinus carpio) probably comprises the greatest percentage of the introduced resident species.

In the higher altitude streams, the California roach (Hesperoleucus symmetricus) is the primary native species, occasionally coexisting with Sacramento squawfish and Sacramento suckers. The larger streams are comprised of resident rainbow trout, occasional introduced brown trout (Salmo trutta), and several introduced species including smallmouth bass (Micropterus dolomieui), and green sunfish (Lepomis cyanellus. Still waters in these areas contain mostly introduced species including bass, catfish, and, most often, carp. According to a 1986 study by the California Department of Fish and Game, there is a possibility that the Thicktail Chub (Gila crassicauda) exists within the county. An endangered species which is thought to be extinct, the Thicktail Chub formerly was common in lowland waters of the Central Valley. It never has been recorded in the area (Clendenen & Associates 1980).

## AGRICULTURE

Agriculture is the county's most distinguishing feature. It provides the physical and rural environment that local residents enjoy and dominates the economy of the county. Cropland and rangeland account for 60 percent of the county's total land area, and in 1985 produced $141.6 million worth of goods. It is the county's foremost objective to preserve agricultural land and to promote practices that will conserve prime soils.

### Soils and Erosion

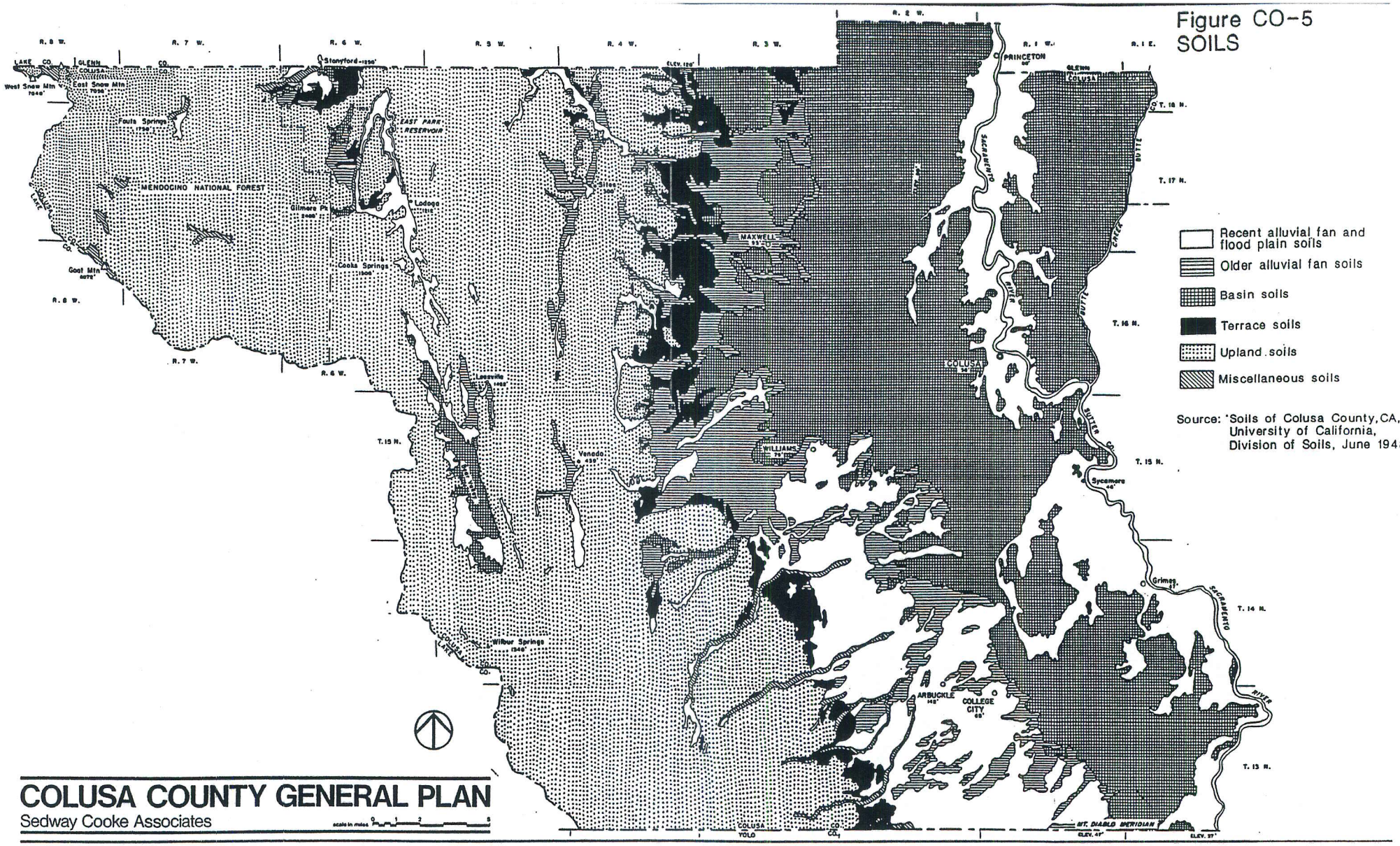
Agricultural soils in the county can be divided into four major classifications: recent alluvial fan and flood plain soils; older alluvial fan soils; basin soils; and terrace soils. Most of the soils are alluvial and originated either from runoff from the Coast Range mountains, or overflow from the Sacramento River. The extent of these soil types is shown in Figure CO-5. The last comprehensive soil study in the County was completed in 1947. The Soil Conservation Service is currently updating soils data and will have maps available by 1993.

The recent alluvial soils occupy a relatively thin strip along both sides of the Sacramento River and large areas east of the foothills and south of Williams. These soils have deep permeable profiles, but may have alkali (salt) problems in some areas due to poor drainage. They are still considered to be the best soils in the County. Most of the prune and walnut orchards are grown on these soils along the Sacramento River; south and east of Williams almonds and walnuts are grown. These soils are also used for a variety of field crops.

The basin soils make up the largest block of area in the county. They occupy most of the area in the northeast corner of the county between the Sacramento River and Butte Creek; and a large area on the west side of the river extending nearly to the foothills in the northern part of the county, narrowing to a 6-8 mile wide strip in the south. These soils are characteristically fine textured and poorly drained, thus alkali is a frequent problem. Rice production is the main use of the basin soils and is the number one crop grown in the County. Irrigated pasture and field crops are scattered throughout the area.

The older alluvial fans occur at the base of the foothills, mainly in the northern two-thirds of the county. These soils are charcterized by moderately compacted and fine textured subsoils which restrict free penetration of water and roots. They are used to grow a variety of crops, both irrigated and non-irrigated.

# Figure CO-5
# SOILS

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The terrace soils form a small discontinuous strip along the base of the foothills. They are comprised of very old valley soil which has not been buried by more recent alluvial material. These areas have been shaped by erosion to a more or less bench-like or terraced relief. Terrace soils are largely used for non-irrigated crops or pasture.

The uplands soils occupy the mountain and foothill areas in the western part of the county, and were formed from underlying bedrock. They are used mainly for range and forest, but grain or grass hay may be produced on very limited areas.

### Erosion

Soil erosion may be defined as the loss of soil material from a specified land area through the action of wind and water. In Colusa County, erosion mainly occurs by water as it washes down the Coast Range and through the foothill drainages, including Stone Corral Creek, Lurline Creek, Freshwater Creek, and Salt Creek. The soil is pushed along the creeks which empty into the Colusa Drainage Canal and eventually washes into the Sacramento River. Figure CO-6 shows the general areas of erosion activity. According to the SCS, the areas most prone to erosion are the fallow grain fields in the foothills. The standard farming practice is to grow one year and leave the field fallow for two years. It is during the off years when there is no ground cover that topsoil is washed away.

## TIMBER RESOURCES

Colusa County's forested areas are located within the immediate vicinity of the Mendocino National Forest, in the northwestern portion of the county. All timber harvesting activity occurs either within National Forest lands or on a single private operation located west of Stonyford. As shown on Table CO-8, the timber harvest in Colusa County has been inconsistent in volume over the past five years. The inconsistency is partially related to natural fluctuations; short-term demand for timber products tends to follow business cycles and interest rate fluctuations.

**Table CO-8: Colusa County Timber Harvest 1981-1985**

| Year | Board Feet[1] | $ Value[2] |
|---|---|---|
| 1981 | 2,156 | $436,000 |
| 1982 | -- | -- |
| 1983 | 436 | 37,000 |
| 1984 | 3,000 | 384,000 |
| 1985 | 50 | 2,000 |

[1]Board feet is the quantity of timber cut and scaled.
[2]Value of the timber immediately before cutting.

Although statewide demand for timber is expected to increase in the future, Colusa County may not play a significant role in the increased production. Most of the forested areas within the county do not contain significant stands of harvestable timber. The Mendocino National Forest Land and Resource Management Plan proposes one-fifth of the National Forest land within Colusa County for modified and intensive timber harvesting activity. The balance of the forest is proposed for wildlife, chaparral, recreation, research natural areas and minimal management programs.

The Mendocino Forest Plan calls for a minor increase in timber harvesting in the county. Because most of the National Forest Land in Colusa County is already roaded, this change will not substantially affect traffic patterns. Each timber sale is also subject to further environmental analysis. Over the summer of 1987, fires burned nearly 6,000 acres of the Mendocino National Forest, including lands in Colusa County. Accordingly, the forest service is reassessing its projected timber outputs before the final plan is published.

Current timber harvesting in the County is insignificant relative to statewide activity. In all years shown on Table CO-8, Colusa County's timber harvest represents less than one-tenth of one percent of the state's total harvest.

## MINERAL RESOURCES[1]

### Introduction

The western portion of Colusa County has a long history of mineral activity. Moderate amounts of mercury have been produced since 1862, and gold has been produced in minor amounts since 1864. Regional geologic patterns and the history of known prospects in the area indicate a high probability for the discovery of additional gold and mercury deposits. Historical mineral resources throughout the county include sandstone, produced in the vincity of Sites; mineral water, from the springs of the western area; and sand and gravel, located in the valley portion of the county. Salt, mineral paint, brick, chromite, copper, limestone, and sulphur have been produced in small quantities; and the occurrence of gypsum, pyrite and manganese have been recorded. Figure CO-7 illustrates locations of potential and recorded mineral resources.

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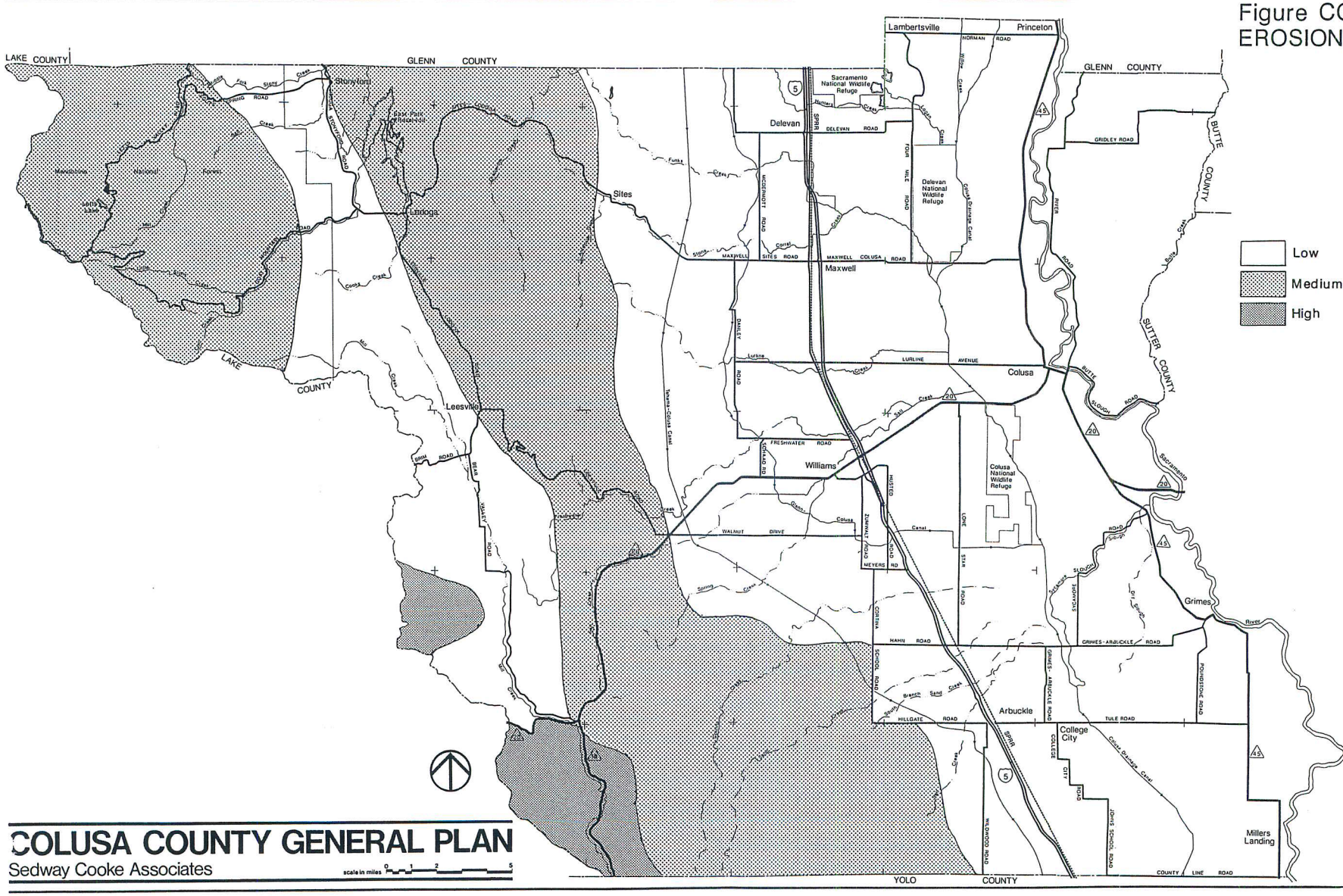
[1]Significant portions of this section are derived from the following sources: (1) Donald L. Gustafson, Manager-Special Projects, Homestake Mining Company, Sparks, Nevada, Mineral Favorability Assessment of Portions of Colusa County, California, 1987, May 1987; State of California Department of Natural Resources Division of Mines and Mining, Chapter of Report XXV of the State Mineralogist, July 1929; William B. Clark, Geologist; California Division of Mines & Geology, Gold Districts of California, CDMG Bulletin 193, 1970; United States Department of Interior, Bureau of Mines, Mercury Potential of the United States, 1965.

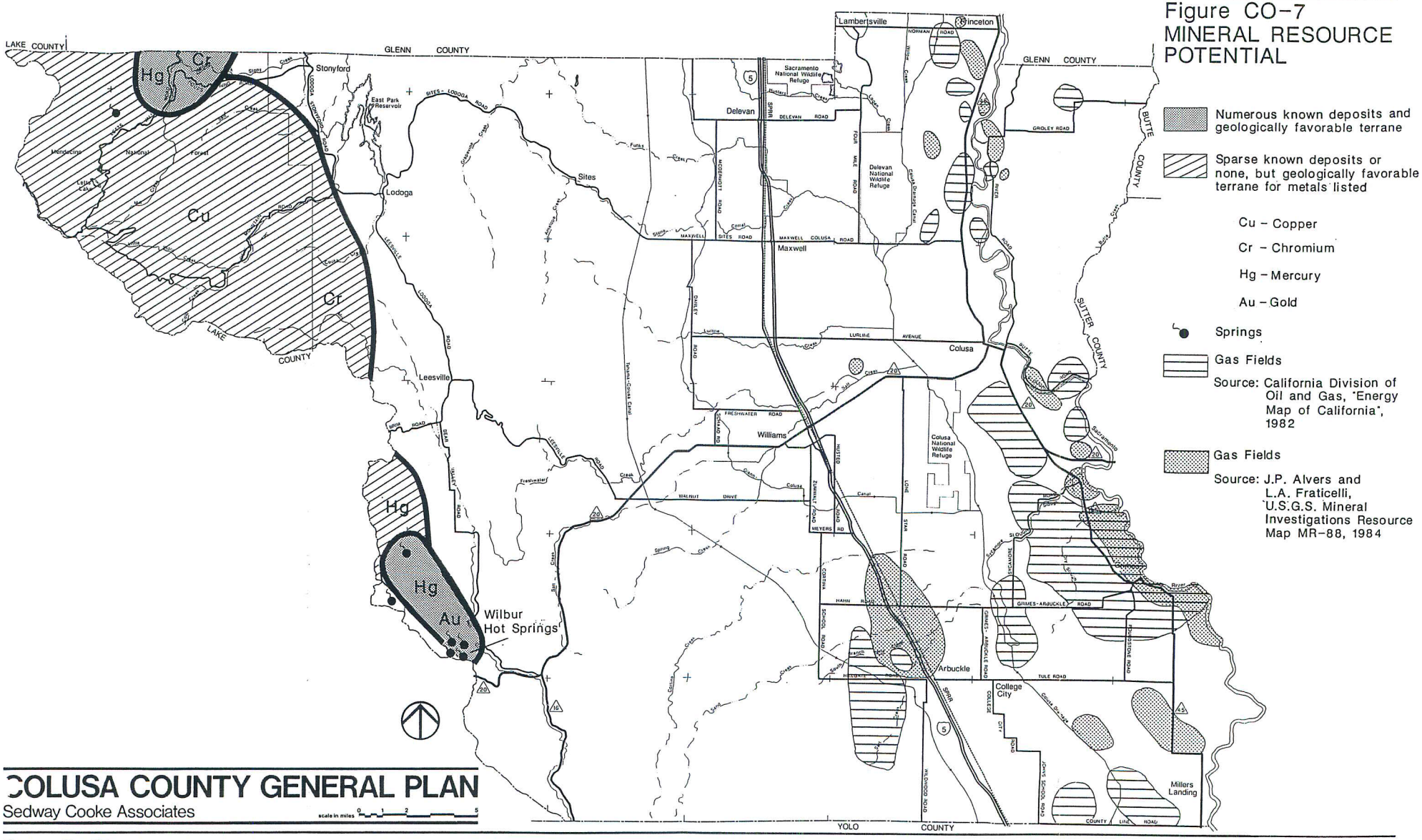
# Figure CO-6
# EROSION ACTIVITY




**COLUSA COUNTY GENERAL PLAN**

Sedway Cooke Associates

scale in miles 0 1 2 5


LAKE COUNTY
GLENN COUNTY
Stonyford
East Park Reservoir
Lodoga
Sites
Leesville
Wilbur Hot Springs
Hg
Cr
Cu
Au
Delevan
Sacramento National Wildlife Refuge
Delevan National Wildlife Refuge
Maxwell
Colusa
Williams
Colusa National Wildlife Refuge
Arbuckle
College City
Millers Landing
Lambertsville
Princeton
BUTTE COUNTY
SUTTER COUNTY
YOLO COUNTY
Mendocino National Forest
SACRAMENTO RIVER
SPRR
Figure CO-7
MINERAL RESOURCE POTENTIAL
Numerous known deposits and geologically favorable terrane
Sparse known deposits or none, but geologically favorable terrane for metals listed
Cu - Copper
Cr - Chromium
Hg - Mercury
Au - Gold
Springs
Gas Fields
Source: California Division of Oil and Gas, "Energy Map of California", 1982
Gas Fields
Source: J.P. Alvers and L.A. Fraticelli, U.S.G.S. Mineral Investigations Resource Map MR-88, 1984
COLUSA COUNTY GENERAL PLAN
Sedway Cooke Associates
scale in miles 0 1 2 5

## Historical and Recent Mining Activity

Mining has occurred in Colusa County since the mid-1800s. Copper was dicovered in 1863 in Little Stony Creek but was not actively mined. Quartz containing gold and silver was discovered at Snow Mountain in 1864. Sulphur was discovered in 1867 and petroleum was found in the Antelope and Bear Valleys in 1865. Limestone was mined near Leesville beginning in 1878. The earliest extraction activity is associated with mercury, which was produced in the 1870s, then again intermittently around the turn of the century. Although gold was discovered in the 1860s, the main period of mining occurred during the 1880s. Significant production of sandstone and mineral water occurred in the first few decades of the 20th century, and sand and gravel have been produced in irregular quantities since about 1910. Minor production of other resources, including salt, mineral paint and chromite, occurred in the early decades of this century. As was the case in other mineral districts throughout the state, maximum production occurred during times of high prices. Most mining activity, other than sand and gravel extraction, ceased by 1943.

The Wilbur Springs Mining District encompasses portions of western Colusa County and eastern Lake County. Abandoned gold and mercury mines within Colusa County associated with the Wilbur Springs District include the Manzanita, located about a mile west of Wilbur Springs (gold and mercury); West End (gold); Cherry Hill, near the Manzanita mine (gold); Wide Awake, just west of Wilbur Springs (mercury); Empire (mercury); Elgin, four miles northwest of Wilbur Springs (mercury); and Clyde, about five miles northwest of Wilbur Springs (gold). There are also several mineral claims in the area. The gold and mercury deposits are associated with the mineral springs of the area. Some of the more significant mines are described below.

Manzanita Mine. Mining claims were first located in 1863 at the Manzanita Mine, which was first operated as a gold mine. An unknown amount of gold was produced. Intermittent mining from the early 1900s to the late 1960s or early 1970s yielded over 2,000 flasks of mercury. Cinnabar was recovered as a byproduct.

Elgin Mine. Several unsuccessful attempts to produce sulfur occurred at the Elgin Mine, which was located in 1875. A minor production of mercury occured around the turn of the century. Later mining attempts were unsuccessful, and the mine has been inactive since 1929. The mine is located in an area of hot springs activity, which made underground mining difficult.

Rathburn Group. This is a group of five claims about 4 miles north of Wilbur Springs which was mined intermittently prior to 1892, when about 100 flasks of mercury were recovered. It is currently inactive.

Wide Awake Mine. This mine, which was discovered during the 1870s, produced about 1,800 flasks of mercury prior to 1900. A moderate production was reported in 1932 and 1943, and since that time the mine workings have become largely inaccessible.

## Current Activity

Today, mineral activity in Colusa County is limited to sand and gravel extraction. There are currently two active producers in the county: Glen English operates the Sand Creek Pit, and Princeton Sand and Gravel operates the Princeton Ranch Pit. In the past, the City of Colusa has also extracted sand and gravel. Several other

operations are either inactive or have not reported their operations to the California Division of Mines and Geology.

The sand and gravel activity in Colusa County is not regionally significant. As shown in Table CO-9, production is inconsistent. Maximum production was 658,000 tons in 1967. More recently, 1984 production totaled 20,250 tons, for a total value of $51,000. Sacramento County, by contrast, produced three million tons in 1986. Several recent proposals for new sand and gravel operations indicate increased interest in Colusa County.

Sand and gravel is primarily used locally. It is relatively inexpensive to extract (approximately $4 per ton), but very costly to transport (about 10 cents per ton per mile). Transportation costs can double the product cost in a trip of just 40 miles. In general, half of all sand and gravel resources are used for asphalt, providing surface material for playgrounds and roads. About 40 percent is used for Portland cement--for example, slab floors, freeways, dams, and tiltup buildings. The remaining 10 percent is used for subbase and specialty uses. According to the Division of Mines and Geology, demand runs at about 8 tons per person per year. This suggests that total demand in the county is approximately 100,000 tons per year. Colusa County imports some of its sand and gravel, namely from Sacramento, Butte, Sutter, and Yolo Counties.[1]

**Resource Potential**

The Wilbur Springs Mining District is located at the boundary between the Great Valley geological province and the Coast Range Province. Another mining district located at this geological boundary is the Knoxville District, which is known to contain gold in commercial quantities; the McLaughlin Gold Mine is currently in production in this district, just south of Colusa County. Most of the mercury mines and prospects of the northern Coast Range occur in the vicinity of the Stony Creek Fault between the Wilbur Springs and Knoxville Districts. Exploration of this area is presently occurring, and increases in gold and/or mercury prices could increase exploration activity and lead to discoveries in the area tie to Colusa County.

Homestake Mining Company, which operates the McLaughlin Gold Mine in Lake County, is a major landholder in southwest Colusa County. Homestake is currently evaluating the resource potential of the area, which is geologically similar to the area of the McLaughlin Mine. Homestake's work has consisted of detailed mapping, core sampling, metallurgical testwork and environmental studies. Approximately 75 percent of the drill holes in Colusa County have indicated gold mineralization. Overall results of Homestake's exploration to date suggest that the area is favorable for discovery of gold deposits. These could become economically feasible to extract in the near future.

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[1]Dave Beeby, Project Manager, Sand and Gravel Resources, California Division of Mines and Geology, April 23, 1987.

**Table CO-9: Sand and Gravel Production, 1960-1984**

| | Production |
|---|---|
| Year | Tons |
| 1960 | 262,000 |
| 1961 | 321,000 |
| 1962 | 418,000 |
| 1965 | 294,000 |
| 1966 | 410,000 |
| 1967 | 658,000 |
| 1968 | 251,000 |
| 1969 | 274,000 |
| 1970 | 298,000 |
| 1982 | 41,000 |
| 1984 | 20,000 |

Note: Figures are not available for some years because the information is proprietary. In some years there are only one or two operators, or one private operator and the City of Colusa. This list includes only active producers who reported their operations to California Division of Mines and Geology.

Source: John L. Burnett, Mines and Mineral Producers Active in California, California Division of Mines and Geology Open-Files Report 87-1 SAC, 1987.

### Regulations

Requirements of the Surface Mining and Reclamation Act of 1975 (or SMARA) state that cities and counties must adopt an ordinance(s) ". . .which establishes procedures for the review and approval of reclamation plans and the issuance of a permit to conduct surface mining operations." (Public Resources Code Section 2774.) The intent of this legislation is to ensure the prevention or mitigation of the adverse environmental impacts of mining and the reclamation of mined lands, and to ensure that the production and conservation of mineral resources is consistent with recreation, watershed, wildlife, and public safety objectives (Public Resources Code 2712).

The Colusa County Zoning Ordinance complies with the requirements of the Act by permitting "surface mining in all zones other than residential subject to the approval of a use permit issued in conformity with provisions of the State Surface Mining and Reclamation Act of 1975 and the County surface mining ordinance."

Also according to the Act, in association with regulations of the State Board of Mines and Geology, the State Geologist must identify mineral areas of the state which are threatened by incompatible land uses that would preclude mining activities. These areas are to be classified as one of four Mineral Resource Zones (MRZ) or as a Scientific Zone. This classification system must be incorporated into the General Plan of cities and counties supporting mining operations, including dredging and quarrying, and is intended to ensure that mineral resources will be available when their development is necessary or economically feasible. Colusa County does not yet contain any areas which have been designated by the state geologist as a Mineral Resource Zone or Scientific Zone.

### Environmental and Safety Implications of Mineral Extraction

Mining operations have the potential to cause significant environmental damage, including increased erosion, disturbance of wildlife habitat, and water quality degradation. In fact, some of the heavy metals found in the Sacramento River have been associated with mining operations in the early part of this century. In addition, most mining operations significantly alter the visual environment. Sand and gravel operations occuring along the Sacramento River or in the valley can be seen from great distances. Most other mineral resources are found in the highly scenic coast range, on the slopes which border Bear and Indian Valleys.

Hazards associated with mineral extraction vary according to the methods of extraction. Many operations, such as gold extraction, are complex and employ highly toxic substances. Development of mercury mines is not likely as long as prices remain low. Some of the hazards associated with geothermal resources include high mercury content of the water and sulfur fumes.

## GEOTHERMAL RESOURCES

Several thermal springs and wells are located within Colusa County. Most of these are in the immediate vicinity of Wilbur Springs, as shown in Figure CO-7. The resources are not known to be hot enough for energy development. A minimum temperature of 100 degrees Celsius would be required, and the water in Colusa

County is less than 70 degrees Celsius, as shown on Table CO-10. Most of the springs are warm enough for residential space heating or for resort development similar to the Wilbur Hot Springs Sanctuary.

It is possible that the thermal water is actually warmer but is cooled by comingling with colder water. This has not yet been determined but may be studied further in the future.

## NATURAL GAS

Natural gas fields are found throughout the eastern portion of the county, as shown in Figure CO-7. Gas drilling has played an increasingly important role in the County's economy, contributing nearly one million dollars to the 1985-1986 tax rolls (about 15 percent of the total tax collected). This figure was down slightly from the peak 1984-1985 production. Overall production in 1985 was valued at $143 million. The Grimes Gas Field, which is located partially within Colusa County and partially within Butte County, is one of the largest and most productive fields in the state. The County plays an important role in natural gas production, ranking third in the state in volume, behind Kern and Solano Counties. Gas production for the past several years is listed in Table CO-11.

Saline water trapped in sedimentary rock is usually drawn up with the gas. The water is usually disposed by injecting it back into the ground, usually into abandoned gas wells. Adverse impacts associated with natural gas extraction are primarily visual. The possibility of well blowouts, subsidence and groundwater contamination have been raised in the past and continue to be an issue in the County. These hazards are further discussed in the Safety Element.

## HISTORIC AND CULTURAL RESOURCES

Colusa County has several noteworthy structures dating back to its settlement in the 1850s. Several homes and commercial buildings that were built in the late 1800s may not be on a historical register, but nonetheless contribute to the County's character. Listed on the National Register of Historic Places are the Colusa Grammar School, the Colusa High School and grounds, the Grand Island Shrine (1883) (located 8 miles south of Colusa), and the Nowi Rancheria (in the vicinity of Grimes). There are three additional properties which have been determined to be eligible for National Register: the Sacramento River Bridge, the Princeton Ferry site, and Upper and Lower Letts Valley.

Letts Valley in the Mendocino National Forest, which was settled in 1855 by Jack and David Lett, is a California Historical Landmark. Other California Landmarks in Colusa County are Swift's Stone Corral--built circa 1850, located 6 miles west of Maxwell; and the Colusa County Courthouse--an 1861 Federal/Classic Revival style building and the oldest courthouse in the Sacramento Valley still in use for its original purpose. Other Colusa County points of historical interest are the Independent Order of Odd Fellows Building in Colusa, and the Sacramento Valley Museum in Williams (1911). There are also numerous homes, commercial buildings, and churches of historical interest in the city of Colusa.

## Table CO-10: Geothermal Resources

| Name of Spring or Well | Latitude North | Longitude West | Temp., °C | Flow, Litres/Minute | Total Dissolved Solids, mg/Liter |
|---|---|---|---|---|---|
| Red Eye Spring | 39°21.06' | 122°40.23' | 26° | 8 | 14,200 |
| Elgin Mine (Spring) | 39°03.42' | 122°28.25' | 69° | 95 | 25,900 |
| Wilbur Hot Springs | 39°02.30' | 122°25.25' | 67° | 100 | 25,000 |
| Empire Silver Mine | 39°02.26' | 122°25.53' | 38° | 1 | |
| Jones Hot Spring (Well) | 39°02.03' | 122°25.62' | 61° | 8 | |
| Unnamed Springs | 39°02.09' | 122°25.59' | 61° | 15 | |
| Blancks Hot Springs | 39°01.87' | 122°25.88' | 49° | 15 | |

Source: California Division of Mines and Geology, Geothermal Resources of California, California Geologic Data Map Series Map No. 4, 1980.

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## Table CO-11: Colusa County Natural Gas Production

| Year | Number of Wells Producing | Number of Wells Shut-In | Gas Production Cubic Feet x $10^6$ | Cumulative Gas Production Cubic Feet x $10^{12}$ | Estimated Reserves, Cubic Feet x $10^{12}$ | Statewide Rank[2] |
|---|---|---|---|---|---|---|
| 1980 | 86 | 39 | 7,116,380 | | | 12 |
| 1983 | 149 | 23 | 13,474,554 | | | 10 |
| 1984 | 149 | 29 | 17,760,164 | | | 8 |
| 1985 | 185 | 22 | 27,601,442 | 212,299[3] | 22,342[3] | 3 |
| Oct. 1986 | 177 | 42 | 2,659,294 | | | 3 |

### Water Production and Disposal

| Year | Number of Wells Injecting | Number of Wells Shut-In | Water Production Barrels[5] | Water Disposal Barrels |
|---|---|---|---|---|
| 1980 | 2 | | | 7,857 |
| 1983 | 1 | 1 | 68,597 | 9,884 |
| 1984 | 2 | 1 | 290,387 | 185,175 |
| 1985 | 2 | 1 | 290,387 | 185,175 |
| Oct. 1986 | 2 | 1 | 21,654 | 28,096 |

[1]Inactive but not abandoned.

[2]For nonassociated on-shore gas production only.

[3]Does not include data for three fields which cross county boundaries.

[4]Data for one month only.

[5]Approximately 40 gallons per barrel.

### Archaeological Sites

Prior to its settlement in the 1850s, Colusa County was home to several Native American groups. As many as 15,000 Indians lived in this part of valley at the time of John Bidwell's expedition in 1843. One of the largest towns in the valley was Coru, capital of the now extinct Colus Indian Nation and site of the present-day city of Colusa. The Colus, who numbered about 1,000 in 1850, subsisted on the lush native vegetation and fish, and resided in rancherias of 100-400 people. Residents of each rancheria spoke a different dialect. When Colusa County was settled by Anglos, the Indians and their culture were obliterated by alcoholism and epidemics.

Two main Indian groups lived in the vicinity of Stonyford-Lodoga: the Pomo and the Wintun. Several Pomo settlements existed near Stonyford, surrounded by the larger, more dominant Wintun settlements on three sides. The Stonyford area is rich in archaeological resources, particularly Indian burial grounds and food storage holes.

Because of the extent of Native American settlement, an archaeological study should accompany development proposals in areas known to have been inhabited by Indians. Information on the general location of these areas can be obtained from the Native American Heritage Commission, the State Lands Division, Parks and Recreation, and the Archaeological Department at Chico State. The precise location of archaeological sites is not published here due to the risk of vandalism of these sites.

## CONSERVATION POLICIES

## RESOURCE MANAGEMENT POLICIES

### General

CO-1 The conservation of the county's natural resources shall be promoted and projects which would waste resources or unnecessarily degrade them shall be discouraged.

### Agricultural Policies

CO-2 Agricultural land should be preserved and protected. This should not be construed to inhibit the restoration of cultivated land to natural habitat by landowners wishing to take such action.

CO-3 Agricultural lands in Colusa County should be classified according to three general categories based on the following criteria (see Land Use Element):

(a) Lands capable of supporting grazing based on resource characteristics, namely soils, climate, and access to water (A-U: Agriculture-Upland)

(b) Lands capable of supporting crop production (A-G: Agriculture-General):

-- Existing croplands used for this purpose
-- Lands which are not now but could be used for this purpose based on resource characteristics (soils, climate, access to water)
-- Prime Soils

(c) Agricultural lands within a community's sphere of influence or ultimate growth area (A-T: Agriculture-Transition or U-T: Upland-Transition)

**Mineral Resource Policies**

CO-4 The Resource Conservation land use classification shall apply to large-and small-scale mineral extraction operations. Among the uses permitted in these areas are mineral extraction, processing, and accessory uses.

CO-5 Mineral extraction, processing, and accessory uses should be conditionally permitted in other areas of the county inherently compatible with mining, provided that mineral extraction activities will not have significant adverse effects on key view areas or wildlife habitat, unless such impacts can be sufficiently mitigated. Extraction of gravel and other minerals along rivers should be permitted, subject to the provisions of CEQA and other applicable laws.

CO-6 Development within and adjacent to Resource Conservation lands shall be regulated so that proposed future land uses will not be incompatible with mineral extraction operations, where existing or future mineral extraction operations are likely. Regulations shall be responsive to the type/intensity of the mining operation and the nature of the adjacent land use. Regulations may include but are not limited to: (1) development siting (setback requirements, clustering); (2) land use buffer requirements; (3) hours of operation for mining activities; and (4) dust and noise controls on mining activities and operation.

CO-7 A Mineral Resource land use classification shall apply to areas designated by the State Geologist as Mineral Resource Zones or Scientific Zones, pursuant to the State Mining and Reclamation Act of 1975, if and when such areas are designated in the future.

CO-8 The county should support exploration and utilization of its geothermal resources.

**Timber Policies**

CO-9 The County shall support the Mendocino Forest Plan for timber resource use.

CO-10 The County shall promote the use of forest improvement practices and programs, including but not limited to: (1) California Forest Improvement Program; (2) Agricultural Conservation Program; (3) Forestry Incentives Program; (4) Agriculture Stabilization and Conservation Service; and (5) Chapparal Management Program.

### Air Quality Policies

CO-11 Future air quality shall be maintained by continuing to encourage a compact development pattern and by encouraging alternative modes of transportation (transit, bicycle, pedestrian).

CO-12 A Colusa County Non-Attainment Plan shall be developed and implemented if and when Colusa County no longer meets state and national air quality standards.

### Water Resource Policies

CO-13 Waste disposal sites and other sources of hazardous or polluting materials should be discouraged in close proximity to streams, creeks, reservoirs, or the Sacramento River groundwater basins. All future sites shall comply with the RWQCB's requirement of filing a Solid Waste Assessment Test (SWAT report).

CO-14 Sedimentation and erosion shall be minimized through control of grading, quarrying, logging, vegetation removal, placement of roads and bridges, use of off-road-vehicles, and agricultural practices.

CO-15 An adequate water supply for the county's domestic, agricultural, and wildlife needs (especially migratory waterfowl) should be assured by working with state and federal agencies responsible for water projects.

CO-16 Development of the Bureau of Reclamation's Sites Reservoir project should be discouraged. The search for an alternate water storage facility should be supported if such a facility is ultimately deemed necessary. Such facilities should be sited to avoid disruption of existing roads, homes, and historical sites.

CO-17 Water-conserving agricultural practices and reuse of water should be promoted.

CO-18 Native or non-water demanding landscaping should be encouraged in new subdivisions.

CO-19 The county should coordinate with state and regional agencies, including the state Water Resource Control Board, Central Valley RWQCB, and Department of Water Resources, to establish a regular monitoring program of the county's water resources. Such a program should monitor: (1) ground water levels; (2) water quality, especially related to herbicides and pesticides; (3) erosion; (4) the effect of injection wells on ground water quality.

### Wildlife and Habitat Policies

CO-20 Protection of Resource Conservation Areas may at times conflict with agricultural and recreation management practices on adjoining lands. Such conflicts should be resolved on a case by case basis in a manner which recognizes the public interests in both habitat resource protection and the sound management of agricultural and recreational resources.

CO-21 Land uses within Resource Conservation areas shall be regulated only to the degree necessary to achieve protection of the resource. Very low density single family residences, low intensity recreation uses, and agricultural uses may be permitted to the extent that critical habitats are not disrupted.

**Cultural Resource Policies**

CO-22 The preservation and re-use of historical sites and structures in the county should be encouraged.

CO-23 The county should apply for landmark status or national register listing for any historical sites which may be eligible.

CO-24 The county shall encourage and cooperate with cities, special districts, state and federal agencies, and private landowners in acknowledging and preserving the county's cultural heritage, historical and archaeological structures, sites and landmarks.

CO-25 An archaeological survey should be required prior to approval of any project which would require excavation in an area known to contain archaeological resources.

IMPLEMENTATION POLICIES

CO-26 The California Environmental Quality Act (CEQA) shall be strictly enforced.

CO-27 As funding permits, a feasibility study to determine the economic impact of extending the Williamson Act across the valley floor should be conducted.

CO-28 If analysis of the economic impact of extending the Williamson Act countywide indicates that such extension would benefit the general welfare of the county at a whole, then all lands classified as agricultural lands should be eligible to enter into a contract, as provided by the Williamson Act.

CO-29 The policy of granting hardship variances to requested splits in rural agricultural zones should be reassessed. Hardship variances should only be granted under unusual circumstances.

CO-30 Existing agricultural lands and other County lands shall be reviewed at five-year intervals to determine the appropriateness of either their current or potential classification as agricultural lands. The purpose of this review is to reinforce agricultural uses by considering changes in farming practices or technologies, the availability of irrigation water, and the demand for land for urban development.

CO-31 Non-agricultural lands located adjacent to lands designated by the General Plan as grazing lands and croplands may be subject to overlay zoning

regulations. These regulations should be designed to mitigate or eliminate conflicts between agricultural uses and non-agricultural uses by using natural and man-made features to establish buffers, by regulating the siting of non-agricultural structures, and by requiring disclosure to persons purchasing parcels or desiring to construct structures within agricultural buffer zones of their location adjacent to agricultural lands.

CO-32 A reclamation plan describing methods to control mining waste, erosion, rehabilitation of streambed channels/streambanks, and reuse shall accompany all applications for mining or mineral extraction permits.

CO-33 The Colusa County Air Quality Pollution Control District shall continue to regulate and issue permits for point sources of pollutants.

CO-34 The county should support the development of a multi-county organization, including, but not limited to, Glenn, Colusa and Tehama Counties, for the management of the Sacramento Valley Groundwater Basin.

CO-35 Colusa County should adopt guidelines for new development governing the preparation of erosion and sediment control plans.