4.2 AVAILABLE DATA

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Introduction

This section briefly documents the available data compiled for this study and provided to Yolo County. Significant gaps in the existing data are identified. These data gaps will be reviewed as part of the development of a recommended groundwater monitoring program for the Cache Creek Resources Management Plan. Basic data reviewed in this section include rainfall, streamflow, irrigation diversions, land use, groundwater levels, groundwater use, groundwater quality, and aggregate excavation and production. References to previous reports, documents, and maps are included in the reference list to the final report.

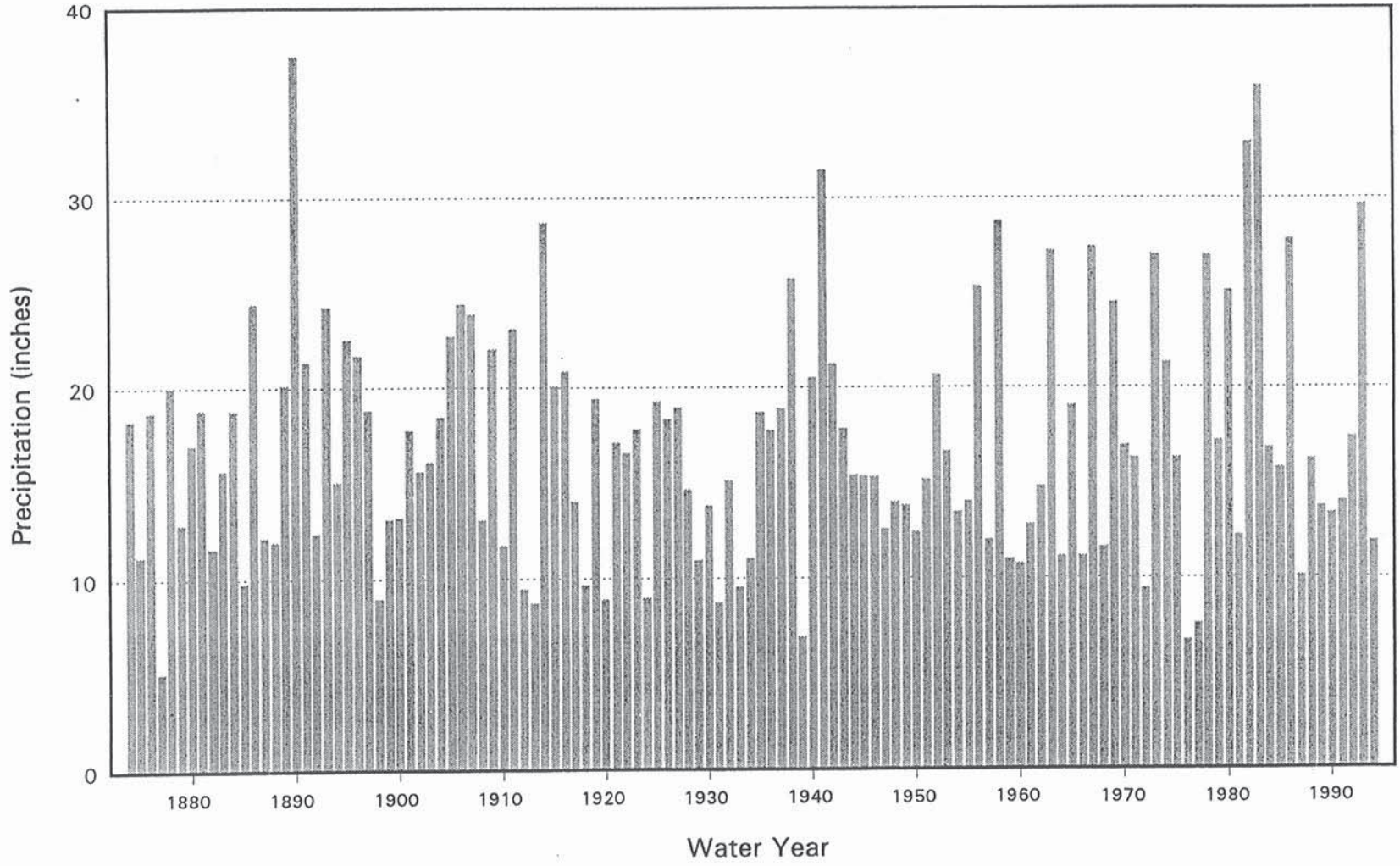
Rainfall

Rainfall records exist for a number of stations in the Cache Creek region. However, many of these records are brief or spotty. The most complete rainfall records exist for stations at Esparto, Woodland, and Davis. These three stations effectively represent the range of rainfall conditions in the study area. Annual rainfall amounts for these stations are shown in Figures 4.2-1 through 4.2-3. The rainfall data have been compiled on a water year basis, so each annual total includes rainfall between October 1 and September 30 of each year.

As indicated, the longest and most complete record is for Davis (California Dept. of Water Resources Station No. 2294-00, Davis 2 WSS Experimental Farm) beginning in 1872 and continuing to present. This record is fairly complete (i.e., missing few days) particularly over the past 40 years. The long-term average annual rainfall at Davis is 17.1 inches per year.

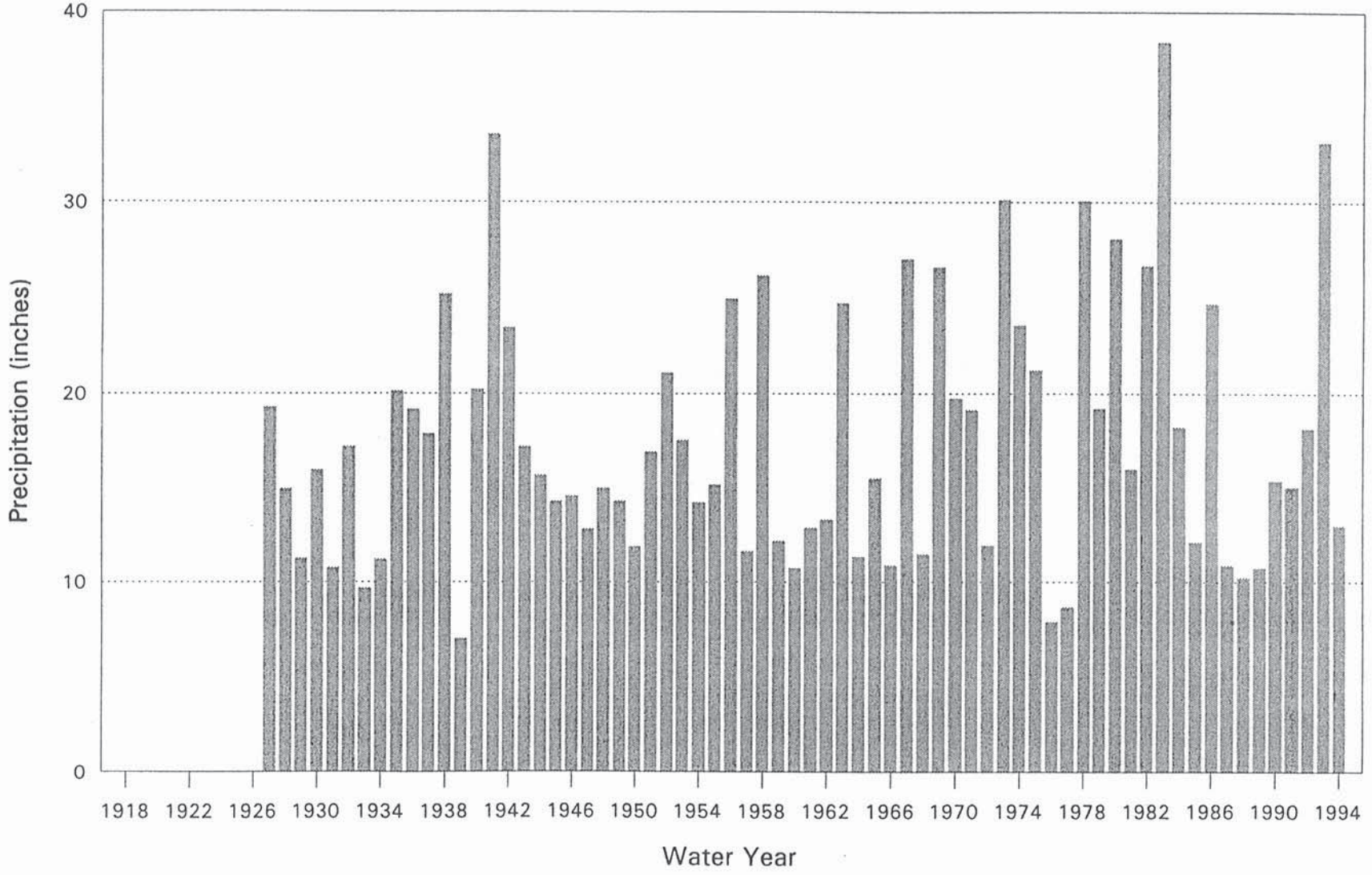
Rainfall records for Woodland (Station No. 9781-00, Woodland 1 WNW) extend back to 1897; however, the early records are missing many years. In addition, the more recent record is spotty with numerous days missing, particularly in the past ten years.

The Esparto data combines two records: Esparto (Station No. 2881-01) and Esparto Armfield Ranch (Station No. 2881-08). The Esparto station is located in the town, with a record including 1888-1900, 1915-1939, and 1949-1959. Figure 4.2-3 is based on this record through 1959. The Esparto Armfield Ranch record includes 1952-1953, and 1957-1982. This station, located on Cottonwood Creek, provided the annual rainfall values for 1960 through 1982.



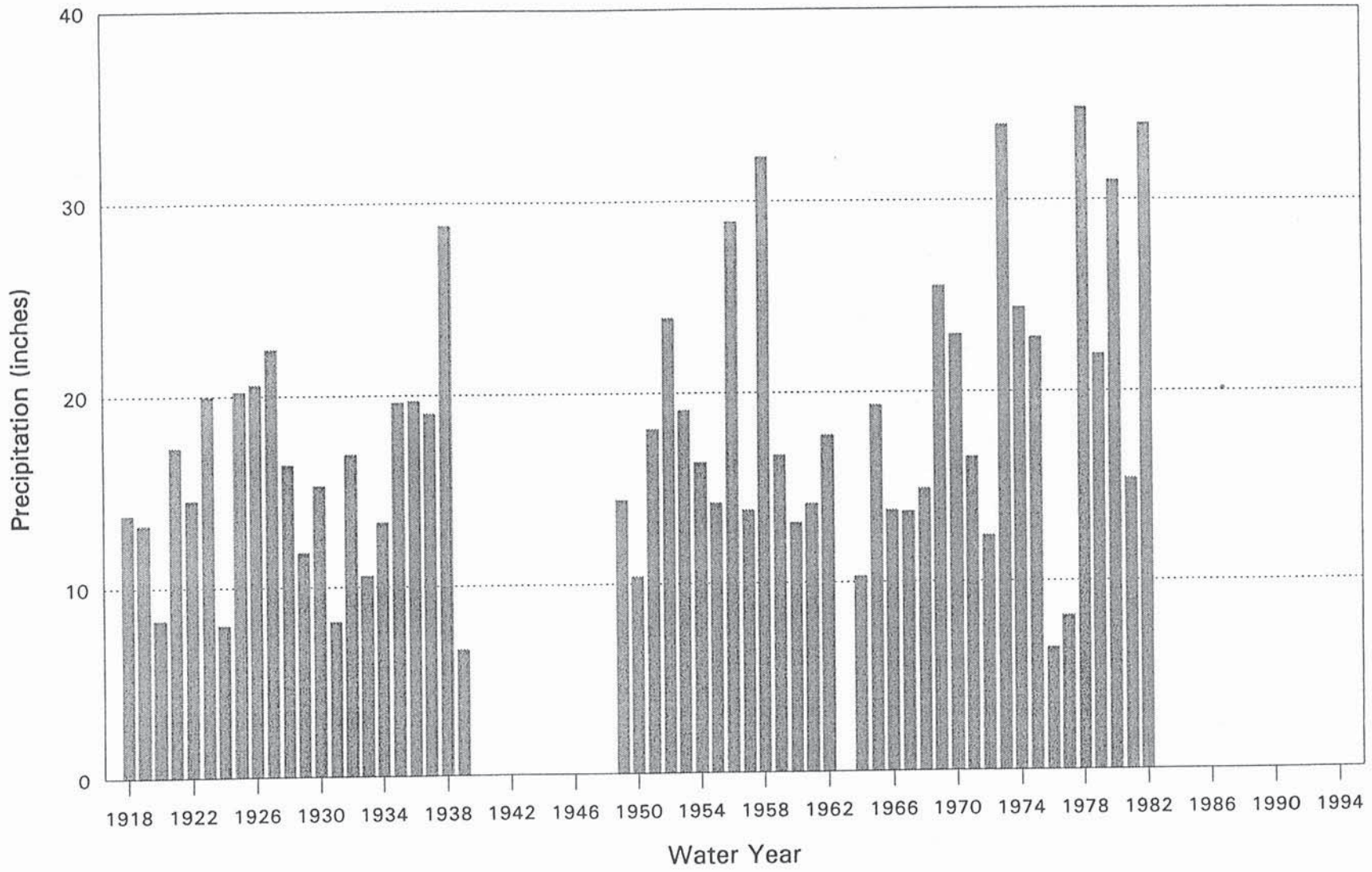
Note: Station no. 2294-00
Rain gage moved in 1959

October 1995	Figure 4.2-1
DAVID KEITH TODD Consulting Engineers, Inc. Berkeley, California	Davis Precipitation 1874 - 1994



Note: Station no. 9781-00

October 1995	Figure 4.2-2
DAVID KEITH TODD Consulting Engineers, Inc. Berkeley, California	Woodland Precipitation 1927 - 1994



Note: Station nos. 2881-01 and 2881-08

October 1995	Figure 4.2-3
DAVID KEITH TODD Consulting Engineers, Inc. Berkeley, California	Esparto Precipitation 1918 - 1994

Streamflow

Streamflow data are available for two key stream gages on Cache Creek in the study area: Cache Creek near Capay, and Cache Creek at Yolo. The Capay record extends from 1942 through 1976, with several missing months of flow in 1975. The Yolo record is complete and long, extending from 1903 to present. For the limited purposes of this study, streamflow data for both stations were compiled on an annual (calendar year) basis. Nonetheless, records are available from the U.S. Geological Survey on a daily and water year basis.

Irrigation Diversions

Streamflow is diverted out of the Cache Creek channel for irrigation purposes by the Yolo County Flood Control and Water Conservation District (YCFCWCD). The diversion system is illustrated schematically in Figure 4.2-4. Diversions are made at Capay Dam into the West Adams Canal, serving southern Hungry Hollow to the north of the creek, and into the Winters Canal, which serves irrigated lands to the south. As shown in the diagram, the Alder Canal returns surplus irrigation water to the creek above Moore Dam. Moore Canal diverts water to irrigated lands south of the creek in the Woodland area.

Total net diversions, accounting for water diverted into each canal and returned through Alder Canal, have been compiled for calendar years 1929 through 1994, as shown in Figure 4.2-5. Individual canal diversions are available for most of this period, with the exception of specific data between 1978 and 1988 that have not been compiled from field records.

Land Use

Land use in Yolo County has been mapped by the California Department of Water Resources (DWR) in 1955, 1961, 1973, 1976, 1981, and 1989, with a reconnaissance of general land use in 1967. Land use maps are compiled on topographic quadrangles on the basis of aerial photo interpretation and field surveys. For this study, land use maps and summary tables were obtained for the Bird Valley (including Hungry Hollow), Esparto, Madison, and Woodland quadrangles for all years except 1955. The DWR was unable to locate either the 1955 maps or summary.

The land use information on the maps (except the reconnaissance maps) is based on specific fields or parcels, and includes notations on particular crop type (e.g., tomatoes, almonds, etc.), whether the crop is irrigated or not irrigated, and the status of the field as cropped, fallow, or idle. Urban land uses also are mapped, and a general indication of natural vegetation is provided. The tabular summaries for each year and topographic quadrangle include specific land use and crop acreage, and cumulated acreage for major crop categories (e.g. field, truck, grain).

Geologic Logs

Water well drillers reports for nearly 1,000 wells drilled in the study area were obtained from the California Department of Water Resources for the Cache Creek area, including townships T9N 2E to 2W and T10N 1E to 2W. In addition, confidential geologic logs of wells and borings were supplied by various aggregate companies.

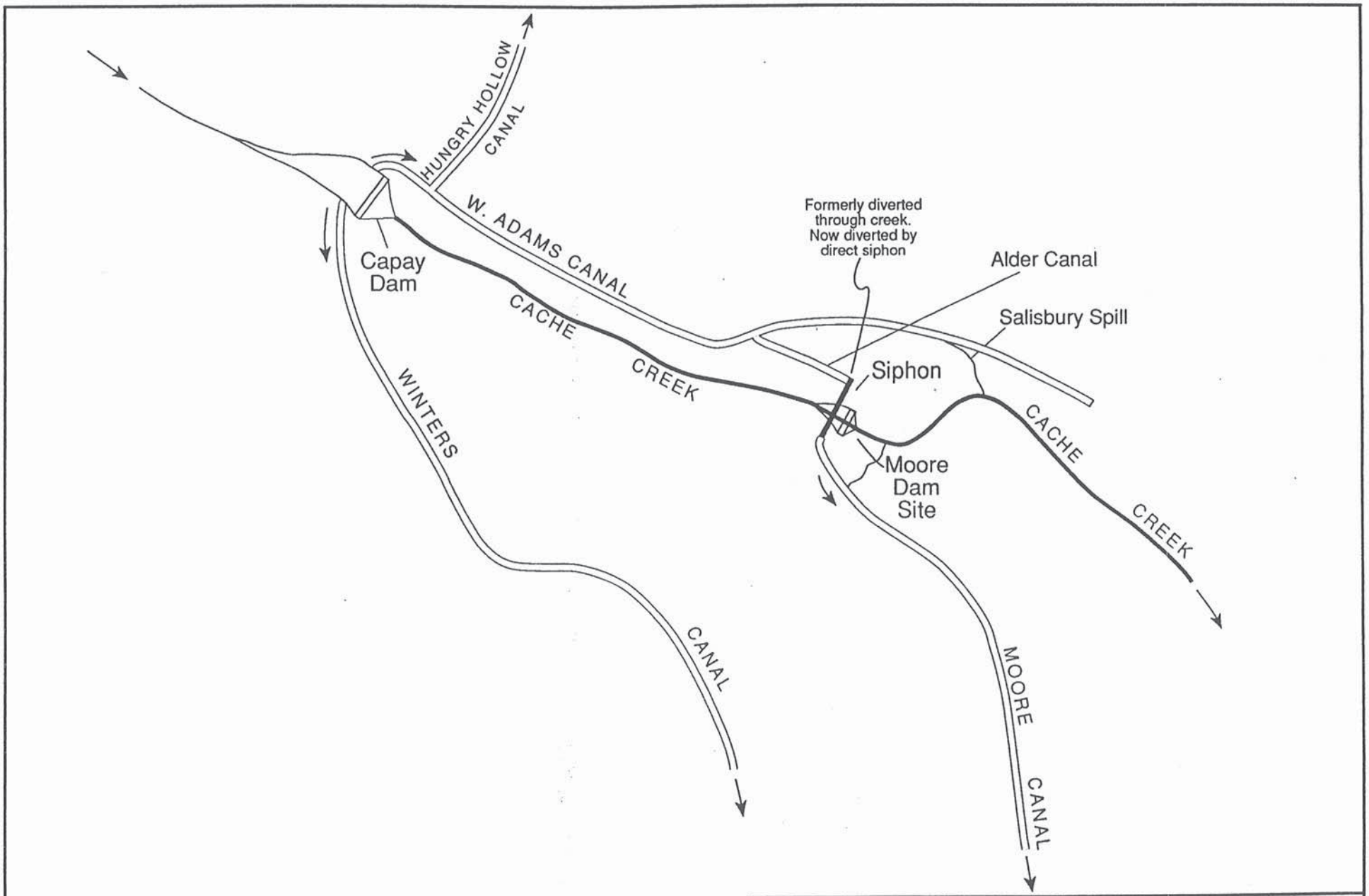
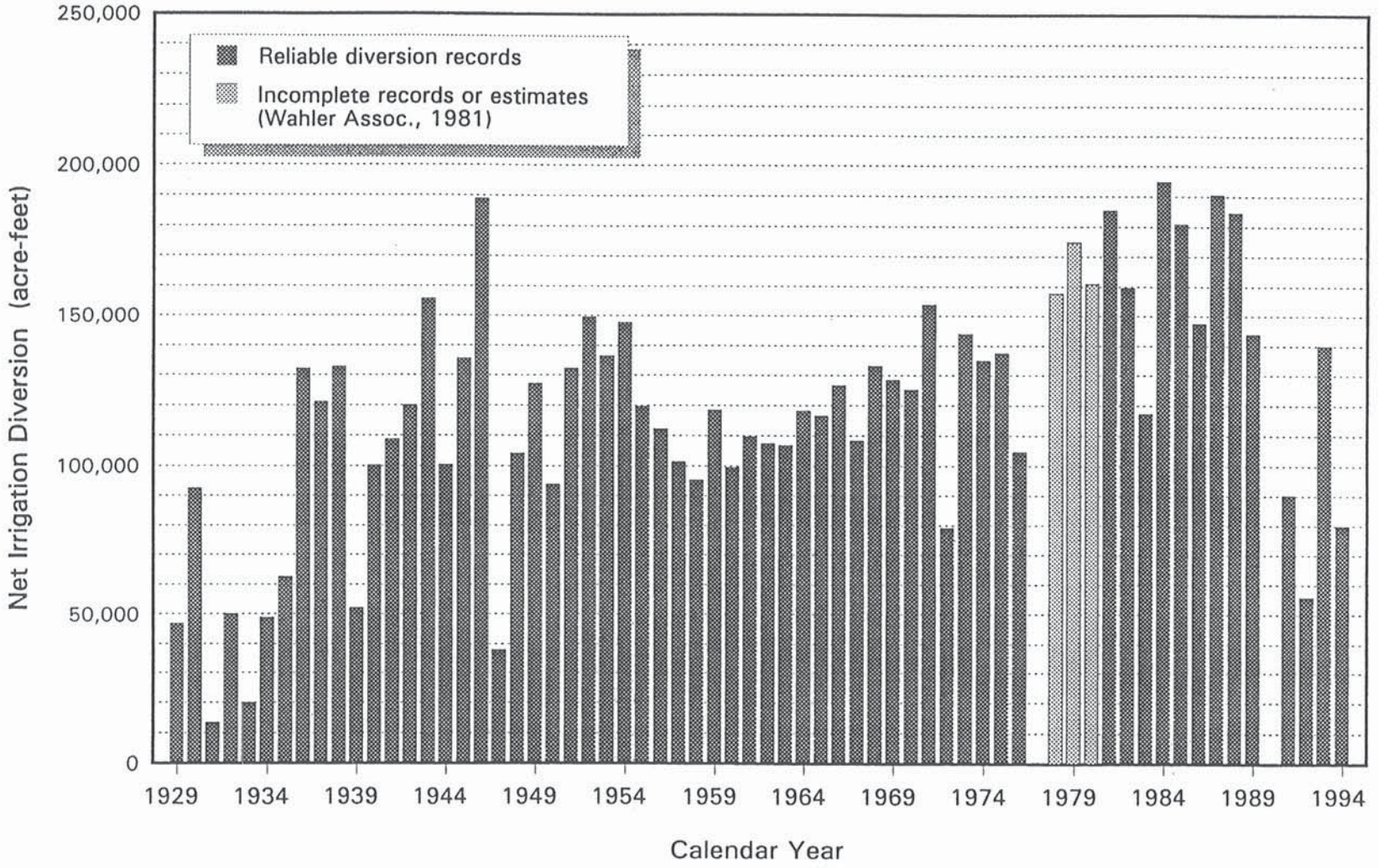


Figure 4.2-4
Sketch of Diversions on Cache Creek



October 1995	Figure 4.2-5
DAVID KEITH TODD Consulting Engineers, Inc. Berkeley, California	Irrigation Diversion On Cache Creek 1929 - 1994

Groundwater

Groundwater Levels

Groundwater elevation data are available both from the Department of Water Resources and aggregate companies. The DWR database consists of semi-annual (spring and fall) and selected monthly measurements from approximately 100 wells located in the study area between Capay Dam and Yolo. The period of record for these wells ranges from the 1930s to 1990s. However, several wells do not have recent (i.e. 1990s) data.

Two aggregate companies, Solano Concrete and Teichert,[1] installed observation well networks between 1985 and 1990, and have since measured water levels on a monthly basis. Other aggregate companies (Syar and Cache Creek Aggregates) collect monthly measurements from production wells.

Groundwater Use

Data on amounts of groundwater pumpage are not available for agricultural wells in Yolo County. Previous estimates of irrigation pumping have been based on evaluation of electric power records and pumping tests.[2],[3] No estimates of pumpage have been made in recent years.

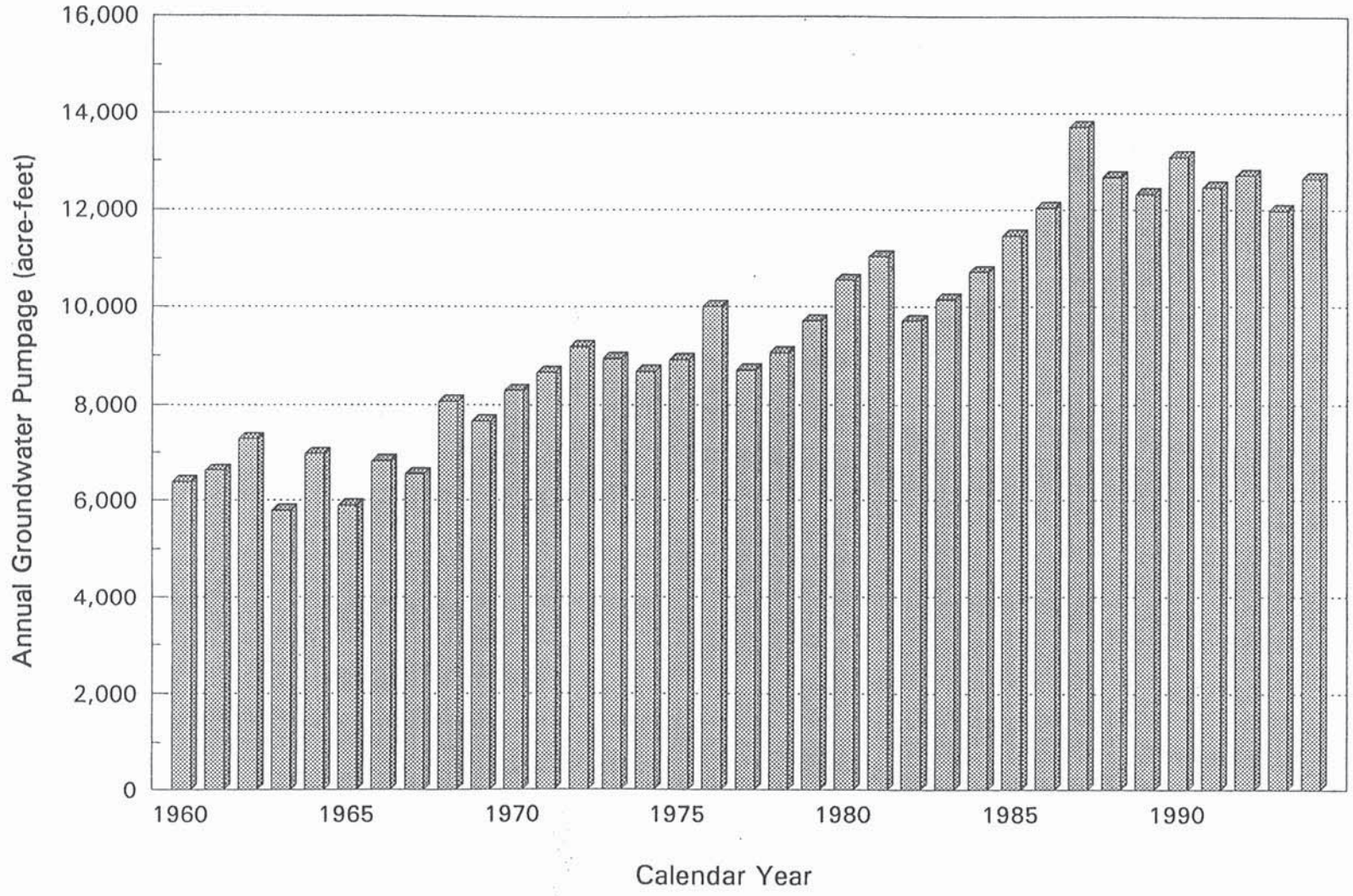
Information on the areal distribution of groundwater use for irrigation is documented in the Yolo County Crop Water Source Maps. These maps are based on the DWR 1989 land use maps, which indicate the general source of irrigation water (surface water, groundwater, or both) and field acreage.

The major municipal user of groundwater is the City of Woodland. Annual groundwater pumpage data for the City have been compiled for the calendar years 1960 through 1994, and are documented in Figure 4.2-6.

Groundwater Quality

Groundwater quality information is gathered by the California DWR. For this study, groundwater quality records, both in computer files and original written forms, were obtained from the DWR. Original written records were compiled into computer files and verified. Subsequently, all computer files were combined into a master database of groundwater quality for the study area.

This database identifies sampled wells by DWR well number, indicating the well's general location. Individual samples are listed by date, with individual records extending to the 1950s. Sampling has tended to be episodic, i.e., including many wells in a few selected years when studies were being conducted. Few wells have long records extending to the present. In recent years, sampling has been limited to two or three wells per township, or, a total of five in the vicinity of Cache Creek. Groundwater quality is documented in terms of general mineral constituents (e.g., total dissolved solids, chloride, boron, etc.), electrical conductivity, and pH. However, many analyses show only selected constituents and parameters (e.g. chloride, sodium) and do not include all of the major ions.



October 1995	Figure 4.2-6
DAVID KEITH TODD Consulting Engineers, Inc. Berkeley, California	**Woodland Wells** **Annual Production** **1960 - 1994**

Aggregate Excavation and Production

Locations of aggregate extraction in and along Cache Creek are identified in Yolo County maps of mining operations. Annual amounts of sand and gravel extraction also are available from the County from the mid 1960s to present. These amounts are shown in Figure 4.2-7 for the Cache Creek mining area. It should be noted that the preponderance of historic annual excavation has occurred within the channel of Cache Creek. However, off-channel mining began in 1981 and since that time has involved about 600,000 tons per year of the overall excavation total.

Prior to the mid-1960s, excavation records were not compiled by the County. Sand and gravel production amounts for Yolo County are available from the California Division of Mines and Geology (Bureau of Mines) and U.S. Department of Interior. As indicated in Figure 4.2-7, these records are incomplete, reflecting combination in some years of Yolo County data with other counties to protect producer confidentiality, as well as changes in production reporting by the agencies.

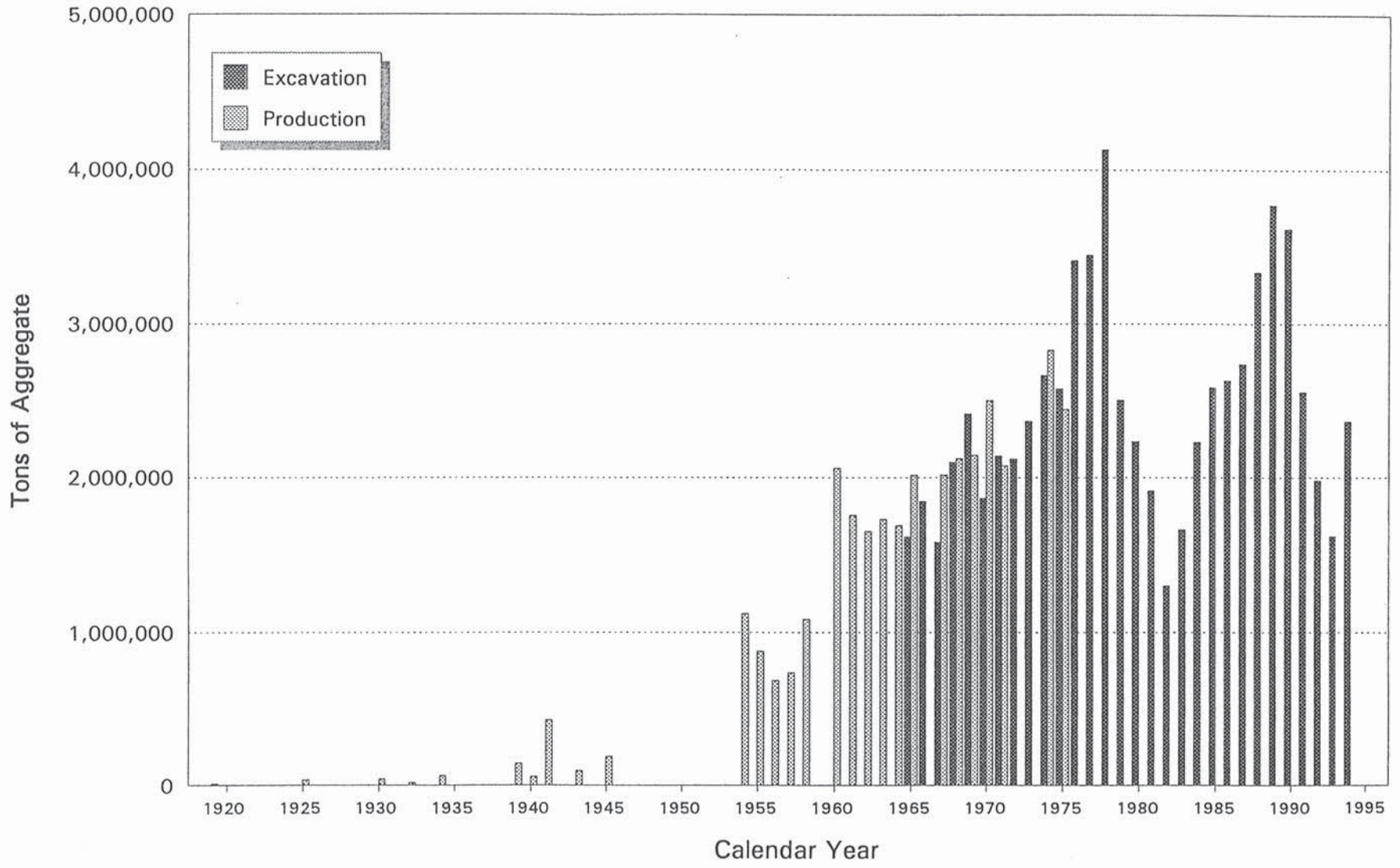
These production records provide an overview of the general amount of material excavated historically from Cache Creek. However, the excavation amounts and production totals are not entirely comparable for the reasons summarized below:

- The recent excavation totals are specific to the Cache Creek area between Capay Valley and Yolo. Production amounts are compiled for the County as a whole, and thus include the minor production that has occurred historically below Yolo on Cache Creek and on Putah Creek.

- The production amounts record the sand and gravel as a final product that has been processed through the plant. Thus, production values do not include excavated fine materials, and are somewhat smaller than the comparable excavated amounts.

- Excavation is reported in terms of the year in which the material actually is removed from the channel or pit. Production of the excavated material may be delayed as materials are stockpiled for later processing. Thus production may represent excavation that occurred in previous years.

Despite these considerations, annual production amounts through a span of years provide insight into the development of the aggregate industry and historic impacts on Cache Creek.



October 1995	Figure 4.2-7
DAVID KEITH TODD Consulting Engineers, Inc. Berkeley, California	Cache Creek Aggregate Extraction/Production 1919 - 1994

ENDNOTES

1. Woodland and Reiff.

2. Department of Water Resources (DWR). *Clear Lake-Cache Creek Basin Investigation.* Bulletin No. 90, March 1961.

3. Mitten, 1971.