4.4 HYDROLOGY AND WATER QUALITY

4.4 HYDROLOGY AND WATER QUALITY

INTRODUCTION

This section comparatively examines potential impacts on hydrology and water quality associated with implementation of the CCRMP and the project alternatives. The main issues addressed in the section are:

- potential impacts associated with flooding outside the creek boundary;
- potential impacts associated with inconsistencies between floodplain delineations;
- potential impacts associated with water quality;
- potential impacts associated with water supply for biotic reclamation; and
- potential impacts associated with groundwater recharge and surface water supplies.

Extensive hydrologic data have been collected and documented in reports prepared on the hydrology of the Cache Creek basin. Much of this information is important to the analysis of the proposed project, while some of it is not pertinent. The model of the hydrologic cycle (Figure 4.4-1) has been used as a framework for selecting information for presentation in this analysis and for evaluating potential impacts associated with aggregate mining on hydrology and water quality. In a simplified manner, the model of the hydrologic cycle demonstrates how water continuously moves through the environment. The cycle encompasses numerous hydrologic processes that can be impacted by human activities. Each major process within the cycle has been evaluated with regard to the potential for the proposed project to affect the movement and quality of water within that process.

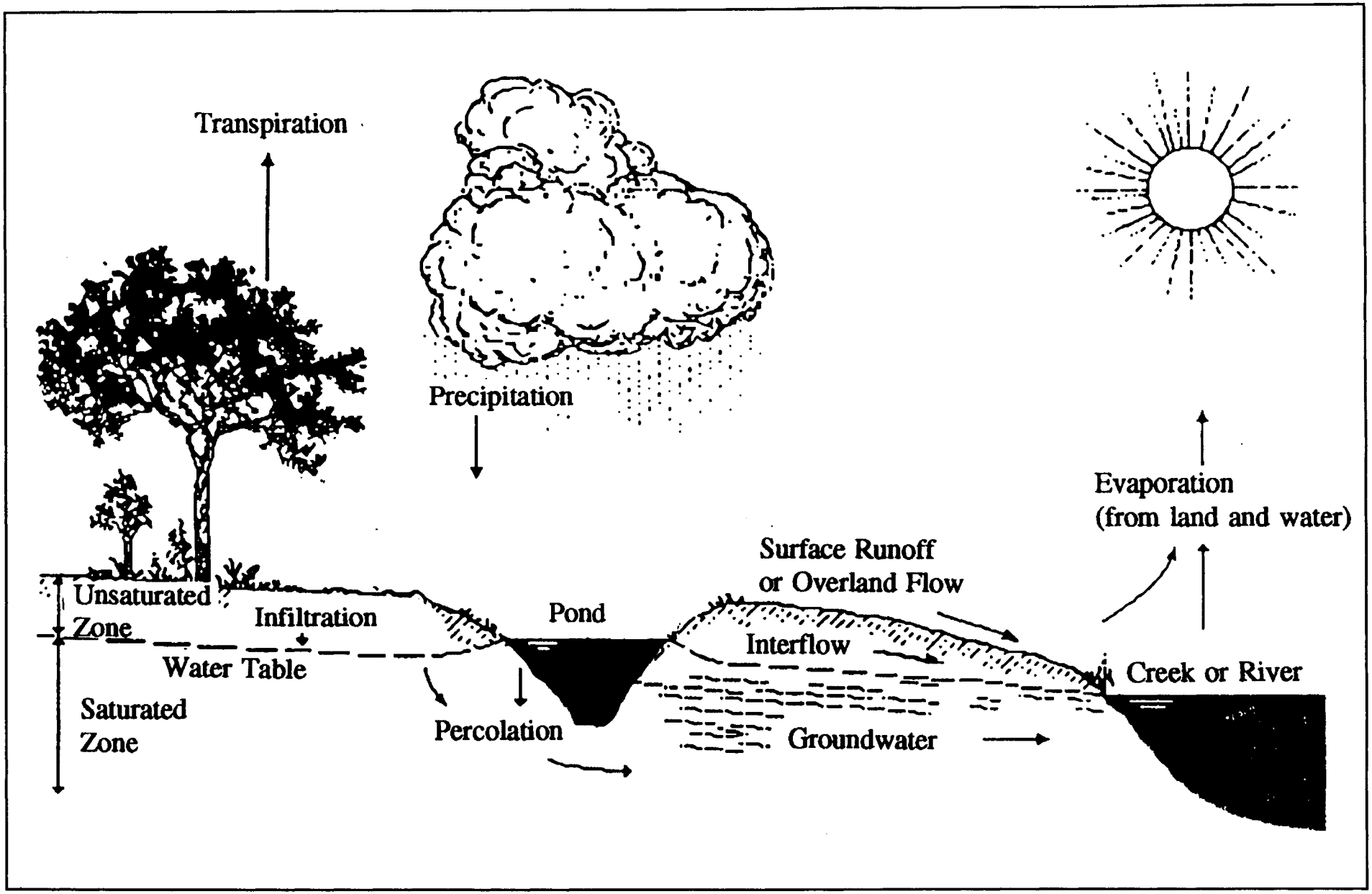
SETTING

Description of Regional Environment

Climate

The climate in the vicinity of the planning area is characterized as Mediterranean; warm to hot dry summers and moist winters. The orographic[1] effects of the Coast Ranges greatly influence rainfall distribution patterns in the area. Most of the precipitation in the area results from storms that originate over the Pacific Ocean and travel eastward over the Coast Ranges to the Sacramento Valley. More rain typically falls in the foothills and uplands of the Coast Ranges (24 inches per year) than the valley floor (19 inches per year) (National Oceanic and Atmospheric Administration, 1992). Most of the rainfall occurs between the months of November and March, and virtually none falls between June and September. Snowfall and snowpack are negligible in the Coast Ranges uplands of Yolo

[1]The physical geography of mountains and mountain ranges.



Note: The hydrologic cycle is the cycle through which water passes from open water bodies through evaporation to the atmosphere, to precipitation, to infiltration and runoff and return to open water.

Figure 4.4-1 The Hydrologic Cycle

SOURCE: MODIFIED FROM GORDON, N.D., McMAHON, T.A., FINLAYSON, B.L., 1992

County. Analysis of long-term precipitation records indicates that wetter and drier cycles lasting several years are common in the region. Severe, damaging rainstorms occur at a frequency of about once every three years in the central California region (Brown, 1988).

The average annual temperature in Yolo County is 62 degrees Fahrenheit (° F). The average daytime high temperature in the summertime is 100° F. Summertime temperatures have been recorded in excess of 115° F in Yolo County (Scott and Scalmanini, 1975).

Surface Water

The planning area contains portions of two drainage basins: the Cache Creek basin and the Willow Slough Basin (Figure 4.4-2). The Putah Creek Basin is also a major drainage basin in the region, but does not directly affect hydrology and/or water quality in the planning area.

Cache Creek is the principal drainage feature within the Cache Creek basin, and drains an area of over 1,140 square miles (NHC, 1995). Cache Creek originates at Clear Lake in the Coast Ranges (approximately 35 miles northwest of the planning area) and flows easterly to the Sacramento Valley. The topography of the Cache Creek basin varies from the steep uplands of the Coast Ranges between Clear Lake and the town of Capay, to the relatively gentle slopes of the valley downstream of Capay. Cache Creek is a seasonal stream with flows ranging from 0 to 50,000 cubic feet per second (cfs) at Capay.

Diversions of Cache Creek occur at the Indian Valley Dam (on the North Fork of Cache Creek), an earthen dam at Rumsey, and the Capay Dam (located at the western margin of the planning area). The dam at Capay diverts nearly all summertime flows to the Adams and Winters Canals for agricultural use. The mean annual runoff[2] within Cache Creek is estimated at 577,000 acre-feet at Capay and 374,000 at Yolo (NHC, 1995).

Indian Valley Reservoir, located on the North Fork of Cache Creek, has a storage capacity of about 300,000 acre-feet, of which 40,000 acre-feet is for flood control storage. The dam was built in 1975 by the Yolo County Flood Control and Water Conservation District (YCFCWCD). If the Indian Valley Dam were to fail, the planning area could be inundated by a wave. The wave would reach the western portion of the planning area in approximately 4.0 hours (YCFCWCD, 1996).

Willow Slough, which flows in an easterly direction, is the principal drainage feature within the Willow Slough Basin. Willow Slough Basin (which includes Dry Creek Slough, Lamb Valley Slough, Cottonwood Slough, and Union School Slough) drains an area of approximately 200 square miles (USACOE, 1994). The Slough receives storm water runoff and agricultural tailwater from the entire central portion of Yolo County. Willow Slough also

[2]The mean annual runoff is the average total volume of surface water that passes in a single year a given location (such as a gauging station) on a creek or river each year.

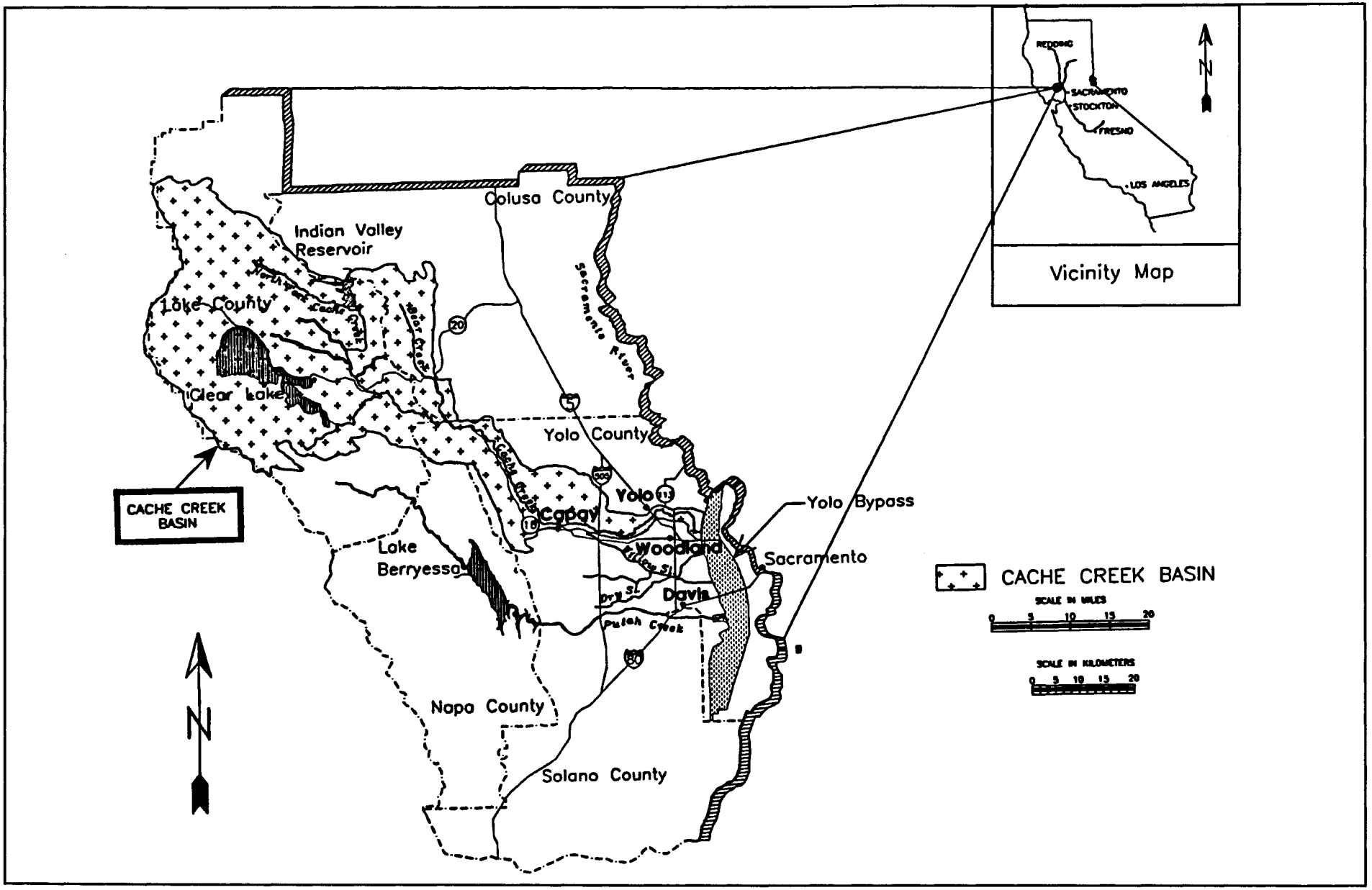


Figure 4.4-2 Regional Drainage

SOURCE: USACOR, 1995

receives water from several canals, irrigation ditches, and small tributaries; flow within the Slough is often sporadic.

Groundwater

Groundwater in the Cache Creek and Willow Slough basins occurs in both the Tehama formation[3] and the overlying younger alluvial deposits. The overlying younger alluvial deposits, which consist primarily of sand and gravel with intermittent layers of silt and clay, comprise the more important groundwater producing unit because yields to wells are significantly higher. The thickest sand and gravel deposits occur nearest to Cache Creek. Along the Creek, the thickest deposits occur west of the Plainfield Ridge. The Plainfield Ridge is an uplifted portion of the Tehama formation that acts as a subsurface restriction to the flow of groundwater. The ridge tends to cause the accumulation of sediments on the upstream (west) side.

Uppermost groundwater is unconfined[4] and typically encountered between 10 and 75 feet below the ground surface in the region, depending on the local topography and seasonal recharge. At a particular site, seasonal fluctuations of groundwater levels can exceed 25 feet (David Keith Todd, 1995). The regional groundwater flow direction is consistently to the east/southeast and relatively parallel to Cache Creek (Figures 4.4-3 and 4.4-4). Depressions in the water table form around pumping wells, particularly during drought periods, which can alter local groundwater flow directions.

The YCFCWCD manages surface water storage and diversion in Yolo County. There is currently no regional groundwater management program. Private and public property owners may, at their discretion, install and operate groundwater supply wells. Pumping and use of groundwater is the right of each property owner. Disputes over uses of groundwater within a basin or subregion are generally resolved through adjudication. The YCFCWCD has released a conceptual plan for Cache Creek Groundwater Recharge Project (1991) that would divert surface waters (that may, if not diverted, flow out of the basin) into temporary groundwater storage via infiltration recharge basins. It is not known when, or if, a comprehensive final plan will be developed and implemented.

Water Quality

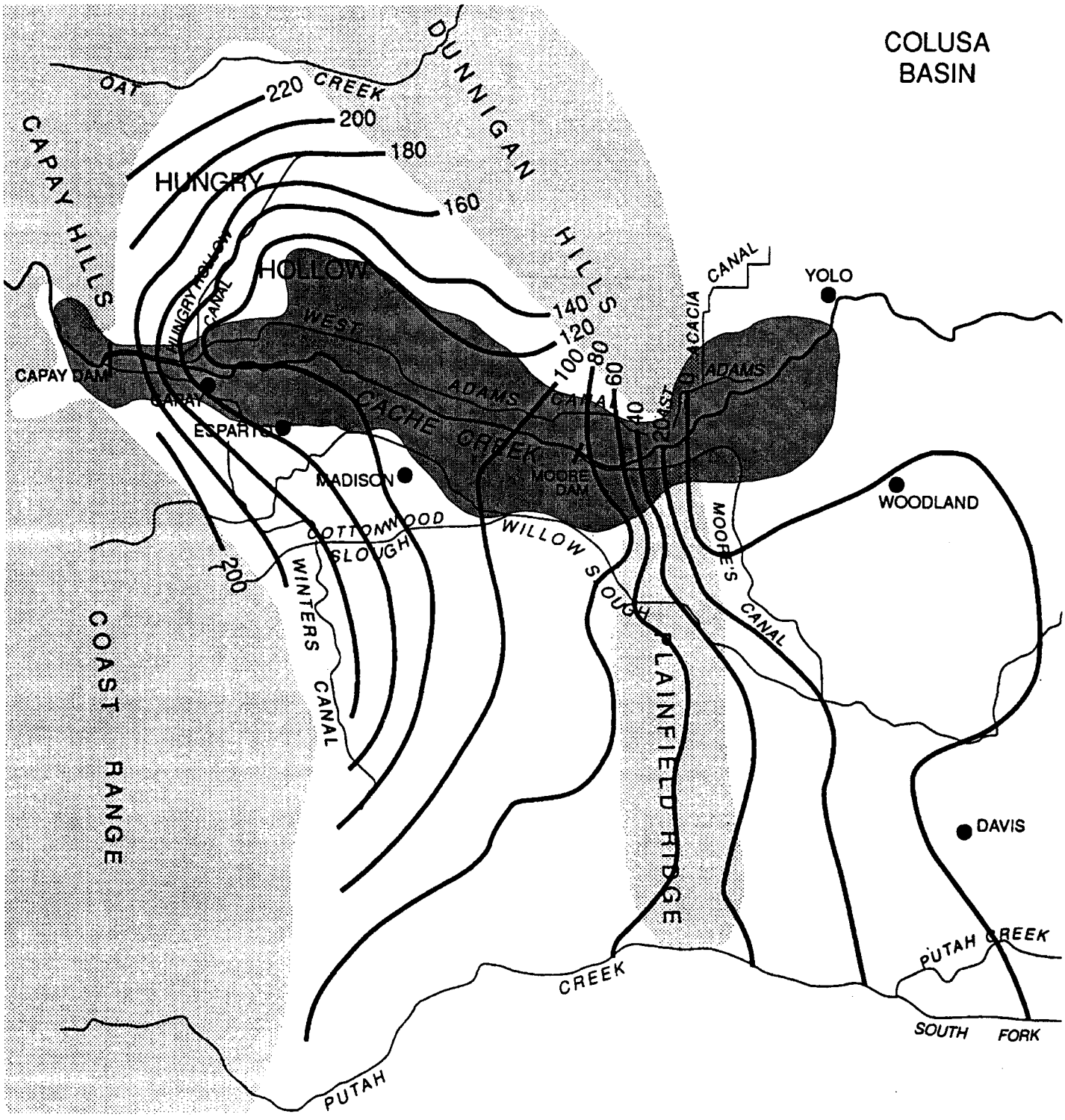
The quality of surface and groundwater in the Cache Creek and Willow Slough basins is affected by source water quality,[5] geologic materials through which groundwater flows, and by land uses within the watershed. In general, groundwater contains higher concentrations

---

[3]The Tehama formation consists of poorly sorted sediments composed of thick-bedded, sandy silt and clay. Gravel and sand deposits are usually thin and discontinuous (DWR, 1978).

[4]An aquifer is "unconfined" when the uppermost water table surface is free to move up and down.

[5]Source water quality refers to the quality of surface water (e.g., reservoir releases) and groundwater (e.g., springs) that discharge into Cache Creek upstream of the planning area.



Yolo County MRZ Area — 140 — Groundwater contour above MSL

SOURCE: ADAPTED FROM LUHDORFF AND SCALMANINI (1992), AND DAVID KEITH TODD (1995)

Figure 4.4-3 Groundwater Elevation Contour Map, Fall 1991

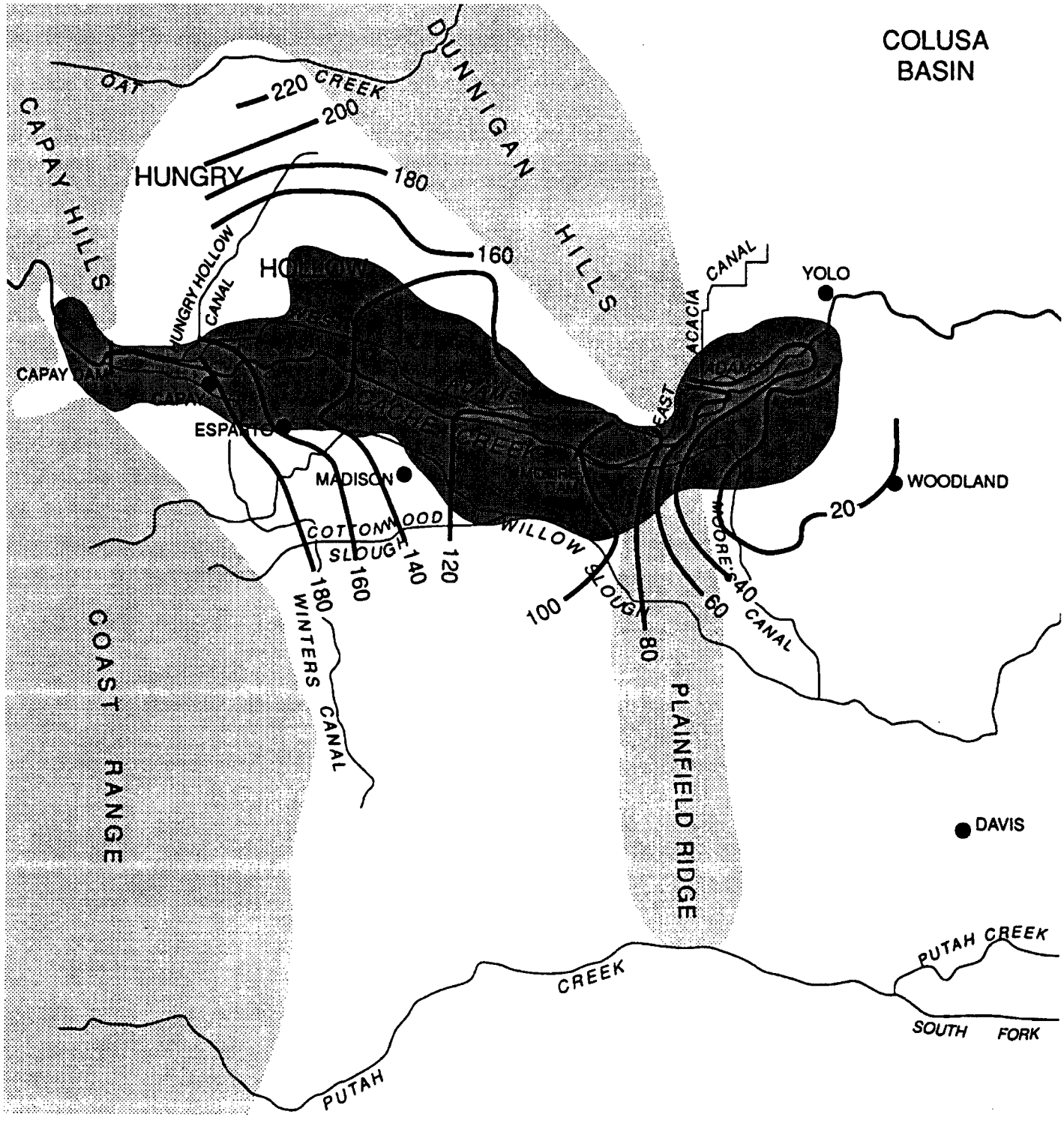


Figure 4.4-4 Groundwater Elevation Contour Map, Spring 1993

SOURCE: David Keith Todd (1995)

of total dissolved solids (TDS) than surface waters due to the relatively slow movement of groundwater and correspondingly longer contact with soluble minerals in the subsurface. Surface water bodies tend to be more susceptible to degradation by sediment-laden runoff and potential chemical discharges because they are exposed at the surface.

Water quality in surface and groundwater bodies is regulated by the State Water Resources Control Board and Regional Water Quality Control Boards. The planning area is under the jurisdiction of the Central Valley Regional Water Quality Control Board (RWQCB), which is responsible for the implementation of State and Federal water quality protection guidelines.

Water quality has been monitored in surface water and groundwater in the Cache Creek and Willow Slough hydrologic basins since the early 1950s. In general, water quality in the basins is considered excellent for agricultural purposes (except for elevated levels of boron), and fair for domestic use (Scott and Scalmanini, 1975; Evenson, 1985).

Groundwater quality in the western portion of the valley is typically poorer than elsewhere, often exceeding the State secondary drinking water standards for TDS (500 mg/L) (Department of Water Resources, 1978). In general, salts occur in the groundwater in the Cache Creek basin at acceptable concentrations, except boron. Boron, which is necessary for plant growth but toxic to certain plants at concentrations in excess of 1.0 mg/L, is imported to the Cache Creek basin. Since Cache Creek is a significant groundwater recharge feature, groundwater quality in the basin has been affected by the elevated levels of boron (Scott and Scalmanini, 1975). Boron-rich waters flow into Cache Creek from natural hot springs in the Bear Valley drainage. The YCFCWCD monitors Cache Creek for boron. Runoff and flow in Cache Creek resulting from the first rainfall events each winter tend to contain higher concentrations of boron than flows during the rest of the year. The YCFCWCD does not divert these "first flush" flows into the irrigation canal system (Barton, 1996).

Cache Creek is listed as an "Impaired Waterway" by the Central Valley Regional Water Quality Control Board in compliance with section 303(d) of the Clean Water Act (Yee, 1996). Grab samples collected from the creek during the winter of 1995 were found to contain mercury in excess of the Maximum Contaminant Level (0.002 mg/L). In addition, samples were subject to bioassay testing and found to be toxic to invertebrates. It is thought that the mercury and unknown toxicity within the creek has resulted from historic hard-rock mining in the upper portion of the basin. The designation as a impaired waterway serves to notify the public of potential water quality degradation. When funding becomes available, the RWQCB, in conjunction with the Yolo County Department of Environmental Health, may conduct additional water quality monitoring and establish Total Maximum Daily Loads for dischargers of contaminants to the Cache Creek system (Yee, 1996).

Available analytical data on water quality samples collected from wells in the Cache Creek area are limited. Numerous wells have been sampled on single occasions and several

wells have been analyzed for mineral quality over various periods. In the vicinity of Cache Creek below Capay, the data suggest consistent water quality with no observable degradation over the last 20 to 40 years. Community water supply sources in Esparto, Madison, Yolo, and south of the Yolo Fliers Club were all screened for organic chemicals in 1985; none was detected in any of the wells.

A wide variety of potential sources of surface water and groundwater contamination occur within the Lower Cache Creek basin. Potential sources of contamination (Figure 4.4-5) can be divided in six categories as follows (EPA, 1987):

Category 1 — Intentional discharges. These releases are intended to occur and generally include established controls for mitigation of potential impacts. The systems are generally designed to use the natural capacity of soils and the aquifer to degrade wastewater (e.g., cess pools, septic tanks, injection wells, and land application of wastewater and sludge). It is estimated that septic tanks and cess pools discharge the greatest volume of wastewater to the subsurface and are the most frequently reported source of groundwater contamination (Miller, 1980).

Category 2 — Releases from storage and treatment areas. These releases are not intended to occur. These systems are designed to store and/or treat substances (e.g., landfills, open dumps, and underground storage tanks).

Category 3 — Releases during transport. These releases are not intended to occur. These systems are designed to transmit products or waste (e.g., fuel pipeline, sewer lines). Releases from these systems generally occur due to accidents or neglect and would include sabotage and illegal dumping.

Category 4 — Discharges associated with other activities. In general, these releases are intended to occur, though controls for potential impacts are often minimal or nonexistent. This category contains agricultural activities (irrigation runoff, feedlot operations, and pesticide application) and urban runoff.

Category 5 — Contamination through conduits. These releases are not intended to occur. This category includes creation of conduits that allow contamination to reach the groundwater (e.g., poorly designed wells, exploration holes, construction excavations, wet pit gravel mines, and drainage/discharge from existing or abandoned hard rock mines).

Category 6 — Naturally occurring sources. Some naturally occurring sources of contamination can impact surface and/or groundwater quality. Problems associated with naturally occurring sources of contamination can be exacerbated by human activity. Salt water intrusion can be caused by overpumping of groundwater. Recharge of an aquifer with poor quality surface water (i.e., high boron content) can adversely impact groundwater quality.

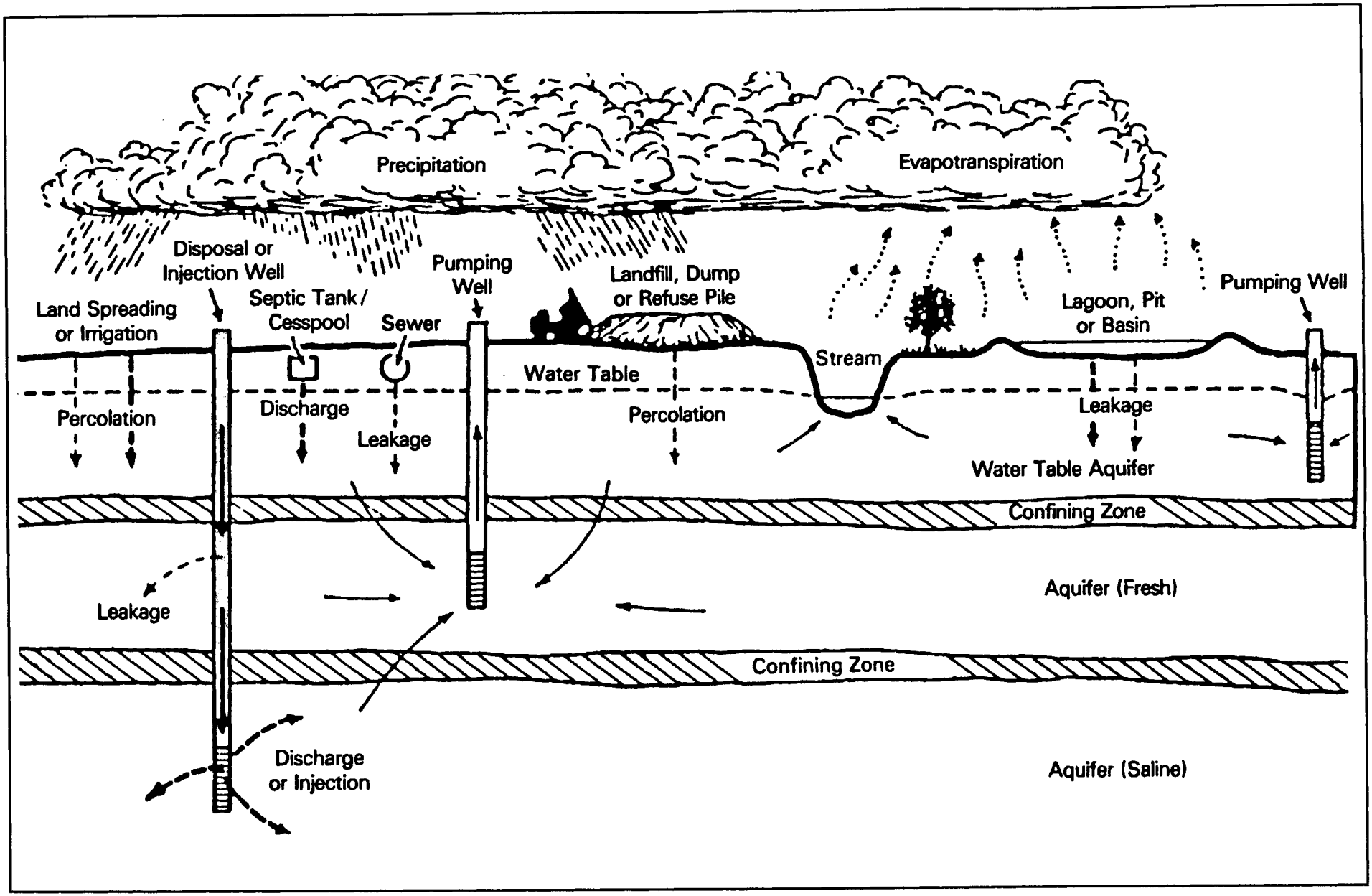


Figure 4.4-5 Potential Sources of Groundwater Contamination

SOURCE: EPA, 1987

Description of Local Environment

Surface Water

Historic Condition of Cache Creek

Cache Creek is a dynamic and highly responsive fluvial system. The following discussion of the history of the Cache Creek channel dynamics is derived from the Technical Studies (NHC, 1995). Prior to the 1930s, the creek below Capay was characterized by a large dispersed riparian and complex distributary system[6] without easily identifiable channel banks. Historical flooding was frequent and covered large areas of land that are now under cultivation. By 1937 human influences had begun to alter flow patterns within the planning area. Five bridges (Capay, Esparto, Madison, Stephens and Yolo) had been constructed across the channel. In each case, construction of the bridges resulted in drastically narrowing the active channel of the creek. In addition to bridge construction, levee building and agricultural activities contributed to channel narrowing. These activities, not gravel mining, were primarily responsible for channel narrowing up to this time.

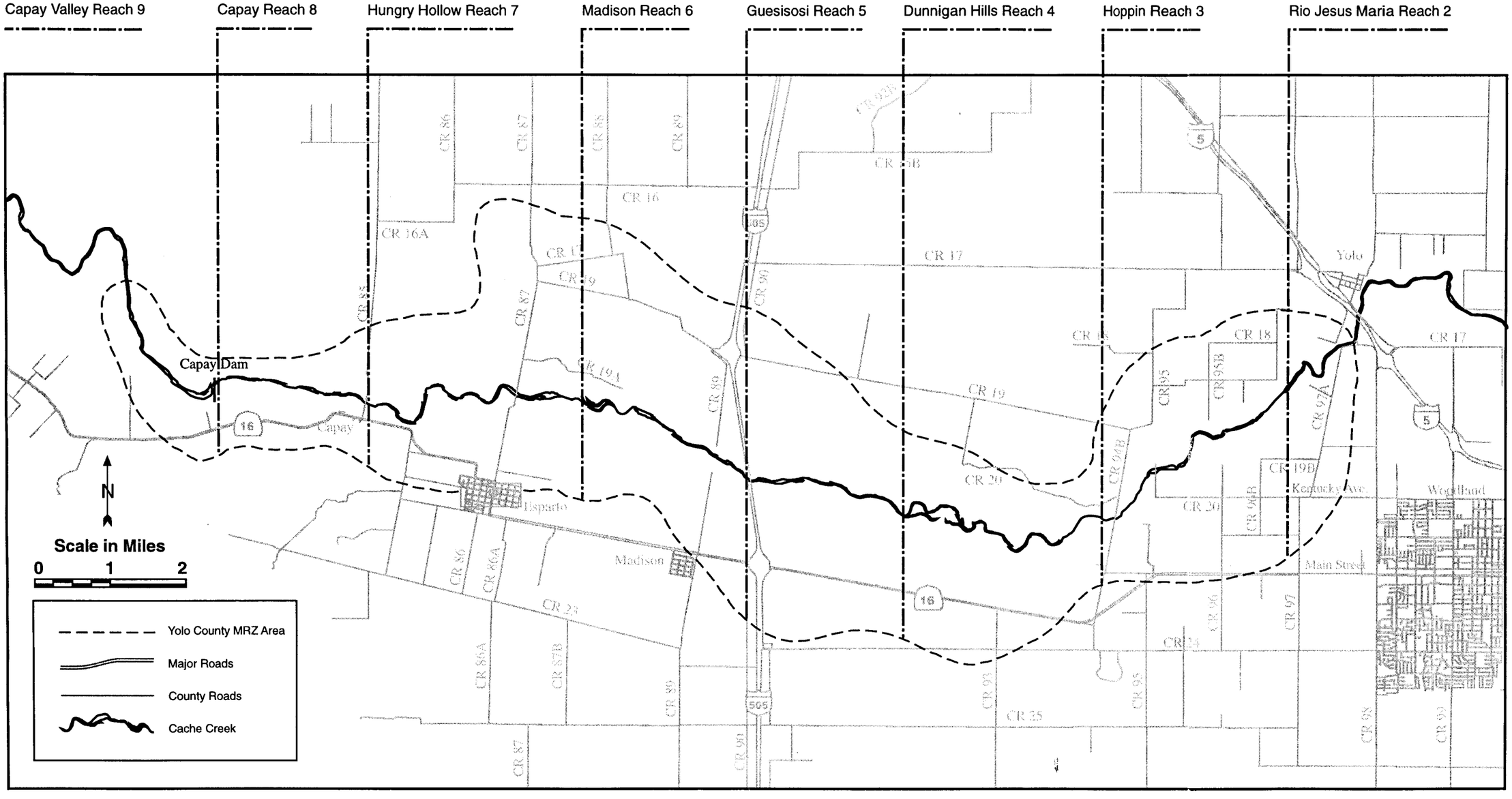
By 1952, the channel generally became more narrow and incised. Gravel mining activities had begun to result in streambed lowering. Gravel mining operations within the channel expanded between 1953 and 1964. By 1964, the active channel had become extremely narrow and incised within the planning area relative to pre-1930s conditions. By 1978, excavation of the banks by aggregate mining operations had resulted in limited channel widening occurred in some reaches. Channel widening resulted in even more dramatic constrictions at the bridges. Between 1978 and 1994, much of the planning area was subject to gravel mining activities, including: in-channel skimming, lateral bank excavation into terrace deposits, and off-channel pit excavation. Since 1950, the streambed within the planning area has been lowered by 15 to 25 feet.

Numerous dams were constructed within the Cache Creek system in the 1900s. In addition, as agricultural activities intensified, the need for irrigation water placed further demands on available water within the system. Dam building and agricultural demand for water resulted in reduced seasonal flows and sediment supply to the creek. Therefore, the creek below Capay is sediment starved and more susceptible to scour and incision. Gravel mining within the channel further exacerbates the problems associated with lack of sediment supply.

Current Conditions of Cache Creek

Cache Creek within the planning area has been divided into seven reaches (Figure 4.4-6) based on geomorphology (NHC, 1995). The characteristics of each reach are summarized on Table 4.4-1.

[6]An overflowing branch of a river, such as occurs characteristically on a delta.



Note: Reach characteristics are summarized on Table 4.4-1.

Reach Boundary

Figure 4.4-6 Geomorphic Reaches of Cache Creek

SOURCE: NHC, 1995

Table 4.4-1 Summary of Cache Creek Reach Characteristics

Reach Name/Number	Length (mi)	Width[1] (ft)	Depth[1] (ft)	Slope[1] (ft/mi)	Gaining/Losing[2] or Neutral	Comments
Capay/8	2.1	1,759	19.7	10.8	Gaining: perennial flow	Steep, confined and incised with bedrock controls
Hungry Hollow/7	2.8	1,548	11.5	11.3	Losing	Channel widens; braided platform; active gravel mining
Madison/6	2.5	692	19.3	12.4	Neutral	Downstream portion of reach narrows and not actively mined
Geusisosi/5	2.3	614	18.6	6.2	Gaining: perennial flow, shallow groundwater	Channel initially confined by levee, reasonably straight but meanders further downstream; some in-channel levees
Dunnigan Hills/4	2.8	879	16.1	9.9	Gaining: perennial flow, shallow groundwater	Well-developed low-flow meanders; significant riparian vegetation; site of former Moore diversion dam; bedrock controls along Dunnigan Hills; some in-channel levees; West Adams Canal drain and Goodenow Slough enter upstream from road 94B
Hoppin/3	3.3	1,584	32.6	7.4	Losing	Some meander development; bedrock controls upstream from Stevens Bridge; extensive gravel mining; dense vegetation downstream from Stevens Bridge; some in-channel levees
Rio Jesus Maria/2	7.5	384	41.6	7	Losing	Upper 1.4 mi included in study area; channel considerably narrower and constricted with steep banks; some riparian vegetation; contains COE flood control levees; four bridge crossings near Yolo

Source: NHC, 1995; Jones and Stokes, 1995.

Note: Reach 1 is outside the planning area and therefore is not included on this table.

[1] Reach averaged.

[2] Refers to whether the reach gains water from groundwater or tributary inflow (gaining reach), loses water to the aquifer (losing reach), or neither gains nor loses water.

It has been stated that the Cache Creek channel within the planning area is "out of balance" (NHC, 1995), which has resulted in increased problems associated with lateral channel migration, incision, and scour near bridge crossings. As long as society requires protection of infrastructure (e.g., bridge crossings, roads, canals, buildings) and agricultural lands adjacent to the streambanks from damage caused by erosion and flooding, the creek cannot be returned to its pre-1900s condition. The goal of achieving a new dynamic equilibrium must balance the needs for flood protection, channel stability, biotic restoration, and managed aggregate extraction.

Runoff and Drainage

In an undeveloped or agricultural setting, a significant amount of precipitation that falls on the ground infiltrates into the subsurface. When rainfall intensities exceed the infiltration capacity of surface soils, runoff flows over the ground surfaces toward established natural or constructed drainage channels. Storm water runoff is then conveyed away from the area as overland flow or conveyed in creeks and canals. In a developed setting much of the natural soils can be covered with impervious surfaces (i.e., roads, driveways, and roofs), reducing infiltration and increasing amounts and altering flow patterns of runoff. The existing conditions within the planning area include very limited impervious cover.

The planning area includes three general types of land uses; agriculture, rural residential, and aggregate mining. The primary land use is irrigated agriculture. During the spring and fall, drainage of agricultural tailwater directly into creeks or irrigation canals is common practice in the area (USACOE, 1994). Runoff (the amount of precipitation that is transported away by drainage) from the planning area is estimated at 2.5 inches per year (Rantz, 1974). The quality of this drainage and runoff is discussed under Impact 4.4-3.

History of Flooding

Flooding results from short-duration high intensity rainfall, long-duration low intensity rainfall, failure of a dam or levee, or a combination of these conditions. Overtopping of the channel banks of Cache Creek or the drainage within Willow Slough could cause flooding within the planning area.

The flood of record (maximum recorded discharge) for Cache Creek (recorded at the town of Yolo[7]) was 41,800 cubic feet per second (cfs) on 9 March 1995 (NHC, 1995). The second highest flood of record occurred on 25 February 1958 and was measured at 41,400 cfs, as compared to mean annual flows of 515 cfs between 1903 and 1992 (USGS, 1992). The calculated flood discharges corresponding to the 10-year and 100-year flood events for Cache Creek at Capay Dam are 30,000 cfs and 64,000 cfs, respectively (USACOE, 1994). The majority of the Cache Creek system is characterized by short stream reaches

[7]The river gauging station at Yolo on Cache Creek (No. 11452500) is located at the eastern end of the project area, and is the nearest USGS gauging station.

with steep gradients, and therefore peak flood flows usually pass through the basin within a 24-hour period.

Existing levees along Cache Creek in the vicinity of Yolo and Woodland, east of the planning area, are overtopped by floods greater than the 10-year event. Floods greater than the 10-year event threaten the town of Yolo and the city of Woodland. The U.S. Army Corps of Engineers (USACOE) has completed a preliminary review of the problem and has recommended that feasibility-level studies be prepared to further evaluate the appropriateness of structural improvements (setback levees and channel improvements) (USACOE, 1994).

Drainage within Willow Slough results in frequent overtopping of banks (as recently as January 1995, but also in 1958, 1963, 1983, and 1986) and floods areas near SR 16 and the southern portion of the planning area (USACOE, 1994; Russo, 1995).

Current Flooding Conditions

The planning area is located within the 100-year flood hazard zone (Figure 4.4-7) as mapped by the U.S. Department of Housing and Urban Development, Federal Insurance Administration (FIA, 1980),[8] indicating that most of the area would be inundated during the 100-year storm event.[9] FEMA generates Flood Insurance Rate Maps (FIRMs) that depict flood hazard areas within studied communities for use as planning tools. In most environments, FIRMs represent the best available estimate of the limits of the 100-year flood.

Within the planning area, alterations to the Cache Creek channel, resulting from in-stream mining and improvements to the levees along the creek, have resulted in significant changes to the 100-year floodplain. As required by County Resolution 94-82, the mining facilities that operate along Cache Creek must maintain 100-year flood protection for plant facilities and off-channel mining areas. Therefore, the active off-channel mining operations have performed hydraulic analyses to verify 100-year protection. These more recent analyses (including those conducted at Solano Concrete and Syar Industries (Cunningham Engineering, 1995a and 1995b)), which take into account channel modifications and levee improvements, indicate different floodplain limits than the 1980 FIRMs. The current FIRMs are therefore no longer accurate.

FEMA is in the process of updating the FIRMs for the planning area, but may not release the new maps for several years (Bencomo, 1996). Difficulties arise when the FIRMs are not accurate and development or erosion-control measures are proposed within the

[8]FIA was a predecessor of the Federal Emergency Management Agency (FEMA).

[9]The "base flood" (or 100-year flood) is the flood having a one percent chance of being equaled or exceeded in any given year. In any single 100-year period, several "base flood" events (or none) *could* occur. But over the long term, the frequency of the "base flood" is expected to *average* once in 100 years.

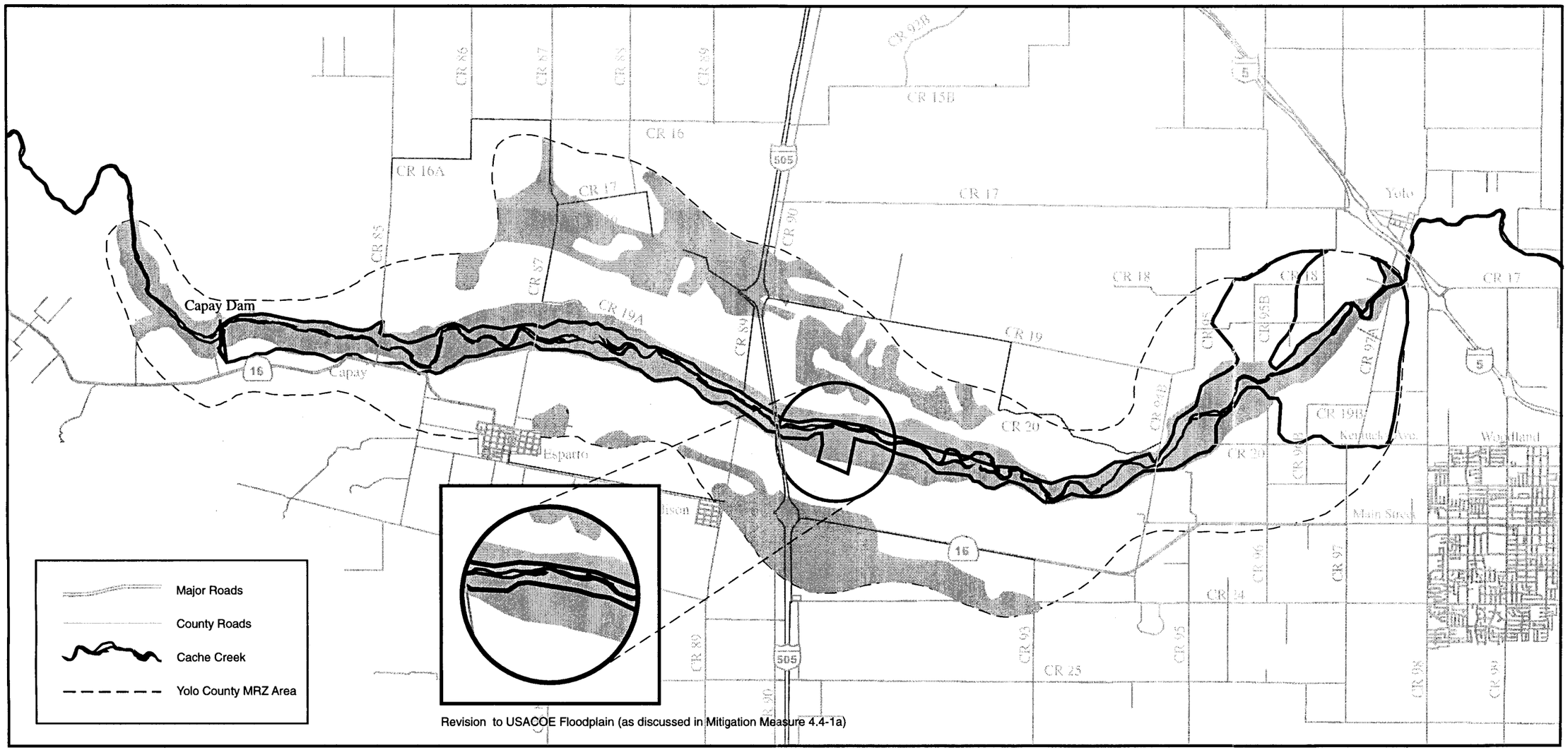


Figure 4.4-7 Cache Creek Floodplain

SOURCE: FIA, 1980; U.S. ARMY CORPS OF ENGINEERS, 1994

floodplain. Under the County Flood Ordinance, the County is bound to enforce permitting and development restrictions within the FEMA designated floodplain, even if the floodplain designation is incorrect. When significant modifications to a floodplain occur, a Letter of Map Revision to FEMA is required requesting an update to existing FIRMs.

Groundwater

The groundwater levels and flow direction in the planning area are generally consistent with the regional easterly/southeasterly gradient. However, significant perturbations in the flow direction can occur in the vicinity of active pumping wells (industrial, municipal, and agricultural).

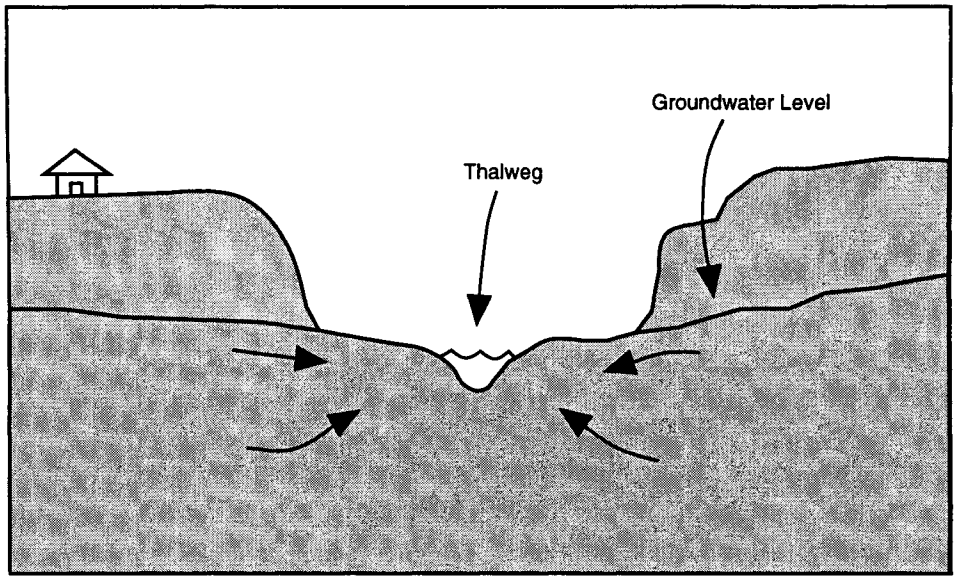
The recharge/discharge relationship between Cache Creek and the aquifer varies by location, and changes with seasonal fluctuations in the elevation of the groundwater table.

Portions of the creek that are actively being recharged by the aquifer are termed "gaining" reaches (Figure 4.4-8). Those portions of the creek that recharge the aquifer are termed "losing" reaches (Figure 4.4-8). Review of various past investigations (David Keith Todd, 1995) indicates that, during the dry season (low groundwater), most of the Creek is losing water (with the exception of the reach just upgradient of the Plainfield Ridge). During periods of high groundwater,[10] part or all of the reach between the Esparto Bridge and the Plainfield Ridge may become a gaining reach.

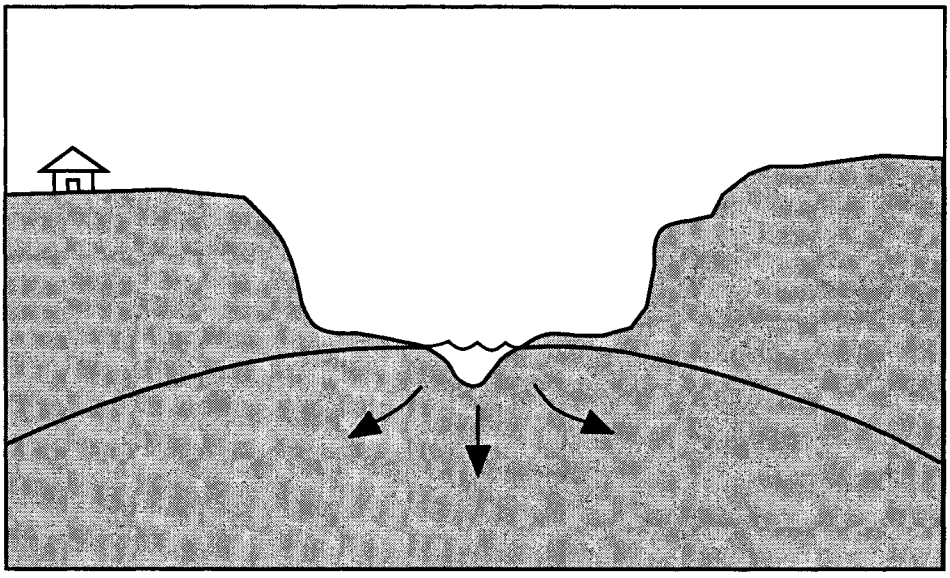
When the water table in the banks of Cache Creek is higher than the thalweg[11] in the active channel, groundwater flows into the channel (and would be considered a gaining reach). This phenomena has been theoretically characterized as the "chipped tea cup" condition (Woodward-Clyde, 1976) because it was thought that the elevation of the thalweg largely controlled the amount of groundwater that could be stored in the aquifer, just as a full tea cup will drain to the level of a chip in its rim. Under this condition, incision in the creek channel (lowering of the thalweg) would allow groundwater to pour through a lowered "chip" resulting in a loss of groundwater storage in the aquifer. Subsequent studies have concluded that the apparent loss of aquifer storage observed in the 1950s through the mid-1970s was the combined result of drought and extensive groundwater pumping (David Keith Todd, 1995). By 1983, the groundwater levels in the basin had essentially recovered to pre-1950s levels, confirming that significant aquifer storage capacity had not been lost.

[10]In the late winter and spring, the water table is elevated due to infiltrating rainfall and lack of pumping for agriculture.

[11]The line joining the deepest points of a creek channel.



A gaining reach. Water flows from the groundwater system into Cache Creek.



A losing reach. Surface water flow in Cache Creek recharges the banks and surrounding aquifer.

Figure 4.4-8 Schematic Cross-Section, Hydrology of Gaining and Losing Reaches

REGULATORY FRAMEWORK

The following section lists the regulations, plans, and policies that would be applicable to the project. The impact section discusses the conformance of the project with these plans, policies, and regulations, when applicable.

U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers regulates activities involving discharge (including excavation) of dredge or fill material in "waters of the United States" (33 CFR 323). Excavation and/or channel reshaping of Cache Creek within the "ordinary high water mark," may require permitting from the Corps. Channel improvements and restoration activities would qualify for coverage under the Corps general permit.

Clean Water Act

Section 402(p) of the Clean Water Act (CWA) and implementing regulations require control of storm water discharges as part of the National Pollutant Discharge Elimination System (NPDES) program. Discharges of storm water from certain industrial activities and large municipalities require a permit under the NPDES program.

Implementation of the NPDES program has been delegated to the State of California. The State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs) are the implementing agencies in the State. The SWRCB has issued a general permit for discharges of storm water associated with construction activities (General Permit). Excavation within, and reshaping of, the Cache Creek channel may represent a construction activity requiring compliance with the General Permit.

National Flood Insurance Program

The National Flood Insurance Program, established by Congress in 1969, allows property owners to purchase federally backed flood insurance within communities that participate in the Program. In return for the insurance protection, participating communities implement floodplain management measures to reduce flood risks to new development. Through this mechanism, the Federal Emergency Management Agency (FEMA) and participating communities are able to reduce future flood losses. Under the program, FEMA (formerly the Federal Insurance Administration) conducts Flood Insurance Studies and prepares Flood Insurance Rate Maps (FIRMs). In general participating communities are obligated to use the FIRMs to delineate the floodplain and regulate development.

Significant changes to the floodplain that may result from modifications to levees or excavation and fill activities must be reported to FEMA. "A community's base flood elevations may increase or decrease resulting from physical changes affecting flooding conditions. As soon as practicable, but not later than six months after the date such information is available, a community shall notify the Administrator (FEMA) of the changes

by submitting technical or scientific data in accordance with this part. Such a submission is necessary so that upon confirmation of those physical changes affecting flooding conditions, risk premium rates and floodplain management requirements will be based upon current data" (44 CFR 65.3). Changes in the Cache Creek channel, including those resulting from aggregate extraction, could be interpreted to cause physical changes in flooding conditions.

SMARA and Related Regulations

The California Surface Mining and Reclamation Act (SMARA) of 1975 requires that the State adopt regulations which establish State policy for reclamation of mined land, including measures to be employed by lead agencies in specifying water quality, watershed, and flood control protection (Sec. 2756). In addition, SMARA requires adoption of regulations specifying minimum verifiable statewide reclamation standards for drainage and stream protection (Sec. 2773). The requirements of SMARA apply to current mining operations along Cache Creek. Channel modification projects performed under a resources management plan may be exempt from the provisions of SMARA.

The State reclamation regulations contain several minimum acceptable practices and performance standards for drainage diversion structures, waterways, and erosion control (CCR Title 14 Section 3706) that may pertain to mining within the planning area, including:

Sec. 3503(b)(1)	Settling ponds or basins shall be constructed to prevent sedimentation of streams.
Sec. 3503(b)(2)	Operations shall be conducted to substantially prevent siltation of groundwater recharge areas.
Sec. 3706(b)	The quality of water, recharge potential, and storage capacity of groundwater aquifers which are the source of water for domestic, agricultural, or other uses dependent on the water, shall not be diminished, except as allowed in the approved reclamation plan.
Sec. 3706(c)	Erosion and sedimentation shall be controlled during all phases of construction, operation, reclamation, and closure of a surface mining operation to minimize siltation of lakes and watercourses, as required by the Regional Water Quality Control Board or the State Water Resources Control Board.
Sec. 3706(d)	Surface runoff and drainage from surface mining activities shall be controlled to ensure that the surrounding land and water resources are protected from erosion, gullying, sedimentation, and contamination.
Sec. 3707(d)	Use of fertilizers or other soil amendments shall not cause contamination of surface or groundwater.

State Reclamation Board Policies

The Reclamation Board (Board), a division of the California Department of Water Resources, is authorized under the State Water Code. It is the policy of The Reclamation Board to allow local control over the extraction of sand and gravel from floodways, so long

as the Board's responsibilities in the area of floodway preservation are not jeopardized or compromised.

When local agencies act as a lead agency, the Board will act as a responsible agency in matters of floodway protection -- with emphasis on the early consultation process. The Board will continue to require applications for encroachment in accordance with its adopted procedures and standards.

Specific policies that relate to in-channel excavations include:

1. Excavated material shall not be stockpiled within the limits of a project floodway or designated floodway during the flood season period. The flood season period for the various floodways is presented in Table 1, "Flood Season Periods," starting on page 2-12 (for Cache Creek; November 1 to April 15).

2. Trees and brush cleared from a mineral extraction area within a floodway shall be completely burned, or disposed of outside the limits of the floodway.

3. Any damage to a levee or existing access ramps caused by the excavation or hauling operations shall be promptly repaired to restore the levee or ramp to the original section. Any damage to the surfacing on the levee crown or existing access ramps caused by the hauling operation shall be repaired or replaced to at least the condition that existed prior to the damage. A profile of any levee crown roadway or existing access ramp used by extraction or hauling operations shall be provided with the application for Approval of Plans.

4. Material shall not be excavated from within at least 100 feet of the edge of a streambank. This area shall be left undisturbed, and retained in its natural state.

5. Any vegetation specifically conditioned to be retained in an Approval of Plans, and subsequently removed, shall be replaced under a replanting program approved by the Reclamation Board.

6. For extraction of minerals within a floodway that is also a fishery, suitable means shall be provided and maintained to preclude (a) entrapment of fish and (b) siltation of spawning gravels.

7. Drainage or other suitable means shall be provided for the abatement of mosquitoes.

Basin Plan, Regional Water Quality Control Board

The Basin Plan is a regulatory reference for meeting the State and Federal requirements for water quality control in the Central Valley Region. The preparation of basin plans is supported by the Federal Clean Water Act and required by the State's Porter-Cologne Water Quality Control Act. The Central Valley Regional Water Quality Control Board (RWQCB), which is responsible for implementation of the Basin Plan in Yolo County, evaluates discharges that may impact beneficial uses of surface water and groundwater and, if appropriate, issues numerical standards and monitoring requirements for the discharge.

Yolo County General Plan

The following policies related to water resources are included in the Safety (S) and Conservation (CON) elements of the 1980 Yolo County General Plan:

S 5 Yolo County shall regulate, educate, and provide guidelines and standards for avoiding and mitigating the effects of flooding.

S 6 Yolo County shall adopt and apply standards and ordinances for control of development relating to potential flooding and local drainage and require mitigation of identified impacts. The County may, at a future time, establish a policy for a countywide drainage plan, but does not require such a plan at this time.

S 7 Yolo County shall require development of all kinds, in areas of "acceptable low risk flooding," to be flood proof.[12]

S 9 Yolo County shall use the Federal Flood Insurance Program maps and standards in regulating and advising on development proposals in flood plains and these maps are a part of this General Plan by reference.

CON 16 Yolo County shall relate new development to water availability and water pollution avoidance or mitigation.

CON 17 Yolo County shall encourage waste water reclamation and reuse.

CON 20 Groundwater shall be protected from overdraft and shall not be encroached upon by construction. Impervious surfaces should be reduced or replaced and groundwater recharge enhanced. The use of non-impervious surfaces is encouraged.

CON 24 Yolo County shall continue to evaluate water resources and to maintain the Yolo County Water Resources Plan.

CON 35 Yolo County shall adopt a Cache Creek Management Program for the carefully managed use and conservation of Cache Creek and its sand and gravel resource, its riverside environment, its relationship to ground and surface water characteristics, and its value as a fishery and recreation resource.

CON 37 Yolo County shall cooperate with the Reclamation Districts to develop an adequate surface drainage plan.

CON 40 Yolo County shall prohibit surface water courses or groundwater recharge areas to be used for dumping sites for toxic materials or secondarily treated waste water and shall support agricultural practices to minimize chemical and nutrient runoff, erosion, and siltation, and support the use of check dams.

[12]Flood proof: Structures and facilities designed and constructed to accept the maximum 100-year flood circumstance without significant hazard to the public, to occupants, or to users, nor to sustain significant damage to vital systems that would lead to such hazards.

Flood Damage Prevention Ordinance (Flood Ordinance)

The purpose of the Yolo County Flood Ordinance is to "...promote the public health, safety, and general welfare, and to minimize public and private losses due to flood conditions in specific areas..(Sec. 8-3.103)."

The Flood Ordinance includes the following relevant objectives (Sec. 8-3.104):

(a) Restricting or prohibiting uses which are dangerous to health, safety, and property due to water or erosion hazards, or which result in damaging increases in erosion or flood heights or velocities;

(b) Requiring that uses vulnerable to floods, including facilities which serve such uses, be protected against flood damage at the time of initial construction;

(c) Controlling the alteration of natural floodplain, stream channels, and natural protective barriers, which help accommodate or channel flood waters;

(d) Controlling filling, grading, dredging, and other development which may increase flood damage, and

(e) Preventing or regulating the construction of flood barriers which will unnaturally divert flood waters or which may increase flood hazards in other areas.

The Flood Ordinance requires acquisition of a Development Permit (Sec. 8.3-401) before construction or development begins in any area of special flood hazard.

IMPACTS AND MITIGATION MEASURES

Standards of Significance

The project would have a significant effect on hydrology and water quality if it would result in:

- Substantial changes in absorption rates, drainage patterns, or rate and amount of surface runoff.
- Exposure of people or property to water-related hazards such as flooding (100-year or more frequent flood frequency may be appropriate threshold).
- Discharge into surface water or other alteration of surface water quality (e.g., temperature, dissolved oxygen, or turbidity) in excess of applicable waste discharge requirements.
- Substantial changes in the amount of surface water in any water body.
- Substantial changes in currents, or the course or direction of water movements.

- Substantial changes in the quantity of groundwater either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations or through substantial loss of groundwater recharge capability.

- Altered direction or rate of flow of groundwater.

- Impacts to groundwater quality.

- Substantial reduction in the amount of groundwater otherwise available for public water supplies.

Impact 4.4-1
Potential Impacts Associated with Flooding Outside the Planning Area

In most of the upstream portions of the planning area (west of Road 94B), the existing configuration of the Cache Creek channel has the capacity to convey the 100-year storm. In several locations downstream (east of Road 94B), the Cache Creek channel cannot contain 100-year flows. Existing levees along Cache Creek in the vicinity of Yolo and Woodland (downstream of the planning area) are overtopped by floods greater than the 10-year event. Floods greater than the 10-year event threaten the town of Yolo and the city of Woodland. Channel modifications and/or restoration activities within the planning area could adversely impact existing downstream flooding problems.

Draft CCRMP

The vision of the draft CCRMP includes modification of the channel to establish and/or maintain a channel configuration that will convey the 100-year flood (Objectives 2.3-3 and 2.3-5). In addition, several policies encourage the cooperation and coordination with other regulating agencies to manage regional flooding issues. Specific details regarding how the 100-year channel capacity would be achieved and maintained for the entire planning area without impacting downstream flooding are not included in the draft CCRMP.

Goal 2.2-1: Recognize that Cache Creek is a dynamic stream system that naturally undergoes gradual and sometimes sudden changes during high flow events.

Goal 2.2-2: Promote development of more natural channel floodway capable of conveying floodwaters without damaging essential structures, causing excessive erosion, or adversely affecting adjoining land uses.

Goal 2.2-3: Coordinate land uses and improvements along Cache Creek so that the adverse effects of flooding and erosion are minimized.

These goals are supported in the draft CCRMP by policies 2.3-1, 2.3-3, 2.3-5, 2.3-6, 2.4-1, 2.4-6, 2.4-13, 2.5-1, and 2.5-4 discussed below.

Obj. 2.3-1: Provide flood management as required to protect the public health and safety.

Objective 2.3-1 encourages protection of people and property from flood-related impacts associated with water damage and water quality degradation and is further supported by policies 2.4-6, 2.4-7, 2.4-12, 2.5-1, and 2.5-4.

Obj. 2.3-2: Integrate the Cache Creek Resources Management Plan with other planning efforts to create a comprehensive, multi-agency management plan for the entire Cache Creek watershed.

Objective 2.3-2 encourages the County to work with other agencies affected by Cache Creek management decisions and the development of a comprehensive watershed management plan. This objective is not adequately supported by policies that would ensure creation of a multi-agency management plan. The County currently does not have the resources for the development and implementation of an interagency watershed management plan. Therefore, this is an objective only. The CCRMP does not ensure implementation of a watershed plan.

Obj. 2.3-3: Design and implement a more stable channel configuration that will convey a 100-year flood event.

Objective 2.3-3 encourages the reshaping of the Cache Creek channel. Under existing conditions, flood flows within the channel experience drastic constrictions at bridges and other geomorphologies that encourage erosion and scour. Channel instability and erosion are discussed in Section 4.3 of this EIR. It is important to note that the objective requires the redesigned channel to convey the 100-year flood. This objective is partially supported by policies 2.3-10, 2.3-11, and 2.5-5.

Obj. 2.3-5: Restrict the amount of aggregate removed from Cache Creek, except where necessary to promote channel stability, prevent erosion, protect bridges, or to ensure 100-year flood protection, in order to allow the streambed to aggrade and create a more natural channel system.

In essence, Objective 2.3-5 encourages the elimination of in-channel commercial mining. Sand and gravel may be removed from the planning area during initial channel reshaping and subsequently, as needed, for maintenance. Complete elimination of sand and gravel removal from within the channel could allow aggradation and eventual loss of 100-year flood conveyance capacity. Objective 2.3-5 is supported by creation of the Technical Advisory Committee (TAC), proposed under Action 2.4-11.

Obj. 2.3-6: Establish monitoring programs for the continued collection of data and information, to be used in managing the resources of Cache Creek.

Objective 2.3-6 is adequately supported by policies 2.4-9 and 2.4-10.

Obj. 2.3-7: Manage Cache Creek so that the needs of the various uses dependent upon the creek, such as flood protection, wildlife, groundwater, structural protection, and drainage are balanced.

Objective 2.3-7 recognizes that various uses and/or issues associated with the creek are in direct conflict with each other. The term "balance" is not clearly defined in the draft CCRMP. Establishing a balance between non-quantitative divergent issues is subjective and based on judgment. This objective is supported by the creation of the TAC, a committee that would be empowered to make judgments and recommendations on how to balance the issues described. Implementation of Action 2.3-11 adequately supports this objective.

Action 2.3-10: Monitor and collect the information necessary to make informed decisions about the management of Cache Creek, including: regular water and sediment discharge data at Capay and Yolo gauge sites, water and sediment discharge data at other sites during high flow events, and topographic data showing the erosion, aggradation, and the alignment of the low-flow channel within the creek. This data should be maintained in the County Geographic Information System, so that staff and the Technical Advisory Committee can coordinate this information with the results of other monitoring programs to develop a comprehensive and integrated approach to resource management. Monitoring may be conducted by either consultants or trained volunteers, including landowners, public interest groups, the aggregate industry, and students, as a part of future public education programs associated with Cache Creek.

Action 2.3-10 does not specify how the data would be used by the TAC to implement restoration or maintenance activities under the CCRMP. Data collected in the future may indicate that 100-year conveyance capacity has been lost, or may soon be lost. The policy does not provide specific direction regarding how this situation would be addressed. This Action requires revision.

Action 2.3-11: Create a Technical Advisory Committee (TAC) to provide the County with specific expertise and knowledge in implementing the CCRMP. The TAC will also provide advice during emergency situations, such as flooding, and will assist the County in carrying out its responsibilities under this plan, as well as recommending changes to the CCRMP and implementing ordinances.

Action 2.3-11 does not specify how the members of the TAC would be selected. Details regarding the creation and operation of the TAC are discussed in section 4.3 of this EIR.

Action 2.4-1: Revoke the 1979 In-Channel Mining Boundary, as defined in Section 10-3.303(a) of the Yolo County Mining Ordinance. In its place, adopt a new in-channel area based on present channel banks and the 100-year floodplain, as determined by the U.S. Army Corps of Engineers in the Westside Tributaries Study, whichever is wider. This is a more accurate measure of delineating the boundary between in-channel and off-channel uses.

The proposed new channel boundary represents the best available information for identifying the floodplain. It is anticipated that there may be modifications required in specific location as a result of circumstances that have changed since the floodplain was mapped by the U.S. COE in 1994. Examples of this occur on property controlled by Solano and by Cache Creek Aggregates. Modification to this boundary based on site-specific analysis will be analyzed in subsequent project-specific EIRs.

Action 2.4-2: Limit the amount of aggregate removed from the channel to the average amount of sand and gravel deposited during the previous year (approximately 200,000 tons on average), except where bank excavation is necessary to widen the channel as a part of implementing the Test 3 Run Boundary, or where potential erosion and flooding problems exist. The amount and location of in-channel aggregate removal shall be carried out according to the ongoing recommendations of the Technical Studies and the Technical Advisory Committee, with the voluntary cooperation of the landowners involved.

Action 2.4-2 would not result in impacts to hydrology or water quality.

Action 2.4-6: Work with other agencies having jurisdiction over Cache Creek including, but not limited to, the Yolo County Flood Control and Water Conservation District, the U.S. Army Corps of Engineers, the State Reclamation Board, State Department of Water Resources, and the Federal Emergency Management Agency in developing a coordinated solution for managing flood events throughout the watershed of Cache Creek.

As a part of this effort, the County should coordinate with the U.S. Army Corps to make appropriate sedimentation and channel stability assessments in conjunction with the development of flood control alternatives near the downstream end of the study area. This would ensure that both agencies are using the same sets of assumptions when making recommendations about the management of Cache Creek.

Action 2.4-6 does not designate who at the County would manage interagency contact or the frequency of the contact. This action requires revision.

Action 2.4-13: Update the Cache Creek Resources Management Plan a minimum of every ten years. This will allow the plan to be amended on a regular basis so that the results of monitoring programs and reclamation efforts can be taken into account.

Action 2.4-13 adequately states the frequency requirement for updating of the CCRMP.

PS. 2.5-1: All proposed grading and/or construction projects within the channel shall require approval from the County Floodplain Administrator, as required under the Yolo County Flood Ordinance.

Performance Standard 2.5-1 adequately restates a requirement of the existing flood ordinance for incorporation into the CCRMP.

PS. 2.5-4: Development and/or construction within the floodplain shall be consistent with the County Flood Control Ordinance.

Performance Standard 2.5-4 adequately states that projects conducted under the CCRMP must comply with the existing flood ordinance.

PS. 2.5-5: The Technical Advisory Committee shall review topographic data and such other information as is appropriate, to determine the amount and location of aggregate to be removed from the channel. Aggregate removal from the channel shall only be recommended in order to provide flood control, protect existing structures, minimize bank erosion, or implement the Test 3 Run Boundary. Except for bank excavation to widen the channel, annual aggregate removal shall not exceed the amount of sand and gravel deposited the previous year, as determined by aerial photography analysis.

Recommendations shall take into consideration the desires of the property owner where excavation is to take place, as well as the concerns of property owners in the immediate vicinity.

Performance Standard 2.5-5 does not specify the mechanism by which the in-channel maintenance activities will be completed. This policy requires revision.

Action 3.4-2: Negotiate cooperative agreements with the Yolo County Flood Control and Water Conservation District, U.S. Army Corps of Engineers, Yolo County Resource Conservation District, and U.S. Bureau of Land Management, among others, to extend the provisions of the CCRMP outside of the plan area and incorporate the requirements of other agencies of jurisdiction into the County's planning efforts.

Action 3.4-2 does not designate who at the County shall manage interagency contact or the frequency of the contact. This action requires revision.

Alternative 1a: No Project (Existing Conditions)

Under Alternative 1a, mining would continue in a manner similar to the current practice. It is anticipated that flooding hazards outside the planning area would not be adversely impacted. Continued removal of gravel from the channel would probably serve to maintain 100-year flood protection for most of the area. It is likely that sediment transport dynamics within the channel would move sand and gravel from unmined areas (areas of potential accumulation) to the mining area, where it would be removed. This transport process should allow maintenance of current levels of flood protection.

Alternative 1b: No Project (Existing Permits and Regulatory Condition)

Same as Alternative 1a.

Alternative 2: No Mining (Alternative Site)

Under Alternative 2, mining from within the channel would be eliminated. Eventually, aggradation within the channel could result in the loss of 100-year protection for off-channel areas near the creek. Flooding problems downstream may worsen.

Alternative 3: Channel Bank Widening (Implement Streamway Influence Boundary)

Under Alternative 3, the CCRMP would establish a wider channel boundary (not a wider channel) similar to the streamway influence boundary. Commercial mining within the boundary would be prohibited. Eventually, aggradation within the channel would result in the loss of 100-year protection for off-channel areas near the creek. Flooding problems downstream may worsen.

Mitigation Measure 4.4-1a (CCRMP)

The following policies of the draft CCRMP shall be modified to support implementation of Objective 2.3-3:

Action 2.3-10: The County shall manage collection of ~~Monitor and collect~~ the information necessary to make informed decisions about the management of Cache Creek, including: regular water and sediment discharge data at Capay and Yolo gauge sites, water and sediment discharge data at other sites during high flow events, and topographic data showing the erosion, aggradation, and the alignment of the low-flow channel within the creek. This data should be maintained in the County Geographic Information System, so that staff and the Technical Advisory Committee can coordinate this information with the results of other monitoring programs to develop a comprehensive and integrated approach to resource management. Monitoring may, at the discretion of the County, be conducted by either consultants or trained volunteers, including landowners, public interest groups, the aggregate industry, and students, as a part of future public education programs associated with Cache Creek. However, the County shall maintain responsibility for collection of high quality data.

The following performance standard shall be added to the draft CCRMP and implementing ordinance:

Performance Standard: Existing flooding problems near Woodland shall not be exacerbated by activities conducted under the CCRMP or CCIP.

PS. 2.5-5: The Technical Advisory Committee shall review topographic data and such other information as is appropriate, to determine the amount and location of aggregate to be removed from the channel. Aggregate removal from the channel shall only be recommended in order to provide flood control, protect existing structures, minimize bank erosion, or implement the Test 3 Run Boundary. Except for bank excavation to widen the channel, annual aggregate removal shall not exceed the amount of sand and gravel deposited the previous year, as determined by aerial photography analysis.

Recommendations shall take into consideration the desires of the property owner where excavation is to take place, as well as the concerns of property owners in the immediate vicinity.

The provisions of the draft Cache Creek Improvement Program (Section 7.3) shall be implemented by the County Resource Management Coordinator, with the assistance of the Technical Advisory Committee, for review and approval of the County Board of Supervisors. The CCIP shall contain provisions to ensure that 100-year flood protection is maintained within the planning area and the existing flooding problems downstream are not exacerbated by channel reshaping. This shall be accomplished by annual monitoring of channel geomorphology, distribution and density of plant material within the channel, and modeling to forecast changes in base flood elevations. When modeling indicates that the channel is approaching loss of 100-year conveyance capacity (or has already lost this capacity) the TAC should prescribe action to reestablish 100-year capacity with adequate tolerances.

The County shall review and monitor removal of aggregate and/or plant material, as prescribed by the TAC. The County, at its discretion, may enlist the aid of gravel mining operators, other private property owners, or conduct the maintenance activities using County resources.

Figure 2 of the draft CCRMP shall be modified as shown on Figure 4.4-7 to more accurately identify areas of potential flood hazard.

Action 2.4-6 shall be modified as follows:

Action 2.4-6: Work with other agencies having jurisdiction over Cache Creek including, but not limited to, the Yolo County Flood Control and Water Conservation District, the U.S. Army Corps of Engineers, the State Reclamation Board, and the Federal Emergency Management Agency in developing a coordinated solution for managing flood events throughout the watershed of Cache Creek.

As a part of this effort, the County should coordinate with the U.S. Army Corps to make appropriate sedimentation and channel stability assessments in conjunction with the development of flood control alternatives near the downstream end of the study area. This would ensure that both agencies are using the same sets of assumptions when making recommendations about the management of Cache Creek.

The County Resource Management Coordinator shall maintain contact with the specified agencies. Interagency contact shall be initiated at least annually. The Resource Management Coordinator shall encourage coordination between the County and other agencies.

Action 3.4-2 shall be modified as follows:

Action 3.4-2: The County Resource Management Coordinator, and other appropriate County staff, shall negotiate cooperative agreements with the Yolo County Flood Control and Water Conservation District, U.S. Army Corps of Engineers, Yolo County Resource Conservation District, and U.S. Bureau of Land Management, among others, to extend the provisions of the CCRMP outside of the plan area and incorporate the requirements of other agencies of jurisdiction into the County's planning efforts. Interagency contact shall be initiated at least twice per year.

Mitigation Measure 4.4-1b (A-1a, A-1b)

None required.

Mitigation Measure 4.4-1c (A-2, A-3)

Elimination of mining and in-channel maintenance will result in loss of 100-year protection. This is a significant and unavoidable impact for Alternative 2. Alternative 3 requires acquisition of floodplain easements for levee overtopping.

Implementation of Mitigation Measures 4.4-1a and 4.4-1c would reduce this potential impact to a less-than-significant level (CCRMP and A-3). Alternatives 1a and 1b would not result in any impacts associated with increased flooding problems, and therefore mitigation would not be required. Alternative 2 would result in a significant and unavoidable impact.

Impact 4.4-2
Potential Impacts Associated with Inconsistencies Between the FEMA Designated 100-Year Flood Zone and More Recent Hydraulic Analyses

Past and proposed alterations to the channel and levees have, and will continue to, result in alterations to the 100-year flood hazard zone. The current Flood Insurance Rate Maps (FIRMs) do not accurately represent existing conditions, and therefore, flood insurance may be inappropriately required for some or unavailable to others.

Difficulty may arise when the FIRMs are not accurate and development or erosion-control measures are proposed within the floodplain. Under the County Flood Ordinance, the County is bound to enforce permitting and development restrictions within the FEMA designated floodplain, even if the floodplain designation is incorrect.

Draft CCRMP

The CCRMP does not provide a specific policy to address the impacts associated with floodplain delineation inconsistencies. The following policies in the CCRMP pertain to floodplain delineation and the County Flood Ordinance:

Action 2.4-1: Revoke the 1979 In-Channel Mining Boundary, as defined in Section 10-3.303(a) of the Yolo County Mining Ordinance. In its place, adopt a new in-channel area based on present channel banks and the 100-year floodplain, as determined by the U.S. Army Corps of Engineers in the Westside Tributaries Study, whichever is wider. This is a more accurate measure of delineating the boundary between in-channel and off-channel uses.

As discussed under Impact 4.4-1, Action 2.4-1 incorrectly identifies a portion of the Solano Concrete mining area (south of Cache Creek and east of Interstate 505) as "in-channel." The Solano Concrete mining area is outside the 100-year floodplain and should not be included within the new channel boundary. The map, which is the implementing tool of this policy, requires revision. The proposed revision is described in Mitigation Measure 4.4-1a, above.

Action 2.4-7: Manage activities and development within the floodplain to avoid hazards and adverse impacts on surrounding properties. This shall be accomplished through enforcement of the County Flood Ordinance and ensuring that new development complies with the requirements of the State Reclamation Board.

Action 2.4-7 requires management of activity in the floodplain in a manner that avoids adverse impact to surrounding properties. This protection may not be best achieved by strict adherence to existing flood ordinance, which is bound to use the floodplain designated in the most recent FIRMs, which were last published in 1980. This policy requires revision.

PS. 2.5-1: All proposed grading and/or construction projects within the channel shall require approval from the County Floodplain Administrator, as required under the Yolo County Flood Ordinance.

Performance Standard 2.5-1 adequately restates a requirement of the existing flood ordinance for incorporation into the CCRMP.

PS. 2.5-4: Development and/or construction within the floodplain shall be consistent with the County Flood Control Ordinance.

Performance Standard 2.5-4 adequately states that projects conducted under the CCRMP must comply with the existing flood ordinance.

Alternative 1a: No Project (Existing Conditions)

Continued in-channel mining in a manner similar to existing conditions would not result in significant changes to the Cache Creek floodplain. The channel boundaries through the planning area are well defined and, for the most part, contain the 100-year flood. Continued in-channel mining would maintain the existing capacity without significant lateral changes to the floodplain boundary. However, the existing FIRMs (1980) are no longer current (Figure 4.4-7). FEMA is in the process of updating the FIRMs, which may be released within the next few years (Bencomo, 1996). Since the FIRMs are being updated, this potential impact is considered less- than-significant.

Alternative 1b: No Project (Existing Permits and Regulatory Condition)

Same as Alternative 1a.

Alternative 2: No Mining (Alternative Site)

Implementation of Alternative 2 would result in significant changes to the floodplain as sand and gravel accumulate in the channel. If mining were no longer allowed within the planning area, the channel would begin to aggrade. The floodplain would not change significantly until the channel capacity was reduced to the degree that the levees would be overtopped during a 100-year flood. As soon as aggradation occurs within the channel, resulting in the 100-year flood overtopping the levees, the floodplain limits would change dramatically. The FIRMs, which are in the process of being updated, would be out of date shortly after being reissued. Use of inaccurate floodplain delineation maps to implement the policies of the County Flood Ordinance could result in impacts to people and property resulting from flooding.

Alternative 3: Channel Bank Widening (Implement Streamway Influence Boundary)

Same as Alternative 2.

Mitigation Measure 4.4-2a (CCRMP, A-3)

Action 2.4-7 shall be revised as follows:

> *Action 2.4-7: Manage activities and development within the floodplain to avoid hazards and adverse impacts on surrounding properties. This shall be accomplished through enforcement of the County Flood Ordinance and ensuring that new development complies with the requirements of the State Reclamation Board.*
>
> *The County Floodplain Administrator shall file for a Letter of Map Revision with FEMA to update the FIRMs affected by channel reshaping within the planning area every ten years, or as needed.*

Mitigation Measure 4.4-2b (A-1a, A-1b)

None required.

Mitigation Measure 4.4-2c (A-2)

The County Floodplain Administrator shall file for a Letter of Map Revision with FEMA, to update the FIRMs affected by channel aggradation within the planning area every ten years, or as needed.

Implementation of Mitigation Measure 4.4-3a would reduce this potential impact to a less-than-significant level (CCRMP and Alternative 3). No mitigation would be required for Alternatives 1a and 1b. Implementation of the Mitigation Measure 4.4-3c would reduce potential impacts associated with Alternative 2 to a less-than-significant level.

Impact 4.4-3
Potential Impacts to Water Quality

Potential sources of water quality degradation associated with potential in-channel activities include: chemical release from mining and maintenance equipment, agricultural runoff into the creek, and illegal dumping/sabotage. Chemical releases from mining equipment and agricultural runoff into the pits are considered mining and reclamation period impacts, and are considered below.

Chemical Releases from Equipment

Operation of mining equipment within and near the channel exposes surface and groundwater to water quality impacts from potential chemical spills (fuels, lubricants, and hydraulic oil) from mining and reclamation equipment. Chemical releases could cause adverse impacts to water quality. Refueling and maintenance of the equipment would be required on a regular basis.

The regulatory framework and required actions regarding the storage and emergency response to chemical releases are discussed in the Hazards Section of this EIR.

Agricultural Tailwater and Runoff

The dominant land use in the planning area is agriculture. It is common practice in the vicinity to discharge runoff from agricultural fields directly to Cache Creek. Runoff and tailwater from agricultural fields may contain residual pesticides, organic material, and sediment. If allowed to drain into channel, the tailwater could adversely impact surface water and groundwater quality.

Draft CCRMP

The following policies contained within the CCRMP pertain water quality (policies 3.5-1 and 3.5-2 are discussed in the Hazards section):

Obj. 2.3-2: Integrate the Cache Creek Resources Management Plan with other planning efforts to create a comprehensive, multi-agency management plan for the entire Cache Creek watershed.

Objective 2.3-2 is supported by Policy 3.4-2, discussed below.

Goal 3.2-1: Improve the gathering and coordination of information about water resources so that effective policy decisions can be made.

Goal 3.2-1 is supported by policy 3.4-3, discussed below.

Goal 3.2-3: Maintain the quality of surface and groundwater so that nearby agricultural productivity and available drinking water supplies are not diminished.

Goal 3.2-3 is supported by policies 3.4-1, 3.4-2, 3.5-3, and 3.5-4, discussed below.

Goal 3.2-4: Enhance the quality of water resources by stressing prevention and stewardship, rather than costly remediation.

Goal 3.2-4 is supported by policies 3.4-1, 3.4-2, 3.5-3, and 3.5-4, discussed below.

Obj. 3.3-2: Use the CCRMP as a basis for developing a comprehensive watershed plan for Cache Creek, that eventually integrates the area above Clear Lake to the Yolo Bypass, relying on coordinated interagency management.

Objective 3.3-2 is supported by Action 3.4-2, discussed below.

Obj. 3.3-3: Promote public education programs that encourage the use of innovative methods and practices for enhancing the water quality of Cache Creek, through the voluntary cooperation of local landowners.

Objective 3.3-3 is supported by policies 3.4-1, 3.4-3, 3.5-3, and 3.5-5, discussed below.

Obj. 3.3-4: Establish monitoring programs for the continued collection of data and information, to be used in managing surface and groundwater resources.

Objective 3.3-4 is supported by policy 3.4-3, discussed below.

Action 3.4-1: Discourage activities that impact the surface water quality of Cache Creek. Although surface mining operations are regulated, other land uses along the creek are not. The County shall work with the U.S. Natural Resource Conservation Service and the Yolo County Resource Conservation District to promote alternative soil and water management practices that improve local water resources.

Action 3.4-1 attempts to provide a means to reduce or eliminate discharge of poor quality water to the creek. Under existing regulations, many types of land uses, including agriculture, cannot be mandated to retain and treat runoff prior to discharge to the creek. This policy requires the County to work with existing resource conservation groups to enlist voluntary cooperation of landowners. This action does not specify who at the County should establish contact, and at what frequency. In addition, the policy does not restrict the use of pesticides and/or herbicides within the channel during reclamation. Pesticide/herbicide application within the channel could adversely impact surface water quality, which is prohibited under SMARA (3710). This action requires revision.

Action 3.4-2: Negotiate cooperative agreements with the Yolo County Flood Control and Water Conservation District, U.S. Army Corps of Engineers, Regional Water Quality Control Board, Yolo County Resource Conservation District, and U.S. Bureau of Land Management, among others, to extend the provisions of the CCRMP outside of the plan area and incorporate the requirements of other agencies of jurisdiction into the County's planning efforts.

Action 3.4-2 encourages the County to work with other agencies affected by Cache Creek management decisions and the development of a comprehensive watershed management plan. This action is not adequately supported by policies that would ensure incorporation of the requirements of the CCRMP outside the planning area. The County currently does not have the resources for development and implementation of an interagency watershed management plan. Therefore, this is an objective only. The CCRMP does not ensure implementation of a watershed plan. Action 3.4-2 does not designate who at the County who manage interagency contact or the frequency of the contact. This action requires revision.

Action 3.4-3: Provide for an annual test of the water quality at various sites along Cache Creek. The County should enlist the assistance of other government agencies in carrying out the measurements, to reduce costs and provide accurate information. Testing should include such components as pH, dissolved oxygen, nitrogen, phosphorus, herbicides and insecticides, suspended and floating matter, odor, and opacity. This information would improve habitat restoration efforts and allow the County to monitor potential water quality.

Action 3.4-3 lacks adequate specificity to be practically implemented. This action requires revision.

PS. 3.5-3: Wastewater should not be directly discharged to Cache Creek. Measures such as berms, silt fences, sediment ponds, hay bales, and/or revegetation should be used to control erosion. Agricultural tailwater should be diverted to catchment basins prior to release to the creek.

Under existing conditions, the mining operations do not discharge wastewater directly to the creek. Continued restriction on this type of discharge is appropriate. In addition, mining site erosion control practices can be regulated through the required Use Permit and Reclamation Plans. As discussed in Action 3.4-1, many types of land uses, including agriculture, are not currently mandated to retain and treat runoff prior to discharge to the creek. The County would work with existing resource conservation groups to encourage practices that reduce untreated discharges. This performance standard would not result in impacts to hydrology or water quality.

PS. 3.5-4: Sediment fines generated by aggregate processing shall be used for agricultural soil enhancement, revegetation projects, or shall be placed in settling ponds, designed and operated in accordance with all applicable regulations, and used for backfill materials in off-channel excavations.

Performance Standard 3.5-4 would not result in impacts to hydrology or water quality.

PS. 6.5-8: No excavation shall take place within one-hundred and fifty (150) feet of the centerline of the low-flow channel, where the creek is contained within a single channel. Where the creek is braided or contains multiple channels, no excavation shall take place within one-hundred and twenty-five (125) feet of each channel.

PS. 6.5-9: In-channel haul roads shall be located along the toe of the streambank, in order to provide additional bank stabilization and to minimize disturbance of the low-flow channel. Each operation may have no more than two (2) haul roads that cross the low-flow channel. Haul roads shall comply with all requirements of the Department of Fish and Game.

PS. 6.5-11: All work within the channel shall comply with the requirements of all agencies of jurisdiction, including but not limited to: the State Department of Fish and Game, the U.S. Army Corps of Engineers, the State Regional Water Quality Control Board, Caltrans, and the State Reclamation Board.

Performance Standards 6.5-8, 6.5-9, and 6.5-11 provide guidance for excavation, reshaping, and maintenance of the channel designed to protect water quality and biotics within the planning area. Implementation of these policies would not result in impacts to hydrology and/or water quality.

Alternative 1a: No Project (Existing Conditions)

Under Alternative 1a, mining would continue in-channel in a manner similar to existing conditions. Discharges of agricultural tailwater directly to Cache Creek are common throughout the planning area and would likely continue under each of the alternatives. These discharges occur from both current and former mining areas and other agricultural lands. Discharges from former mining areas, reclaimed to agriculture, can be minimized by implementation of reclamation plans requiring drainage control. In addition, future proposed mining projects would be evaluated under separate environmental review. The

County does not have authority to require drainage controls from other agricultural lands. Agricultural runoff draining into Cache Creek represents a significant impact to water quality.

Alternative 1b: No Project (Existing Permits and Regulatory Condition)

Same as Alternative 1a.

Alternative 2: No Mining (Alternative Site)

No mining would occur under this alternative. Therefore, the requirement for regrading of reclaimed areas to drain toward detention basins and not into Cache Creek, would not be enforceable. The County does not have authority to require drainage controls from other agricultural lands. Agricultural runoff draining into Cache Creek represents a significant impact to water quality.

Alternative 3: Channel Bank Widening (Implement Streamway Influence Boundary)

Same as Alternative 2.

Mitigation Measure 4.4-3a (CCRMP, A-3)

Action 3.4-1 shall be modified as follows:

Action 3.4-1: Discourage activities that impact the surface water quality of Cache Creek. Although surface mining operations are regulated, other land uses along the creek are not. The County shall work with the U.S. Natural Resource Conservation Service and the Yolo County Resource Conservation District to promote alternative soil and water management practices that improve local water resources. The County Resource Management Coordinator shall initiate contact with resource conservation agencies at least annually.

Pesticides and herbicides shall be used within the channel boundary only under the direction of a certified pesticide/herbicide applicator. These chemicals shall not be applied prior to forecasted rainfall.

Action 3.4-3 shall be modified as follows:

Action 3.4-3: Provide for ~~an~~ annual testing or more frequent (if necessary) of ~~the~~ surface water quality ~~at various sites along~~ of Cache Creek at Capay and Yolo. The sample collection and testing should be conducted in the fall or early winter so that the "first flush" of runoff is evaluated for water quality. The County should, when appropriate, enlist the assistance of other government agencies in carrying out the measurements, to reduce costs and provide accurate information. However, the County should not rely on others to complete the monitoring.

Testing should include, but not be limited to, ~~such components as~~ pH, TDS, temperature, turbidity, total and fecal coliform, mercury, total petroleum hydrocarbons, dissolved oxygen, nitrogen, phosphorus, herbicides and ~~insecticides~~ pesticides (EPA Methods 8140 and 8150), suspended and floating matter, odor, and color. This information would ~~improve~~ assist in habitat restoration efforts and allow the County to monitor ~~potential~~ water quality trends within the planning area. The

County Resource Management Coordinator should be responsible for collection, management, and distribution of all water quality data.

Mitigation Measure 4.4-3b (A-1a, A-1b, A-2)

The County shall work with the U.S. Natural Resource Conservation Service and the Yolo County Resource Conservation District to promote alternative soil and water management practices that improve local water resources. The County Resource Management Coordinator shall initiate contact with resource conservation agencies at least twice each year.

Implementation of Mitigation Measures 4.4-3a and 4.4-3b would reduce this potential impact to a less-than-significant level (CCRMP and Alternative 1a, 1b, 2, and 3). Potential impacts to water quality associated with discharges of agricultural runoff from mining areas under Alternatives 1a and 1b would be evaluated and, if appropriate, mitigated under separate environmental review.

Impact 4.4-4
Potential Impacts Associated with Water Supply for Biotic Restoration

Availability and distribution of surface and near-surface water supplies will be a critical factor in determining the success of reclamation plantings and habitat within the planning area. The in-channel water supply could be affected by management of diversions at Capay Dam, groundwater pumping, natural seasonal fluctuations, and long-term water level changes resulting from extended drought and/or wet periods.

Draft CCRMP

The following policies contained within the CCRMP pertain to biotics and water availability and would be evaluated under this impact:

Action 3.4-4: Enlist landowners adjoining Cache Creek to submit regular groundwater level measurements, so that an ongoing groundwater data base can be developed for this area. This information would be used as reference material for the Water Resources Agency and other regional water planning efforts.

Action 3.4-4 encourages the collection of groundwater level measurements to support a water resources data base. This policy lacks necessary specifics to ensure that the data would be collected in a uniform manner, managed and analyzed by a qualified person, and presented in a way that would be of value to the TAC and interested parties. In addition, most water supply wells are not located adjacent to the creek; unless groundwater measurements are made close to the creek, the relationship between the creek and the aquifer will be difficult to evaluate. This policy requires revision.

Obj. 4.3-2: Establish conditions to encourage the development of a variety of natural riparian habitat types within the Cache Creek channel.

Objective 4.3-2 is not adequately supported by performance standards to ensure implementation. The hydrology (availability of water) within the various reaches of the channel is critical to the potential success of restoration activities. Agreements have not yet been made with the YCFCWCD to release adequate volumes of water from storage to maintain flow in the creek year-round. The CCRMP lacks guidance regarding how to plan restoration activities while water availability issues remain unresolved. Inadequate water supply for plant material would decrease the potential for success of biotic reclamation and would be considered a significant impact. The objective requires the support of an additional performance standard to ensure adequate implementation.

PS. 4.5-3: Oaks and drought-tolerant shrubs should be planted on streambank slopes due to the lack of water on the higher elevations. Oaks and shrubs should be especially encouraged on slopes facing north or east.

Performance Standard 4.5-3 appropriately identifies water availability as a primary concern for potential success of reclamation plantings. This policy would not result in adverse impacts to hydrology and/or water quality.

PS. 4.5-11: Irrigation may be necessary for the first one or two summers in drier sites to allow the roots to develop sufficiently to tap into the summer groundwater level. A drip irrigation system may be necessary at least twice per month during dry periods for the first two years.

Performance Standard 4.5-11 does not specify who would be responsible for water acquisition, design, construction, and operation of the irrigation systems. This policy requires revision.

Alternative 1a: No Project (Existing Conditions)

Under Alternatives 1a, mining would continue in a similar manner as the current practice. It is anticipated that biotic reclamation in the channel would not be conducted, and therefore no impact associated with water availability for plant material would occur.

Alternative 1b: No Project (Existing Permits and Regulatory Condition)

Same as Alternative 1a.

Alternative 2: No Mining (Alternative Site)

Under Alternative 2, mining within the channel would be eliminated. Biotic reclamation in the channel would not be conducted, and therefore no impact associated with water availability for plants would occur.

Alternative 3: Channel Bank Widening (Implement Streamway Influence Boundary)

Under Alternative 3, the CCRMP would establish a wider channel boundary (not a wider channel) similar to the streamway influence boundary. Active management of the creek and its biotic habitat would not be conducted, and therefore impacts associated with availability of water for plant material would not occur.

Mitigation Measure 4.4-4a (CCRMP)

The following modifications shall be made to Performance Standard 4.5-11:

PS. 4.5-11: Existing hydrologic conditions (as described in Figure 4.4-1, the technical studies, and Jones and Stokes (1995)) shall be assumed for all proposed biotic reclamation activities. If an agreement were reached between the County and the YCFCWCD regarding maintenance of year-round flow in the creek, additional water would be available for restoration activities. The TAC would be responsible for identifying and implementing new restoration opportunities resulting from the increased water availability. All plantings should be carefully selected based on the existing hydrology and water availability of the reclamation area.

Irrigation may be necessary for the first one or two summers in drier sites to allow the roots to develop sufficiently to tap into the summer groundwater level. A drip irrigation system may be necessary at least twice per month during dry periods for the first two years. The party undertaking restoration shall be responsible for acquisition of water supply, design, construction, and operation of the irrigation systems.

Mitigation Measure 4.4-4b (A-1a, A-1b, A-2, A-3)

None required.

Implementation of Mitigation Measure 4.4-4a would reduce this potential impact to a less-than-significant level (CCRMP). Alternatives 1a, 1b, 2, and 3 would generate no impact associated with water availability for reclamation plant material, and therefore mitigation would not be required.

Impact 4.4-5
Potential Impacts Associated with Groundwater Recharge and Surface Water Supplies.

Management of groundwater and surface water supplies and transfers is the primary responsibility of the Yolo County Flood Control and Water Conservation District (YCFCWCD). A water management plan has not been completed by the YCFCWCD as of February 1996. Therefore, the location and design of appropriate recharge facilities is unknown.

The following policies contained within the draft CCRMP pertain to water supply:

Goal 2.2-4: Ensure that the floodway is maintained to allow other beneficial uses of the channel, including groundwater recharge and riparian vegetation.

Obj. 2.3-7: Manage Cache Creek so that the needs of the various uses dependent upon the creek, such as flood protection, wildlife, groundwater, structural protection, and drainage are balanced.

Goal 3.2-1: Improve the gathering and coordination of information about water resources so that effective policy decisions can be made.

Goal 3.2-2: Promote the conjunctive use of surface and groundwater to maximize the availability of water for a range of uses, including habitat, recreation, agriculture, water storage, flood control, and urban development.

Obj. 3.3-1: Encourage the development of groundwater recharge basins located along the Cache Creek channel.

The policies listed above appropriately reflect the intent of the County to encourage groundwater recharge within the planning area. However, the draft CCRMP should not attempt to design components of or mitigate potential impacts associated with a groundwater recharge program that has not been completed. Objective 3.3-1 should be revised.

Action 3.4-2: Negotiate cooperative agreements with the Yolo County Flood Control and Water Conservation District, U.S. Army Corps of Engineers, Yolo County Resource Conservation District, and U.S. Bureau of Land Management, among others, to extend the provisions of the CCRMP outside of the plan area and incorporate the requirements of other agencies of jurisdiction into the County's planning efforts.

Action 3.4-2 does not designate who at the County should manage interagency contact or the frequency of the contact. This action requires revision (as discussed under Impact 4.4-3).

Action 3.4-4: Enlist landowners adjoining Cache Creek to submit regular groundwater level measurements, so that an ongoing groundwater data base can be developed for this area. This information would be used as reference material for the Water Resources Agency and other regional water planning efforts.

Action 3.4-4 encourages the collection of groundwater level measurements to support a water resources data base. This policy lacks necessary specifics to ensure that the data would be collected in a uniform manner, managed and analyzed by a qualified person, and presented in a way that would be of value to the TAC and interested parties. This policy requires revision.

Action 3.4-5: Coordinate with the Yolo County Flood Control and Water Conservation District in locating groundwater management facilities in accordance with the Recommended Management Activity Zones shown in Figure 5. Groundwater recharge basins are best located in Zones 1 and 4.

Action 3.4-5 is an inappropriate policy of the draft CCRMP. Since a water management plan has not been completed, it is unknown whether concentration of recharge activities within Zone 1 and 4 would be a practical approach to management of water resources.

Alternative 1a: No Project (Existing Conditions)

A water management plan has not been completed, and therefore cannot be evaluated in this EIR. Potential impacts associated with implementation of a groundwater recharge program would be evaluated, when available, under CEQA.

Alternative 1b: No Project (Existing Permits and Regulatory Condition); and
Alternative 2: No Mining (Alternative Site)

Same as Alternative 1a.

Alternative 3: Channel Bank Widening (Implement Streamway Influence Boundary)

Same as CCRMP.

Mitigation Measure 4.4-5a (CCRMP, A-3)

Action 3.4-5 shall be eliminated from the draft CCRMP.

Objective 3.3-1 of the draft CCRMP shall be revised as follows:

> *The County shall encourage the development of a groundwater recharge ~~basins~~ program, where appropriate, ~~located along~~ within the Cache Creek ~~Channel~~ basin. The program may specify use of reclaimed mining pits and open lakes to the greatest extent feasible, while maintaining consistency with the other goals, objectives, actions, and performance standards of the OCMP and CCRMP.*

Mitigation Measure 4.4-5b (A-1a, A-1b, A-2)

None required.

Implementation of Mitigation Measure 4.4-5a would reduce potential impacts associated with a separate undefined project to a less-than-significant level (CCRMP and Alternative 3). No impact would result from implementation of Alternatives 1a, 1b, and 2.