4.9 HYDROLOGY AND WATER QUALITY

1. INTRODUCTION

This section assesses the effects of the proposed CCAP Update on the hydrology and water resources of the County. Government agencies and the public were provided an opportunity to comment on the proposed Project in response to a Notice of Preparation (NOP) of and EIR and an Initial Study that provided a preliminary summary of potential impacts that could result from the Project. Two comment letters related to hydrology and water quality were received, one from the Central Valley Regional Water Quality Control Board (CVRWQCB) and one from the Central Valley Flood Protection Board (CVFPB).

> CVRWQCB – This comment letter (dated June 20, 2017) summarizes a set of programs, policies, and regulations that may pertain to the proposed CCAP Update. No specific comments on the CCAP Update were provided. The information provided in the comment letter was considered during preparation of the Regulatory Framework subsection below.
>
> CVFPB – This comment letter (dated June 5, 2017) asserts that Cache Creek is a regulated stream under CVFPB jurisdiction and that the proposed Project may need a permit from the CVFPB. The County has corresponded with the CVFPB, informing the CVFPB that they have no jurisdiction over the program or Cache Creek.

The following subsections describe the existing hydrology and water quality setting of the County and specifically in the lower Cache Creek area, the applicable regulatory framework, criteria of significance used to determine potential environmental effects that may result from implementation of CCAP Update, identified impacts, and mitigation measures to reduce those impacts to a less-than-significant level, if applicable.

2. SETTING

a. Physical Environment

(1) Hydrology and Flooding

Cache Creek is the principal drainage feature within the Cache Creek basin, and drains an area of over 1,140 square miles. 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 historic Cache Creek active channel meandered across a broad alluvial fan, occupying different locations over time. The distribution of gravel and sand deposits records the migration of Cache Creek across the ancient floodplain.

Cache Creek has been significantly altered by historic processes such as in-stream gravel extraction, upstream dams, highway bridges, and agricultural practices. Reduction of sediment load to Lower Cache Creek has resulted in narrowing of the channel, as well as considerable incision into the bed. 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. There are several tributaries to Cache Creek in the CCAP area. Gordon Slough, which is just north of Cache Creek and is part of the West Adams Canal system, joins the Cache Creek channel near County Road 94B.

At least 20 severe floods have occurred in the Cache Creek basin since 1900; the most severe floods of recent years (per highest recorded peak flows measurements) occurred in 1958, 1965,

1970, 1983, 1995, 1998, and 2005.[1] Based on the Federal Emergency Management Agency (FEMA) Flood Insurance Study (FIS), the 100-year peak discharge in Cache Creek (at Road 94B) is 63,680 cubic feet per second (cfs).[2] The highest recorded flow in Cache Creek (at Yolo) occurred in 1995 at 41,800 cfs.[3] Flooding has been a long-term concern in and near the CCAP area. In the late 1990's, new FEMA maps identified a portion of the City of Woodland (located just east of the CCAP area) as being within the Cache Creek floodplain, particularly if levees failed. The current 100-year flood hazard zone as mapped by FEMA for the CCAP area is shown on Figure 4.9-1. As shown on this figure, much of the eastern portion of the CCAP area and the City of Woodland continue to be in the Cache Creek floodplain.

As a dynamic creek system, the geomorphology (and flood flow capacity) of Cache Creek is continually changing as sediment is eroded and deposited and channel features are modified by high-energy winter flows. Implementation of the CCAP program in 1996 discontinued commercial mining within the active creek channel, and focused on improving the stability of the channel, minimizing flood damage, and restoring habitat. However, it was acknowledged at the time that the CCAP program was initiated that elimination of in-channel mining, which regularly removed sediment (i.e., marketable aggregate from the channel) could allow sediment to build up within the creek channel, which may have effects on flood flow capacity. Based on detailed topographic studies conducted as a part of the ongoing implementation of the program, a total of approximately ten million tons of sediment was deposited in lower Cache Creek in the CCAP area between 1996 and 2011.[4]

(2) Groundwater

Groundwater is an important resource in the vicinity of the CCAP area and the entire County. The CCAP area straddles the boundary between two California Department of Water Resources (DWR) groundwater sub-basins; the Colusa sub-basin (no. 5-21.52) to the north and the Yolo sub-basin (no. 5-21.67) to the south. These groundwater sub-basins have been designated as high priority (Yolo) and medium priority (Colusa) under the Sustainable Groundwater Management Act (SGMA), indicating that there are potentially conditions present in these basins (e.g., overdraft, water quality problems, population growth pressure) that threatens sustainability of these basin aquifers. SGMA requires that California groundwater basins identified as high or medium priority establish a Groundwater Sustainability Agency and develop a plan for sustainable management. SGMA defines sustainable management as:

> "Management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results."

The Yolo Subbasin Groundwater Sustainability Plan (GSP) will be completed by January 1, 2022 to meet the State's deadline.

The 21-year record from 1996-2016 shows that while drought periods such as occurred in 2007-2009 and 2012-2015 create a noticeable decline in groundwater levels in excess of annual seasonal variation, they can rebound within one to two years if a wet year (such as occurred in 2011) occurs.[5]

[1] United States Geological Survey (USGS), 2019, Peak Streamflow for California, website accessed 4/8/19 at: https://nwis.waterdata.usgs.gov/ca/nwis/peak?site_no=11452500&agency_cd=USGS&format=html.

[2] Ibid.

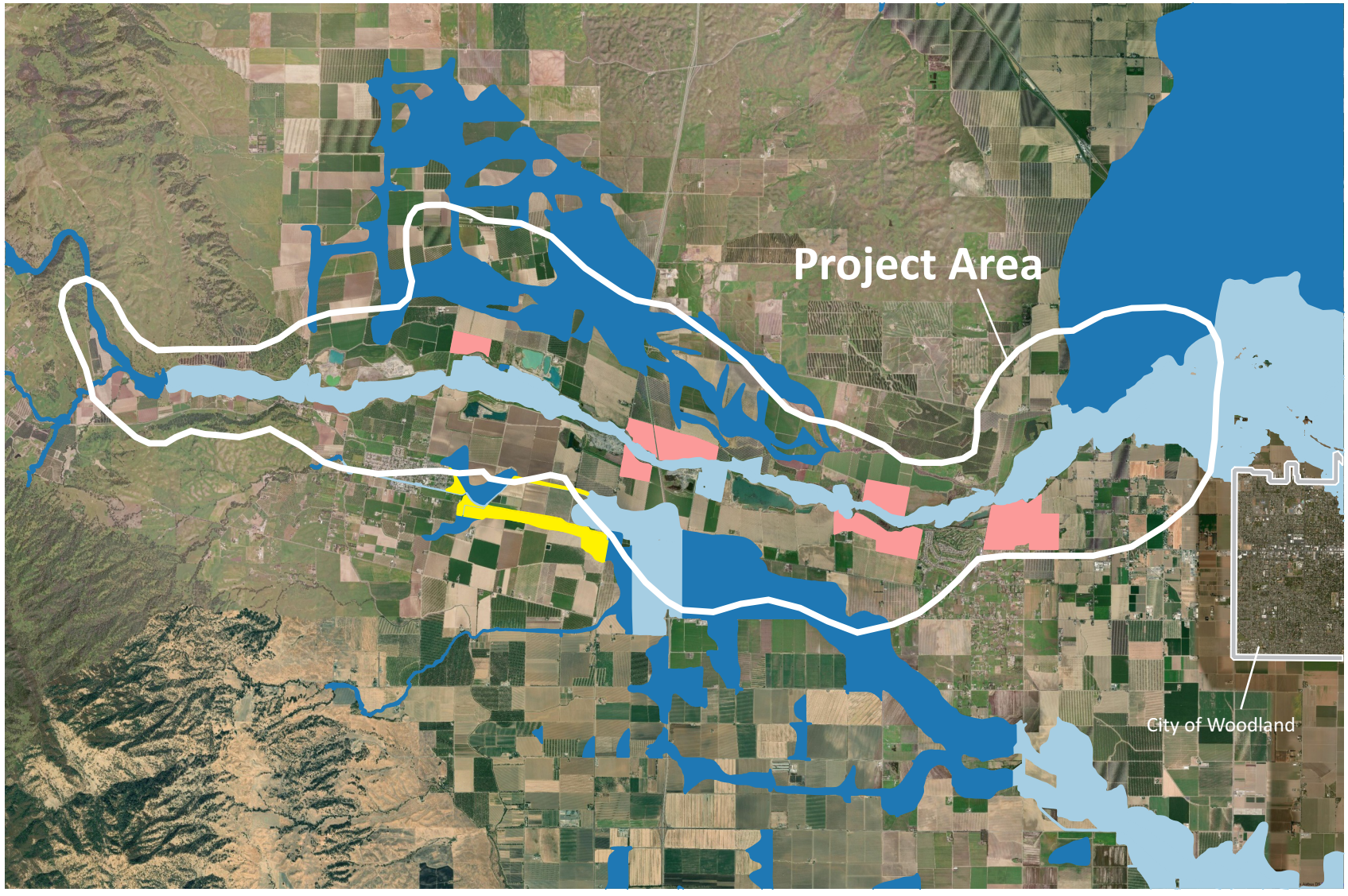
[3] Yolo County, 2009, Environmental Impact Report for the Granite Esparto Mining and Reclamation Project, December.

[4] Tompkins, M., Frank, P., and Rayburn, A.P., 2017, 2017 Technical Studies and 20-Year Retrospective for the Cache Creek Area Plan, March 17.

[5] Tompkins, M., Frank, P., and Rayburn, A.P., 2017, op.cit

FEMA 100-YEAR FLOOD-HAZARD ZONES

Figure 4.9-1



Legend

100-Year Flood Zones

- Zone A, No Base Flood Elevations Determined
- Zone AE, Base Flood Elevations Determined
- Zone AO, Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined
- Future Proposed Mining Area (as proposed under CCAP Update)

0 2.8 Miles

BASELINE ENVIRONMENTAL CONSULTING

Source: Federal Emergency Management Agency, 2018. FEMA's National Flood Hazard Layer (NFHL) Viewer, Yolo County GIS data. Accessed October 29th.

P:|Base 17218-00 Yolo 10-Yr Review\4-EIR sections\0.5 EIR Figures\Figure 4.9-1 cdr 11/7/18

The primary source of groundwater recharge is applied irrigation water and direct rainfall. Recharge of aquifers typically occurs along the streambeds of creeks and canals. The Lower Cache Creek channel and adjacent coarse-grained alluvial deposits (within the CCAP) is one of the major groundwater recharge areas within the County. Recharge occurs naturally, and also through reservoir releases, such as the release of stored water from the Indian Valley Reservoir into Cache Creek during low flows periods.

Streams interact with groundwater in two basic ways: streams gain water from inflow of groundwater through the streambed (see Figure 4.9-2, "gaining" stream shown on Figure 4.9-2a), they lose water to groundwater by outflow through the streambed (losing stream, Figure 4.9-2b), or they do both, gaining in some reaches and losing in other reaches. Within the CCAP area, Cache Creek is sometimes a "gaining" creek, but more often a "losing" creek (see Figure 4.9-3). As shown on Figure 4.9-3, groundwater elevation is generally higher than the creek level in the Capay reach, and therefore this is a "gaining" reach (i.e., groundwater flows toward the creek). In most of the other reaches, groundwater elevations are lower than the creek level which reflects that they are "losing" reaches.

Yolo County has no natural lakes. However, as a result of aggregate mining and reclamation activity along lower Cache Creek (within the CCAP area), several small open water bodies have been created and are either part of active mining operations or have been reclaimed to wildlife habitat.

(3) Water Quality

Based on review and analysis conducted by the CCAP Technical Advisory Committee (TAC), the water quality monitoring program under CCAP (both surface water samples collected by the County and samples collected at mining sites by operators) provides an overview of the condition of the Creek. While there are no obvious long term trends, and most contaminants are below action levels, the Gordon Slough site frequently has the highest recordings of many contaminants and may be a key source of nutrient and organic contaminants. In addition, mercury continues to be a concern for Cache Creek and its surrounding areas.[6]

Mercury is a naturally-occurring chemical element and liquid metal at room temperature. It has been historically mined and processed for use in thermometers, barometers, and mercury switches. The Cache Creek watershed, particularly the uplands above the Town of Capay, has been the location of extensive historic mercury mining. These historic mines produced a large percentage of mercury used within the United States.

[6] Tompkins, M., Frank, P., and Rayburn, A.P., 2017, op.cit

STREAM GAINING AND LOSING REACHES

Figure 4.9-2

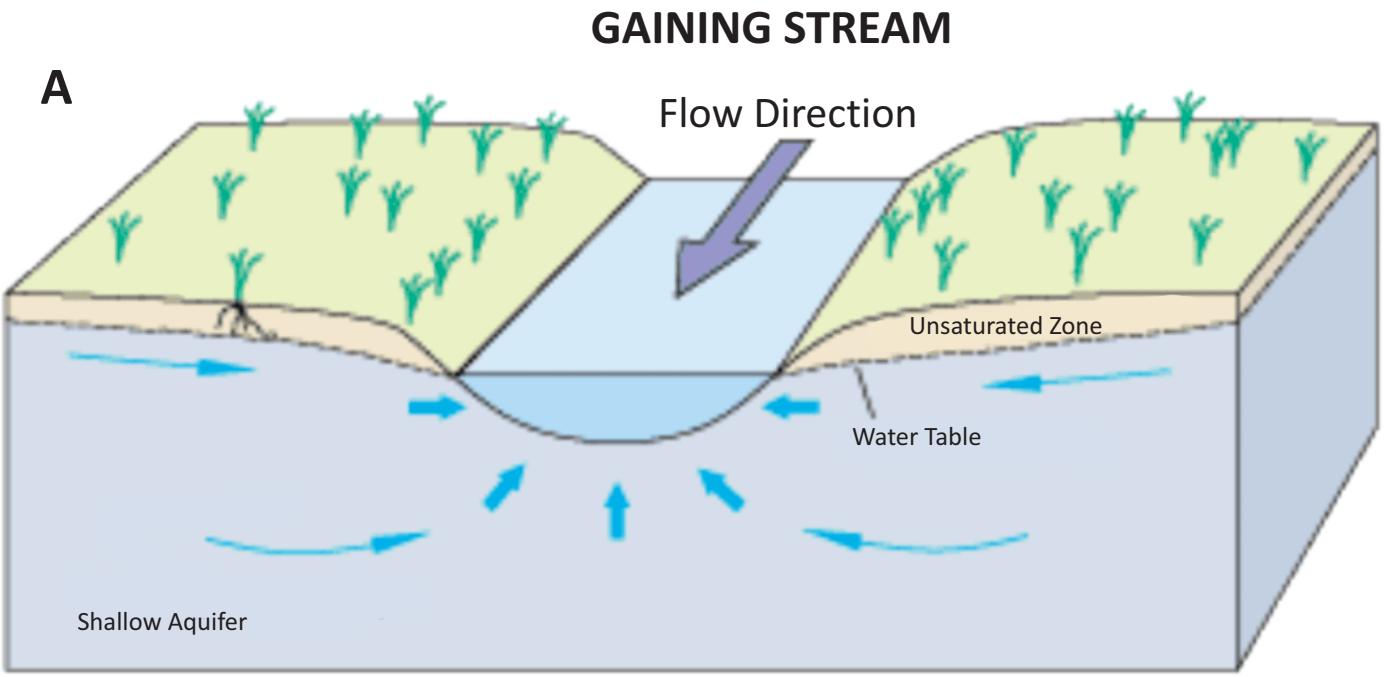


Figure 4.9-2a: Gaining Stream

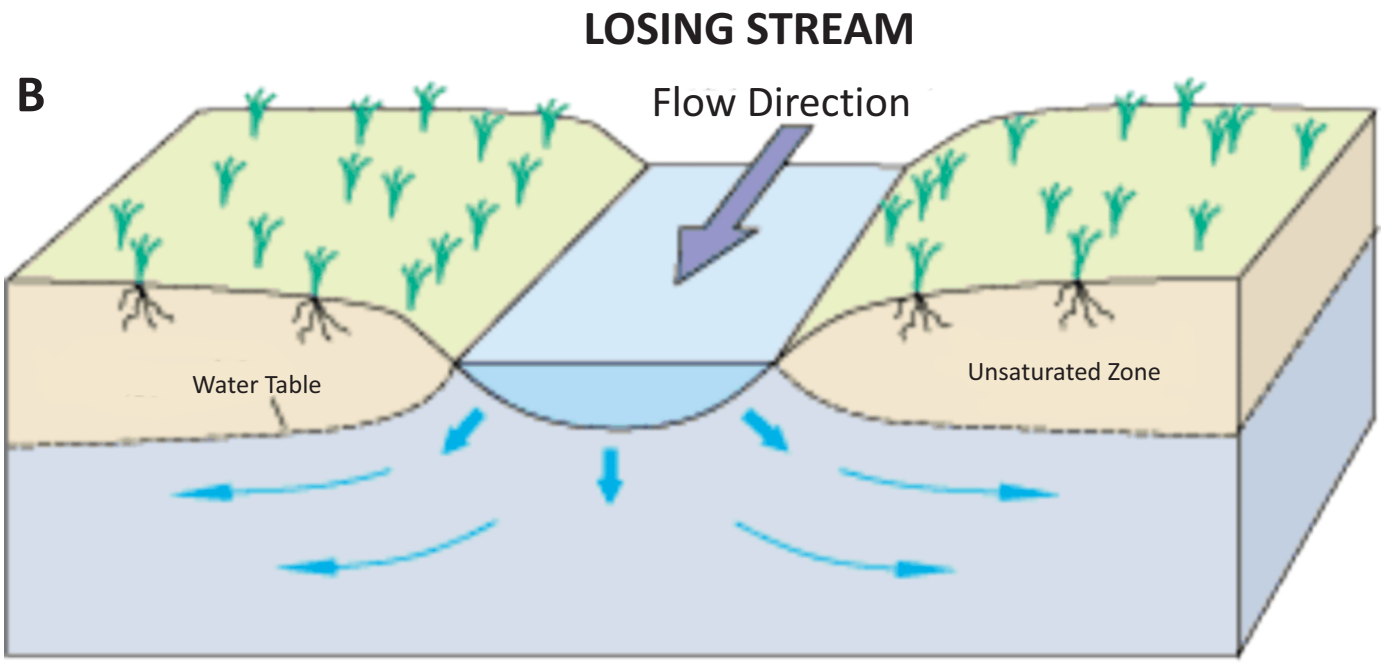


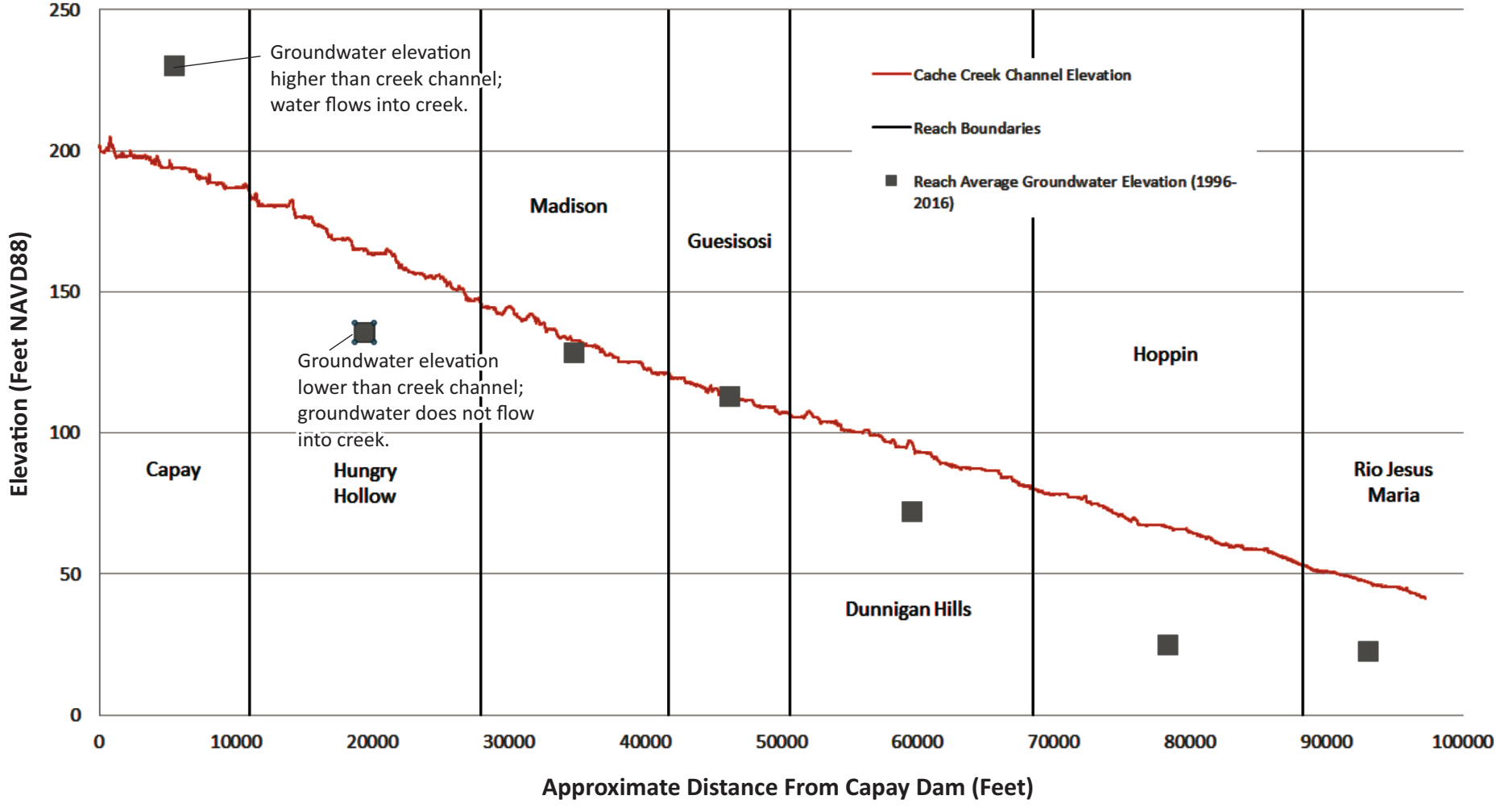
Figure 4.9-2b: Losing Stream

Source: Technical Advisory Committee, 2017.

BASELINE ENVIRONMENTAL CONSULTING

CACHE CREEK GAINING AND LOSING STREAM REACHES

Figure 4.9-3



Source: Tompkins, M., Frank, P., and Rayburn, A.P., 2017, 2017 Technical Studies and 20-Year Retrospective for the Cache Creek Area Plan, March 17, page 2-12.

BASELINE ENVIRONMENTAL CONSULTING

P:|Base 17218-00 Yolo 10-Yr Review\4-EIR sections\0.5 EIR Figures\Figure 4.9-3 cdr 1/30/19

Clear Lake and Cache Creek are both listed as impaired waters for mercury on the federal Clean Water Act Section 303(d) list for California. These waters are an identified source of mercury and contribute a substantial portion of total mercury load delivered to the Sacramento-San Joaquin Delta. Mercury contamination originates from past mining activities, geothermal springs, erosion of naturally occurring mercury-containing soils, and atmospheric deposition near Clear Lake and at tributaries to Cache Creek.

Bioaccumulation of Mercury. Compounds of mercury can be harmful to health. Organic mercury compounds, including methylmercury,[7] are rapidly accumulated by aquatic animals. The concentration of these compounds increases through time in the flesh of fish, a process called bioaccumulation. In addition, the accumulation of organic mercury concentrates along aquatic food chains, reaching high levels at the top predators through a process referred to as biomagnification. Consumption of fish with bioaccumulated levels of methylmercury is the largest source of mercury exposure for humans.

The availability of mercury within the Cache Creek watershed, both naturally-occurring as bedrock deposits and from mercury mining and processing facilities, has resulted in mercury being present in the alluvial sediments within the CCAP area, which have been documented to contain significant levels of mercury. The mercury within these deposits is primarily inorganic forms of mercury, including fragments of mercury sulfide deposits and mercury adsorbed to clay particles. Soils developed on these deposits may also contain mercury. In particular, the organic surface (A-horizon) soils are likely to contain relatively high levels (compared to deeper sediments) because of the affinity of mercury for forming strong complexes with organic material in these soils.

Methylation of inorganic mercury is of particular concern because methylmercury is much more “bio available” to assimilation by living organisms. Sulfur-reducing anaerobic bacteria are considered to be the most efficient organisms for methylation of mercury. The conversion of mercury to methylmercury is, therefore, promoted by anaerobic (oxygen-deficient), acidic (low pH) aquatic environments. The rate of methylmercury production is generally controlled by the availability of mercury and the presence of anaerobic bacteria. Although methylmercury is volatile and unstable in the aquatic environment, bioaccumulation of this compound in the tissue of aquatic life and biomagnification of methylmercury in the food chain present potential health impacts in environments where methylmercury forms.

It was recognized by the County at the initiation of the CCAP program in the early 1990’sthat reclamation of off-channel mining areas within the OCMP planning area to permanent wet pit lakes could present conditions favorable to the conversion of mercury to methylmercury. The concern was that thermal stratification of lake waters and accumulation of organic matter could promote the development of anaerobic conditions in the bottom of the wet pit lakes. Although throughflow of groundwater through the lakes was expected to reduce the potential for severe eutrophication of the lakes, algal growth and detritus from the margins of the lakes were thought capable of providing a significant source of organic materials. Deeper portions of the lakes could be deficient in dissolved oxygen. Anaerobic conditions could promote the development of significant anaerobic bacteria populations, capable of converting inorganic mercury to methylmercury. The CCAP program was structured to allow for ongoing monitoring of this issue, with required adaptive responses to prevent and control adverse conditions, if any.

[7] Methylmercury is formed through "methylation" of inorganic mercury. Methylation occurs primarily as an assimilative process within the cells of organisms which are able to metabolize available mercury compounds.

b. Regulatory Environment

(1) Federal and State

Clean Water Act (CWA) (33 USC Section 1251 et seq.). The CWA was enacted with the intent of restoring and maintaining the chemical, physical, and biological integrity of the waters of the United States. The CWA requires states to set standards to protect, maintain, and restore water quality through the regulation of point source and certain non-point source discharges to surface water. Those discharges are regulated by the National Pollutant Discharge Elimination System (NPDES) permit process (CWA Section 402). In California, NPDES permitting authority is delegated to, and administered by, the nine Regional Water Quality Control Boards (RWQCBs) under the auspices of the State Water Resource Control Board. The proposed Project is located within the jurisdiction of the Central Valley RWQCB, and is therefore subject to management direction of this agency.

National Flood Insurance Program (NFIP). The NFIP enables participating communities to purchase flood insurance. Flood insurance rates are set according to the flood-prone status of property as indicated by Flood Insurance Rate Maps (FIRMs) developed by FEMA. FIRMs identify the estimated limits of Flood Hazard Areas, or the 100-year floodplain for mapped watercourses, among other flood hazards. A 100-year floodplain is the area expected to be inundated as a result of the 100-year flood, or the magnitude of a flood with a one percent chance of occurring in any given year. As a condition of participation in the NFIP, communities must adopt regulations for floodplain development intended to reduce flood damage for new development through such measures as flood proofing, elevation on fill, or floodplain avoidance.

State Flood Legislation. In 2007, the state legislature enacted six interrelated bills to strengthen the linkage between local land use planning decisions and flood management practices. SB 5 and 17, and AB 5, 70, 156, and 162 added or amended over 25 sections of the Government Code, Health and Safety Code, Public Resources Code, and Water Code. There was considerable overlap between these bills. Together they significantly modified floodplain planning and management at the state, regional, and local levels. See Section 4.9 Hydrology and Water Quality for additional information.

Among other things, these bills created the Central Valley Flood Protection Board (CVFPB), which superseded the State Reclamation Board, required preparation of the Central Valley Flood Protection Plan, established 200-year protection as the minimum urban level of flood protection in the Central Valley, required a variety of local general plan and zoning code amendments, and established restrictions on local approval of development agreements and subdivision maps in flood hazard zones within the Central Valley.

It is important to note, however, that notwithstanding the fact that Yolo County lies within the Central Valley, lower Cache Creek is identified by the state as a Designated Floodway under "Local Control." In correspondence dated July 14, 2005, the State Reclamation Board (since succeeded by the Central Valley Flood Protection Board) confirmed that authority for regulating "encroachments" into Cache Creek in the area upstream of I-5 is held by Yolo County and enforced through the Yolo County Flood Damage Prevention Ordinance. Therefore, the Central Valley Flood Protection Board does not have jurisdiction within the CCAP area.

Groundwater Legislation. In 2015, a three-bill package known as the Sustainable Groundwater Management Act (SGMA) went into effect. This legislation does the following:

- Provides for sustainable management of groundwater basins
- Enhances local management of groundwater consistent with rights to use or store

groundwater

- Establishes minimum standards for effective, continuous management of groundwater
- Provides local groundwater agencies with the authority, technical, and financial assistance needed to maintain groundwater supplies
- Avoids or minimizes impacts for land subsidence
- Improves data collection and understanding of groundwater resources and management
- Increases groundwater storage and removes impediments to recharge
- Empowers local agencies to manage groundwater basins, while minimizing state intervention

SGMA mandates the creation of Groundwater Sustainability Agencies (GSAs) in groundwater basins defined as high or medium priority by the Department of Water Resources (DWR) by June 30, 2017. It also mandates the preparation of Groundwater Sustainability Plans (GSP) by January 2022, and implementation of a GSP for a 20-year period ending in 2042. Much of Yolo County lies within what is referred to as the Yolo Groundwater Subbasin, which is a high-priority basin.

The Water Resources Association of Yolo County (WRA) and Yolo County Farm Bureau have partnered to implement SGMA in Yolo County, and have coordinated with local public agencies for creating a GSA. Since spring 2016, a group of local public agencies have held numerous public meetings and governance workgroup discussions on how to comply with SGMA. These agencies have agreed to partner together and create a single GSA through a joint powers agreement (pursuant to California Government Code 6500).

The CCAP contemplates opportunities for groundwater recharge among other public benefits of the plan and encourages recharge projects as possible community benefit projects. This Draft EIR for the subject CCAP includes and more detailed discussion of SGMA and considers whether the new groundwater legislation merits additional changes to the program as part of this update.

(2) Local

2030 Countywide General Plan. The 2030 Countywide General Plan contains the following goals, policies, and actions related to hydrology and water quality that are relevant to the proposed Project:

Flood Hazards (Health and Safety Element)

Goal HS-2	Flood Hazards. Protect the public and reduce damage to property from flood hazards.
Policy HS-2.	Manage the development review process to protect people, structures, and personal property from unreasonable risk from flooding and flood hazards.
Policy HS-2.2	Ensure and enhance the maintenance and integrity of flood control levees.
Policy HS-2.3	Actively update and maintain policies and programs to ensure consistency with State and federal requirements.

Policy HS-2.4 Clearly communicate the risks, requirements, and options available to those who own land and live within the floodplain.

Policy HS-2.6 Maintain the structural and operational integrity of essential public facilities during flooding.

Policy HS-2.7 Manage the floodplain to improve the reliability and quality of water supplies.

Policy HS-2.8 Consider and allow for the ecological benefits of flooding within historic watercourses while balancing public safety and the protection of property.

Action HS-A5 Require a minimum of 100-year flood protection for new construction, and strive to achieve 200-year flood protection for unincorporated communities. Where such levels of protection are not provided, require new development to adhere to the requirements of State law and the County Flood Damage Prevention Ordinance.

Action HS-A12 Evaluate the feasibility of designating land as open space for future bypass systems to prevent flooding hazards. Work with State and Federal agencies to include such bypasses in the Central Valley Flood Protection Plan, where appropriate. Ensure that responsible agencies fund the purchase of flood easements where bypass systems are designated.

Action HS-A13 Review development proposals to ensure that the need to maintain flood control capacity is balanced with consideration of the environmental health of watercourses that convey floodwaters so as not to cause significant erosion, sedimentation, water quality problems, or loss of habitat.

Action HS-A15 Restrict proposed land uses within 500 feet of the toe of any flood control levee, including but not limited to the items listed below, unless site-specific engineering evidence demonstrates an alternative action that would not jeopardize public health or safety:

- Prohibit permanent unlined excavations;
- Large underground spaces (such as basements, cellars, swimming pools, etc.) must be engineered to withstand the uplift forces of shallow groundwater;
- Prohibit below-grade septic leach systems;
- Engineered specifications for buried utility conduits and wiring;
- Prohibit new water wells;
- Prohibit new gas or oil wells;
- Engineered specifications for levee penetrations; and
- Require landscape root barriers within 50 feet of the toe.

Action HS-A21 Private development of levees should be limited to those cases where the construction meets national levee standards, the project is in conformance with the State's comprehensive plan for flood damage reduction, and a public agency agrees to provide long-term maintenance of the levee.

Action HS-A22 Ensure that the upgrade, expansion, or construction of any flood control levee demonstrates that it will not adversely divert flood water or increase flooding.

Action HS-A37 Continue to work with the Flood Control District, the City of Woodland, other appropriate agencies and private landowners to develop strategies and pursue funding for the implementation of projects to improve flood protection for urban and rural residents along lower Cache Creek.

Water Resources (Conservation and Open Space Element)

Policy CO-5.7 Support mercury regulations that are based on good science and reflect an appropriate balancing of sometimes competing public values including health, food chain, reclamation and restoration of Cache Creek, sustainable and economically viable Delta agriculture, necessary mineral extraction, flood control, erosion control, water quality, and habitat restoration.

Policy CO-5.8 Support efforts to reduce the accumulation of methyl mercury in fish tissue in Cache Creek and the Delta, as well as the consumption of fish with high levels of methyl mercury.

Policy CO-5.12 Support the integrated management of surface and groundwater, stormwater treatment and use, the development of highly treated wastewater, and desalinization where feasible.

Policy CO-5.14 Require that proposals to convert land to uses other than agriculture, open space, or habitat demonstrate that groundwater recharge will not be significantly diminished.

Policy CO-5.17 Require new development to be designed such that nitrates, lawn chemicals, oil, and other pollutants of concern do not impair groundwater quality.

Policy CO-5.21 Encourage the use of water management strategies, biological remediation, and technology to address naturally occurring water quality problems such as boron, mercury, and arsenic.

Policy CO-5.23 Support efforts to meet applicable water quality standards for all surface and groundwater resources.

Policy CO-5.24 Pursue funding to remediate historic mines and other sources of mercury contamination on the Cache Creek watershed.

Policy CO-5.3 Strive to increase artificial recharge of important aquifers with surplus surface water supplies.

Action CO-A95 Work with the Central Valley Regional Water Quality Control Board and other State and federal agencies to implement mercury total maximum daily loads (TMDLs) for Cache Creek and to develop mercury TMDLs for the Delta and other Yolo County waterways where appropriate.

Action CO-A97 Continue to monitor water quality in Lower Cache Creek and annually make the resulting data publicly available.

CCAP Plans and Regulations. The existing policies and ordinances related to mining activity and hydrology and water quality are presented below. The CCAP Update proposes changes to some of these ordinances (which are not shown here). Refer to Table 4.9-1, located at the end of this section, for the proposed CCAP Update changes to these ordinances.

CCRMP

2.4-5 Acknowledge the streamway influence boundary described in the Technical Studies as the general area of the creek which has historically

been subject to meandering. The streamway influence boundary also defines the area where in-stream and off-channel issues overlap and are address in both plans.

6.5-14 Proposed off-channel excavations located within the streamway influence boundary shall be set back a minimum of seven-hundred (700) feet from the existing channel bank, unless an engineering analysis demonstrates that a small distance will not adversely affect channel stability within the reach. If the proposed engineering measures are demonstrated to be feasible, then the minimum setback distance shall be no less than two hundred (200) feet.

Approval of any off-channel mining project located within seven-hundred (700) feet of the existing channel bank shall be contingent upon an enforceable agreement which requires the project operator to participate in the completion of channel improvement projects, along the frontage of their property, consistent with the CCRMP and CCIP. The agreement shall also require that the operator provide a bond or other financial instrument for maintenance during the mining and reclamation period of any bank stabilization features approved for the mining project. The agreement shall also require that a deed restriction be placed on the underlying property which requires maintenance of the streambank protection by future owners of the property. Maintenance of the bank stabilization features following completion of reclamation shall be the responsibility of the property owner.

OCMP

3.4-2 Coordinate with the Yolo County Flood Control and Water Conservation District in developing an integrated groundwater recharge plan for Cache Creek, in order to increase the available groundwater supply for municipal and agricultural uses.

3.4-3 Include a groundwater monitoring program as a condition of approval for any surface mining and reclamation operation that proposes off-channel excavations that extend below the groundwater level. The monitoring program shall require regular groundwater level data, as well as a water quality monitoring program based on a set of developed standards.

3.4-5 Require that surface mining operations demonstrate that proposed off-channel excavations extending below the groundwater level will not adversely affect the producing capacity or water quality of local active wells.

Mining Ordinance

Section 10-4.416. Flood protection.

All off-channel surface mining operations shall be provided with a minimum one hundred (100) year flood protection. Off-channel excavations shall be designed to minimize the possibility of levee breaching and/or pit capture ... Flood protection shall be provided from flooding associated with overtopping of the alluvial separators or levees along Cache Creek and all tributaries· and drainage channels (including, but not limited to, Willow Slough and Lamb Valley Slough).

The flood protection upgrades shall be designed and constructed to provide the necessary 100-year protection without creating a net increase

of downstream flooding elevations. Downstream flooding could be increased if floodplain storage areas were removed from the drainage system by constructing levees in areas where they aid not exist before (or raising levees that are overtopped in floods up to the 100-year event). Alternative flood management design systems (potentially using detention basins, infiltration galleries, and/or floodplain storage in noncritical areas) shall be required as a condition of project approval. New development (such as buildings, levees, or dikes) located within the floodplain shall conform to all applicable requirements of the Yolo County Flood Ordinance, the Federal Emergency Management Agency (FEMA), and the State Reclamation Board.

Section 10-4.417. Groundwater monitoring programs.

All surface mining operations that propose off-channel excavations extending below the groundwater level shall develop and maintain a groundwater monitoring program consisting of two components: water level measurements and water quality testing. A groundwater level monitoring program shall be .initiated at least six months prior to the removal of overburden. At a minimum, the groundwater level monitoring program shall consist of three monitoring wells, with at least one well upgradient of the wet pit and one well downgradient · of the wet pit. Monitoring programs for proposed mining areas exceeding one-hundred (100) acres (total proposed mining area over the life of the project) shall include one additional well for each one-hundred. (100) acres of wet pit mining. ·Therefore, wet pit mining areas of 1 to 99 acres would require 3 wells, 100 to 199 acres would require 4 wells, 200 to 299 acres would require 5 wells, and so on. These wells shall be distributed through the vicinity of the wet pit mining area and used for groundwater level measurements. Groundwater levels shall be collected from the monitoring wells on a quarterly basis for six (6) months prior to mining and for the duration of the mining period. All wellheads shall be surveyed with horizontal and vertical control to allow calculation of groundwater elevations and development of groundwater contour maps. Groundwater levels shall be measured with an accuracy of plus or minus 0.01 foot, at minimum.

Water quality in the vicinity of each active wet pit mining location shall be evaluated by analyzing samples from selected monitoring wells (one upgradient and one downgradient) and wef pit surface water sampling locations. Since mining may be conducted in phases over a relatively long period of time, pit boundaries may change with time. Selection, and installation if necessary, of downgradient monitoring wells, which would be critical to adequately characterize the groundwater quality in the vicinity of the wet pits, shall be submitted by the operator for review and approval by the County. The selected monitoring wells shall be installed and sampled at least six (6) months prior to the removal of overburden. The downgradient wells shall be located as near to the active wet pit mining areas as is practical. The upgradient wells shall be located an adequate distance from the proposed mining area to ensure that the effect of the wet pit on water quality in the well would be negligible. The water samples from the wet pit shall be collected in a manner so as to ensure that they are representative of water quality within the wet pit. The minimum sampling schedule and required analyses are described below.

(a) Groundwater level and pit water surface level measurements shall be performed quarterly in all wells for the duration of mining and reclamation.

(b) For monitoring the groundwater quality of proposed wet pit mining, sample collection and analysis of physical, chemical, and biological constituents shall be conducted according to the following specifications:

(1) Prior to the removal of overburden - One upgradient and one downgradient well shall be sampled at least six (6) months prior to the removal of overburden and again at the start of excavation. The samples shall, at minimum, be analyzed for general minerals; inorganics; nitrates; total petroleum hydrocarbons (TPH) as diesel and motor oil, benzene, toluene, ethylbenzene, and xylenes (BTEX); pesticides . (EPA 8140 and 8150); and coliform (with E.coli confirmation).

(2) During wet pit mining and active reclamation ~ The wet pit shall be sampled semi-annually for the duration of mining and active reclamation. The samples shall, at minimum, be analyzed for general minerals; inorganics; nitrates; TPH as diesel and motor oil, BTEX; pesticides (EPA 8140 and 8150); and coliform (with E. coli confirmation).

One upgradient and one downgradient well shall be analyzed, at minimum, for general minerals; inorganics; nitrates; TPH as diesel and motor oil, BTEX; pesticides (EPA 8140 and 8150); and coliform (with E.coli confirmation). The wells shall be sampled according to the following schedule: semi-annually for the first two years, and annually every year thereafter.

(3) After active reclamation - One year after all heavy equipment work has been completed in the vicinity of the pit, the TPH and BTEX analyses may be discontinued. The wet pit and one upgradient and one downgradient well shall be sampled and analyzed for pH; temperature; nutrients (phosphorous and nitrogen); total dissolved solids; total coliform (with E. coli confirmation); and biological oxygen demand. This monitoring shall be conducted every two (2) years for a ten (10) year period after completion of reclamation.

A report to the Agency and Department of Environmental Health shall be submitted within thirty (30) days of the required groundwater testing.

Additional tests and analysis shall be required only if a new condition is recognized that may threaten water quality or if the results of previous tests fall outside allowable ranges. If at any time during the monitoring period, testing results indicate that sampling parameters exceed Maximum Contaminant Levels (MCLs), as reported in the California Code of Regulations, or established background levels, a qualified professional shall evaluate potential sources of the contaminants. The evaluation shall determine the source and process of migration (surface or subsurface) of .the contaminants. A report shall be submitted to the regulatory agencies (the Agency, Yolo County Department of Environmental Health, the Central Valley Regional Water Quality Control Board, and the U.S. Environmental Protection Agency) which identified the source of the detected contaminants and specifies remedial actions to be implemented by the operator for corrective action. If it is determined that the source of water quality degradation is offsite and the County and the RWQCB are in agreement with this conclusion, the operator shall not be responsible for corrective action.

If corrective action is ineffective or infeasible, the responsible party must provide reparation to affected well owners, either by treatment of water at the wellhead or by procurement of an alternate water supply.

If, at the completion of the mining and reclamation period, water quality has not been impacted, all monitoring wells shall be destroyed in accordance with the California Department of Water Resources Well Standards. If the County or other agency wishes to maintain the wells for future water resources evaluation, selected wells may be preserved for this use. .

The County may retain appropriate staff or a contract consultant to provide third party critical review of all hydrologic reports related to monitoring.

Section 10-4.427 Protection of nearby drinking water wells. (no changes proposed by CCAP Update)

If any off-channel. excavation proposes to extend below the level of seasonal high groundwater, then six months prior to the commencement of excavation below the average high groundwater level, the operator shall identify and locate all off-site municipal wells within one-thousand (1,000) feet and all domestic wells within five hundred (500) feet of the proposed wet ·pit mining boundary. If active wells are identified, well· characteristics (pumping rate, depth, and locations of screens) shall be determined. If wells are not located within one-thousand (1,000) feet, the pre-mining impact evaluation shall be considered complete.

If wet pit mining is proposed within one-thousand (1,000) feet of a municipal water supply or within five-hundred (500) feet of a domestic water supply well, a capture zone analysis shall be conducted using the U.S. Environmental Protection Agency model WHPA (or a similar model of equal capability and proven reliability, as approved by the Director). The simulation shall assume thirty (30) days of continuous pumping of the water supply well (at its maximum probable yield) under analysis. A mining setback shall be established so that the capture zone and the pit do not coincide. Alternatively, the operator shall submit a written agreement that the well owner has agreed to relocate or redesign the well, or accept the potential impact (at no expense to the County). The analysis shall be prepared and signed by a Registered Civil Engineer or Certified Hydrogeologist and submitted to the County for review and approved at least six months prior to the commencement of excavation below the seasonal high groundwater level.

Any new drinking water wells proposed for installation within one-thousand (1,000) feet of an approved wet pit mining area shall be subject to review by the Yolo County Environmental Health Department. The County shall determine, based on site-specific hydrogeology and available water quality data, whether to approved the proposed well installation. Analysis of environmental impact for projects in the vicinity of the wet pits shall include consideration of potential water quality impacts on the open water bodies. The County may retain appropriate staff or a contract consultant to provide third party critical review of all hydrogeologic reports related to mining applications.

Section 10-4.429 Setbacks

(d) Proposed off-channel excavations located within the streamway influence boundary shall be set back a minimum of seven-hundred (700) feet from the existing channel bank, unless it is demonstrated that a smaller distance will not adversely affect channel stability. The evaluation of the potential for adverse effects of bank erosion or failure of the land separating pits located less than seven-hundred (700) feet from the active channel shall address, at a minimum, the following:

(1) The two-hundred (200) foot setback area shall not include portions of the former historic active floodplain or formerly mined lands separated from the active channel by levees or unmined areas less than two-hundred (200) feet wide (measured perpendicular to the active channel),

(2) Identification of the former historic positions of the Cache Creek channels as delineated in the CCRMP Technical Studies, and determination if the proposed· project is located within the limits of the historic-channel.

(3) Description of current channel hydraulic conditions (based on existing or site-specific hydraulic models) for the Cache Creek channel adjacent to the site and extending not less than one-thousand (1,000) feet upstream and downstream of the site.

(4) Determination of the erosion potential of the stream bank adjacent to

the site made on the basis of stream flow velocity and estimated shear stress on bank materials during 100-year flood flows and historic patterns of erosion.

(5) Analytical slope stability analysis in conformance with Sections 10·4.426 and 10·5.517 of this title. The analysis of the slopes separating the mining area from the creek channel shall include evaluation of stability conditions during 100-year flood flows in the channel.

(6) Future proposed bank stabilization designs, if recommended, shall not conflict with channel design recommendations of the Cache Creek Resource Management Plan unless approved by the Technical Advisory Committee.

Reclamation Ordinance

Section 10-5.503. Backfilled excavations: Groundwater flow impacts.

The area of backfilled off-channel excavations extending below the groundwater table shall be minimized in order to reduce changes to groundwater levels and flow. Backfilled pits shall be oriented with regard to the direction of groundwater flow to prevent localized obstructions. If a backfilled off-channel excavation is proposed to penetrate either fifty (50) feet or one-half (112) into the saturated thickness of the shallow aquifer, then at least six months priorto the commencement of excavation below the average high groundwater level, the applicant shall demonstrate in a manner consistent with the Technical Studies that the pit design will not adversely affect active off-site wells within one-thousand (1,000) feet of the proposed pit boundary. If the application includes a series of backfilled pits, then the applicant shall also demonstrate that the cumulative effects of the multiple backfilled pits will not adversely affect groundwater flow, if there are any active off-site wells within one-thousand (1,000) feet of the pit boundaries.

The applicant shall demonstrate, using MODFLOW (or a similar model of equal capability and proven reliability, as approved by the Yolo County Community Development Director), that the proposed pit design would not adversely impact active off-site wells within one-thousand (1000) feet of the proposed pit boundary or result in well failure. Average, historic low groundwater levels, which represent the condition of maximum threat to water levels in the subject well, shall be used for this simulation. If an adverse impact is identified by the MODFLOW (or other approved model) simulation, the mining and reclamation plan shall be modified or the applicant shall submit a written agreement that the well owner has agreed to relocate or redesign the well, or accept the potential impact (at no expense to the County). Site-specific aquifer testing shall be conducted, if needed, to determine aquifer properties for the required modeling.

Section10-5.507. Drainage.

Upon the completion of operations, grading and revegetation shall minimize erosion and convey storm water runoff from reclaimed mining areas to natural outlets or interior basins. The condition of the land shall allow sufficient drainage to prevent water pockets or undue erosion. Natural and stormwater drainage shall be designed so as to prevent flooding on surrounding properties and County rights-of-way.

Drainage and detention facilities within the proposed mining areas and vicinity shall be designed to prevent discharges to the wet pits and surface water conveyances (i.e., creeks and sloughs) from the 20-year/1-hour storm or less. For events greater than the 20-year/1-hour storm, runoff from around the perimeter of the mining areas shall be directed into surface water conveyances. Runoff from within the lowered mining area shall be directed away from wet pits to detention/infiltration areas. Drainage plans shall not rely solely on ditches and berms to direct runoff away from the wet pit. Without proper maintenance, berms and ditches may deteriorate with time and become ineffective. Drainage plans shall emphasize the grading of disturbed areas that results in broad gently slopes that drain away from the pits. Grading plans shall be reviewed by the County to evaluate compliance with drainage plan objectives prior to project approval.

In addition, a restriction shall be recorded on the deed that requires berms and ditches to be permanently maintained 'in a condition consistent with the final approval. The deed restriction shall require an inspection easement which allows County staff or other authorized personnel access for the inspection of berms and ditches. If the County determines that evidence of damage to those facilities exist, the County shall require that the owner have an inspection report for the property prepared by a Registered Geologist or Registered Civil Engineer. The inspection report including recommendations for corrective action, if needed, shall be submitted to the Yolo County Community Development Agency. The property owner shall be required to implement recommended corrective action, if any.

Section 10-5.517. Mercury bioaccumulation in wildlife.

Prior to the approval of reclamation of aggregate mining areas to permanent lakes, the County shall commission a sampling and analysis program, to be implemented in one existing wet pit mining area within the

OCMP planning area, to evaluate the potential for increased methylmercury production associated with wet pit mining and reclamation of mining areas to permanent lakes. The program shall include the sampling of water and sediments from the bottom of the existing pit and analysis of the samples for organic content; pH; dissolved oxygen content; dissolved carbon content; and total mercury. In addition, samples of predatory fish (preferably largemouth bass) shall be collected and analyzed for mercury and methylmercury content. If the initial sampling indicates either of the following conditions, the County shall perform verification sampling:

(a) Average concentrations of total mercury in excess of 0.000012 milligrams per liter (mg/l) in the water; and

(b) Average mercury levels in fish samples in excess of 0.5 milligrams per kilogram (mg/kg).

If verification sampling indicates exceedance of these mercury criteria, the County shall approve the reclamation of mining areas to permanent lakes only if the average level of mercury in fish collected from the existing mining pits is shown to be equal to or less than ambient (background) mercury levels determined from a representative sample of similar species of fish (of similar size) collected in the Cache Creek channel within the planning area. The determination of the ambient mercury level shall be performed by the County prior to the excavation of any new wet pit mine and at years 10, 20, and 30 in the permit time period, and shall be paid for by the mining permit operators on a fair-share basis. The County shall evaluate available data to determine any significant change in ambient concentrations of mercury in fish within the Cache Creek channel. In the event of approval of reclamation of mined areas to permanent lakes, each mining area to be reclaimed to a permanent lake as part of each approved long-range mining plan shall be evaluated annually by the operator for five years after creation of the lake for conditions that could result in significant methylmercury production. An additional ten years of biennial monitoring shall be performed after reclamation of each lake has been completed. The evaluations shall be conducted by a qualified aquatic biologist or limnologist acceptable to the County and shall include the following analyses:

(c) Lake condition profiling during the period of June through September, including measurements of pH; eH (or redox potential); temperature; dissolved oxygen and total dissolved carbon.

(d) Collection of a representative sample of fish specimens (including a minimum of five (5) predator fish if available) and analysis of the specimens for mercury content. Sampling and analysis shall be conducted using methodologies which are consistent with the California State Water Resources Control Board Toxic Substances Monitoring Program procedures, or more stringent procedures.

(e) The results of the evaluation shall be summarized in a report and submitted to the County. The report shall include a comparison of the site specific data to available data on the background concentrations of mercury in fish within the Cache Creek watershed. The County shall be responsible for submitting the data on mercury levels in fish to the California Department of Fish and Game and the Office of Environmental

Health Hazard Assessment for a determination of whether a fish advisory should be issued.

(f) If a fish advisory is issued, the owner/operator shall be required to post warnings on fences surrounding the mining pit lakes which prohibit fishing in the lakes and describe the fish advisory. If the average fish specimen mercury content exceeds the statistically verified ambient mercury concentrations for comparable fish species (of similar size) collected within the CCRMP planning area for two (2) consecutive years, wet pit mining on property controlled by the mining operator/owner shall be suspended and the owner/operator shall either:

(g) Present a revised reclamation plan to the Yolo County Community Development Agency which provides for filling the reclaimed lake to a level five (5) feet above the average seasonal high groundwater level with a suitable backfill material; or

(h) Present a mitigation plan to the Yolo County Community Development Agency which provides a feasible and reliable method for reducing methylmercury production or exposure to elevated mercury levels. Potential mitigation could include permanent aeration of the bottom levels of the lake, alteration of the water chemistry (increasing pH or dissolved organic carbon levels), control of anaerobic bacteria populations, or removal and replacement of affected fish populations. The mitigation plan would require review by the Regional Water Quality Control Board. California Department of Fish and Game, and the Yolo County Department of Environmental Health. (The removal and replacement of fish is not intended to be a long-term solution.) The reclamation plan shall be modified such that the mitigation approved for methylmercury reduction shall be applied to all mining areas proposed for reclamation to permanent lakes within the reclamation plan.

Section 10-5.524. Post-reclamation groundwater monitoring. Monitoring during the mining and reclamation period shall be a condition of the permit. The applicant shall ensure that the groundwater monitoring of wet pit mining continues for (10) years after the completion of reclamation.

3. IMPACTS AND MITIGATION MEASURES

a. Significance Criteria

The following significance criteria are based on the changes to CEQA, including Appendix G, adopted by the California Natural Resources Agency on December 28, 2018. [8] The following criteria are for the topics of hydrology and water. The wording and order of the criteria have changed relative to the previously adopted CEQA criteria that were identified in the NOP/Initial Study released in May 2017. However, all the criteria considered on the 2017 NOP/Initial Study are substantively covered by the revised criteria below (i.e., the wording may have changed, but the content of the criteria is the same).

The proposed Project would result in a significant hydrology impact if it would:

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

b) Substantially decrease groundwater supplies or interfere substantially with

[8] http://resources.ca.gov/ceqa/ accessed January 9, 2019.

groundwater recharge such that the project may impede sustainable groundwater management of the basin?

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

   i) result in substantial erosion or siltation on- or off-site;

   ii) substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

   iii) create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or

   iv) impede or redirect flood flows?

d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?

e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

b. Impacts Found Less than Significant in Initial Study

In the Initial Study, the conclusion was reached that implementation of the proposed CCAP Update would not result in significant impact for several of the significance criteria. These are summarized below.

Create or contribute runoff water which could exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff

In general, the CCAP area is not currently connected to a public stormwater drainage system, and is not anticipated to be connected in the future. The Initial Study completed for the proposed CCAP Update found that no impacts related to existing or planned storm drainage systems would occur.

Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map

The CCAP Update does not propose the new housing and therefore this potential impact does not apply to the Project**.**

Inundation by seiche, tsunami, or mudflow.

The CCAP area is not in a location that would be affected by tsunamis or seiches. Waves from tsunamis in the Pacific Ocean would dissipate before reaching the area, more than 50 miles inland from San Pablo Bay. There are no major enclosed water bodies within 10 miles of the Project Site that could generate a seiche. In general mudflows occur in areas of steeply sloping terrain. Since the CCAP area is generally level or characterized by gentle slopes, mudflows are not a hazard of concern. Therefore, the risk of the CCAP area being inundated by a tsunami or a seiche or affected by mudflows would be less than significant.

c. Approach

The proposed CCAP Update is comprised of a series of specific text changes to eight policy and regulatory County plans and ordinances that govern the County's activities along Lower Cache

Creek. The proposed text changes that have the potential to result in impacts related to hydrology and water quality are identified in Table 4.9-1, located at the end of this section. Each proposed change is discussed in the impact analysis below grouped by in-channel plans and regulations, and off-channel plans and regulations.

To evaluate potential impacts related to hydrology and water quality, the preparers of this EIR reviewed the relevant surface water, flooding, groundwater, and water quality data collected by the County over the past 20 years (as summarized in the 2017 Technical Studies). In addition, the County retained an expert aquatic scientist (a licensed Professional Engineer and a Certified Lake Professional) to assist with evaluation of the mercury monitoring results and develop refined mercury management strategies for the future.

d. Impacts Analysis

Impact HYD-1: The CCAP Update would not result in increased erosion and sedimentation or violation of any water quality standards or waste discharge requirements, but could otherwise substantially degrade surface or ground water quality by creating conditions that allow for methylmercury to form in wet pit lakes. (S)

This impact analysis addresses the following criteria:

a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would: result in substantial erosion or siltation on- or off-site;

There are two main ways that the proposed Project could impact water quality: 1) result in direct discharges of degraded runoff to surface waters (i.e., Cache Creek or its tributaries), or 2) result in discharges or generation of contaminants in the wet pit lakes that would degrade wet pit surface water quality or nearby groundwater quality.

Proposed Revisions to In-Channel Plans and Regulations

The following types of in-channel projects are allowed under the existing CCAP program and would continue to be allowed under the CCAP Update: maintenance of flood flow capacity; protection of existing structures, infrastructure, and/or farmland; minimization of bank erosion; implementation of the Channel Form Template; enhancement of creek stability; establishment of riparian vegetation; and recreation and open space uses consistent with the CCAP. These types of projects could have adverse effects on water quality, potentially violating water quality standards, if not implemented properly. However, per Section 10-3.103. Purpose of the In-Channel Ordinance one of the main purposes of the CCAP in-channel program is to prevent erosion and stabilize the channel which provides long-term benefits to water quality by reducing erosion and sedimentation.

Under the existing CCAP Program, the CCIP includes numerous best management practices to ensure that erosion and potential impacts to water quality are minimized. Under the CCAP Update, these best practices are updated to reflect current best industry practice. The CCIP (subsection 5.2, Design Guidelines) groups these creek stabilization and erosion control measures into seven categories, including: *discharge control, revetments, dikes, vegetation (and biotechnical methods), alignment adjustments, bank drainage, and bed scour controls.*

Compliance with the CCIP requirements would ensure that erosion and potential water quality impacts related to in-stream projects are minimized.

In addition, the In-Channel Ordinance includes specific regulations that address, and when implemented, ensure that water quality degradation does not occur. These include:

Proper Handling of Hazardous Materials. Section 10-3.407 (see Table 4.9-1) includes requirements for the proper handling and management of hazardous materials associated with heavy equipment used for channel improvement projects so that leaks and spills of petroleum products (e.g., fuel and oil) are not released in the Cache Creek channel. This regulation also ensures that wastewater from in-channel projects will not be directly discharged to Cache Creek. Measures such as berms, silt fences, sediment ponds, hay bales, and/or revegetation must be used to control erosion. Agricultural tailwater must be diverted to catchment basins prior to release to the creek. This regulation (as updated) also requires that in-channel sediment fines shall only be used as backfill material in off-channel habitat restoration if it can be demonstrated that sediment quality is acceptable based on applicable regulations and standards.

Water Quality Monitoring. Regular testing and monitoring is an important tool to manage water quality and allow for corrective response to identified water quality degradation. Since its inception, the CCRMP has required annual testing (at minimum) of surface water quality of Cache Creek at Capay and Yolo (CCRMP Action 3.4-3). The majority of contaminants (>85%) have never been detected in the CCRMP water quality monitoring program.[9] The CCAP Update (CCRMP Action 3.4-3) proposes to modify the testing requirements (see Table 4.9-1, at the end of this section). These modifications were proposed by the TAC water quality specialist based on review of the 20-year water quality data set of the CCAP program. The proposed update refines the list of parameters and constituents to be monitored, including the elimination of some constituents that have never been identified in collected samples. This refinement of the monitoring program represents an improvement that will make the monitoring program more efficient and effective. No adverse impacts would result from the proposed modification of the monitoring program.

Use of Overburden and Fine Sediments in Reclamation. The existing Reclamation Ordinance (Section 10-5.532) does not allow sediment fines associated with processed in-channel aggregate deposits to be used in the backfill or reclamation of off-channel permanent lakes because it was thought at the time of CCAP program development that these sediments might have elevated concentrations of mercury which could exacerbate methylmercury production in the wet pit lakes. The proposed CCAP Update would modify Section 10-5.532 (see Table 4.9-1) to allow use of in-channel fines for off-channel lakes when it can be demonstrated that no detrimental sediment toxicity exists (including unacceptable levels of mercury). As this proposed change includes measures to ensure that wet pit lake water quality degradation does not occur (e.g., testing the sediments to ensure no detrimental toxicity), this update would not result in significant impacts to water quality.

Implementation of the CCIP including the In-Channel Ordinance requirements would ensure that potential water quality impacts related to in-channel projects are less than significant.

Proposed Revisions to Off-Channel Plans and Regulations

The off-channel activities conducted under the CCAP Update could violate water quality standards (i.e., adversely affect water quality in the wet pits and adjacent groundwater) in the off-channel area if mining operations resulted in the discharge of contaminants to wet pits lakes.

[9] Tompkins, M., Frank, P., and Rayburn, A.P., 2017, op.cit.

However, the existing County ordinances and the proposed updates to these ordinances (the complete text of these ordinances (as updated by the proposed CCAP Update and included in Table 4.9-1) include numerous sections that effectively address potential impacts to water quality related the discharge of contaminants to wet pit lakes, including:

Section 10-3.408 Hazards and Hazardous Materials. Specifies that 1) all heavy equipment used for channel improvements must be kept in good working order to avoid spills and leaks of fuel and oils into the channel; that a stormwater pollution prevention plan must be prepared and implemented to minimize the potential for erosion and chemical spills; and 3) test fill used for bank repair projects to ensure that the fill material does not contain contaminants above applicable thresholds.

Section 10-4.413 Drainage. Specifies that surface water may be directed into mined areas (i.e., wet pits) only designed and engineered in accordance with an approved reclamation plan that includes erosion and sediment control measures.

Section 10-4.415 Equipment maintenance. Specifies that 1) all internal combustion engine driven equipment and vehicles shall be kept tuned according to the manufacturer's specifications and properly maintained to minimize the leakage of oils and fuel; and 2) that fueling and maintenance activities of heavy equipment (except draglines and floating suction dredges) are prohibited within one-hundred (100) feet of open bodies of water during mining and reclamation. All Storm Water Pollution Prevention Plans shall include provisions for releases of fuels during fueling activities for draglines and floating suction dredges.

Section 10-4.417 Groundwater monitoring programs. Establishes that groundwater monitoring programs are conducted for all operations that propose off-channel mining excavation that extend below the groundwater table. These monitoring programs require collection and testing of groundwater samples for a wide range of constituents and chemicals. In addition, the ordinance requires measuring of groundwater levels and determination of groundwater flow directions at each site.

Section 10-4.427 Protection of nearby drinking water wells. Requires that for any off-channel excavation that is proposed to extend below the level of seasonal high, that all local domestic and municipal wells are located and identified and that groundwater modeling is conducted to determine whether the proposed wet pit mine would adversely affect the wells.

Section 10-4.437 Wastewater discharge. Specifies that no wastewater will be discharged directly to Cache Creek and that sediment fines generated by aggregate processing be used as off-channel fill or soil amendments.

Section 10-4.438 Watercraft. Specifies that only motorized dredges and draglines shall be allowed on the wet pit lakes. All other fuel-powered (gasoline or diesel) watercraft shall not be used on the wet pit lakes. Electric-powered or non-motorized boats shall be permissible.

Section 10-5.510 Fencing. Requires fencing around mining areas and prevents trespass and illicit discharges of contaminants to wet pits.

The 1996 OCMP EIR found that implementation of these measures (which are now regulations) would ensure that potential impacts related to discharges of contaminants to mining wet pits are

less than significant. The CCAP Update to these regulations would not decrease their effectiveness and therefore, the potential water quality impact related to discharge of contaminants to the wet pit lakes under the CCAP Update is less than significant.

The CCAP program could otherwise substantially degrade surface or groundwater quality by creating wet pit lakes in the OCMP area where inorganic mercury could be converted to methylmercury. The creation of mining wet pit lakes occurs under the existing CCAP program and would continue to occur under the CCAP Update when a mining operator excavates below the groundwater table.

Based on the concern that the wet pit lakes could promote methymercury formation, which could degrade water quality and have harmful effects related to bioaccumulation of mercury in fish and other wildlife, the County established a CCAP mercury monitoring program under Section 10.5.517 of the Reclamation Ordinance. Results of the ongoing monitoring program indicate that of the seven wet pit lakes that have been created within the OCMP area at existing mining operations, five of these wet pit lakes are, or may be [some results are preliminary], locations of methylmercury formation (based on fish tissue sampling results required under Section 10.5-517).

Based on approximately 20 years of experience administering the mercury monitoring program and reviewing results and current practices, the County has proposed a substantial update to Section 10.5.517 (and added 10-4.420.1) of the Reclamation Ordinance (as shown in Table 4.9-1). To ensure that the mercury monitoring program will be implemented in the most effective way and is consistent with current scientific understanding of mercury in the environment and best practices under the CCAP Update, the County retained an expert third-party aquatic systems scientist to review the proposed CCAP Update modifications related to the mercury monitoring program under Section 10.5.517. The third-party expert had the following comments on the proposed update to Section 10.5.517:[10]

- References and applicability of the ordinance to active mining, reclamation and post-reclamation phases should be clearly separated.
- Details on monitoring fish and water seem overly prescriptive for an ordinance.
- References to state programs should be updated, where still applicable.
- The ordinance should be limited to addressing lower Cache Creek, not the entire watershed.
- Several references to criteria and acceptability should be clarified.
- Several examples of adaptive management mitigation measures may not be needed.

Based on the review by third-party expert of Section 10.5-517, the proposed CCAP Update changes to Section 10.5-517 may not be adequately protective of water quality. Therefore, impacts, related to methylmercury production in wet pit lakes, on water quality, biologic resources, and humans (fishers who consume fish), are potentially significant and require mitigation. The following mitigation measure shall be implemented.

> **Mitigation Measure HYD-1:** The text of Sections 10.5.517 and 10-5.532 of the Reclamation Ordinance shall be replaced in their entirety by the following:

[10] McCord, Stephen, 2018, Technical Memorandum: Peer review of proposed changes in Yolo County ordinances addressing mercury bioaccumulation, November 2.

Section 10-5.517. Mercury bioaccumulation in fish.

As part of each approved long-term mining plan involving wet pit mining to be reclaimed to a permanent pond, lake, or water feature, the operator shall maintain, monitor, and report to the Director according to the standards given in this section. Requirements and restrictions are distinguished by phase of operation as described below.

(a) Mercury Protocols. The Director shall issue and update as needed "Lower Cache Creek Off-Channel Pits Mercury Monitoring Protocols" (Protocols), which shall provide detailed requirements for mercury monitoring activities. The Protocols shall include procedures for monitoring conditions in each pit lake, and for monitoring ambient mercury level in the lower Cache Creek channel within the CCAP planning area, as described below. The Protocols shall be developed and implemented by a qualified aquatic scientist or equivalent professional acceptable to the Director. The Protocols shall identify minimum laboratory analytical reporting limits, which may not exceed the applicable response threshold identified in subsection (e) below. Data produced from implementing the Protocols shall meet or exceed applicable standards in the industry.

(b) Ambient Mercury Level. The determination of the ambient or "baseline" fish mercury level shall be undertaken by the County every ten years in years ending in 0. This analysis shall be undertaken by the County for use as a baseline of comparison for fish mercury testing conducted in individual wet mining pits. The work to establish this baseline every ten years shall be conducted by a qualified aquatic systems scientist acceptable to the Director and provided in the form of a report to the Director. It shall be paid for by the mining permit operators on a fair-share basis. The results of monitoring and evaluation of available data shall be provided in the report to substantiate the conclusions regarding ambient concentrations of mercury in fish within the lower Cache Creek channel within the CCAP planning area.

(c) Pit Monitoring.

(1) Mining Phase (including during idle periods as defined in SMARA).

The operator shall monitor fish and water column profiles in each pit lake once every year during the period generally between September and November for the first five years after a pit lake is created. Fish monitoring should include sport fish where possible, together with other representative species that have comparison samples from the creek and/or other monitored ponds. Sport fish are defined as predatory, trophic level four fish such as bass, which are likely to be primary angling targets and have the highest relative mercury levels. The requirements of this subsection apply to any pit lake that is permanently wet and navigable by a monitoring vessel. If, in the initial five years after the pit lake is

created, the applicable response threshold identified in subsection (e) is exceeded in any three of five monitoring years, the operator shall, solely at their own expense, undertake expanded analysis pursuant to subsection (f) and preparation of a lake management plan pursuant to subsection (g).

(2) Reclamation Phase. No monitoring is required after mining has concluded, during the period that an approved reclamation plan is being implemented, provided reclamation is completed within the time specified by SMARA or the project approval, whichever is sooner.

(3) Post-Reclamation Phase. After reclamation is completed, the operator shall monitor fish and water column profiles in each pit lake at least once every two years during the period of September-November for ten years following reclamation. Monitoring shall commence in the first calendar year following completion of reclamation activities. If fish monitoring results from the post-reclamation period exceed the applicable response threshold described in subsection (e) or, for ponds that have implemented mitigation management, results do not exhibit a general decline in mercury levels, the operator shall, solely at their own expense, undertake expanded analysis pursuant to subsection (f) and preparation of a lake management plan pursuant to subsection (g).

(4) Other Monitoring Obligation**.** If monitoring conducted during both the mining and post-reclamation phase did not identify any exceedances of the ambient mercury level for a particular pit lake, and at the sole discretion of the Director no other relevant factors substantially support that continued monitoring is merited, the operator shall have no further obligations.

(d) Reporting.

(1) Pit Monitoring Results. Reporting and evaluating of subsection (c) pit monitoring results shall be conducted by a qualified aquatic scientist or equivalent professional acceptable to the Director. Monitoring activities and results shall be summarized in a single report(addressing all wet pit lakes) and submitted to the Director within six months following each annual monitoring event. The report shall include, at a minimum: (1) results from subsection (b) (pit monitoring), in relation to subsection (a) (ambient mercury levels).

(2) Expanded Analysis Results. Reporting and evaluation of subsection (f) expanded analysis shall be conducted by a qualified aquatic scientist or equivalent professional acceptable to the Director. Results shall be summarized in a single report (addressing all affected wet pit lakes) and submitted to the Director within six months following each annual monitoring event. The report shall include, at a minimum, the results of the expanded analysis undertaken pursuant subsection (f).

(2) Data Sharing. For pit lakes open to the public, the Director may submit the data on mercury concentrations in pit lake fish to the state Office of Environmental Health Hazard Assessment (or its

successor) for developing site-specific fish consumption advisories.

(e) Response Thresholds.

(1) Fish Consumption Advisory. If at any time during any phase of monitoring the pit lake's average sport fish tissue mercury concentration exceeds the Sport Fish Water Quality Objective, as it may be modified by the state over time (as of 2019, the level was 0.2 mg/kg), the operator shall post fish consumption advisory signs at access points around the lake and around the lake perimeter. Catch-and-release fishing may still be allowed. Unless site-specific guidance has been developed by the state's Office of Health Hazard Assessment or the County, statewide fish consumption guidance shall be provided.

(2) Mining Phase Results. If, during the mining phase of monitoring, the pit lake's average fish tissue mercury concentration exceeds the ambient mercury level for any three of five monitoring years, annual monitoring shall continue for an additional five years, and the operator shall undertake expanded analysis pursuant to subsection (f) and preparation of a lake management plan pursuant to subsection (g).

(3) Post-Reclamation Phase Results. If during the first ten years of the post-reclamation phase of monitoring, the pit lake's average fish tissue mercury concentration exceeds the ambient mercury level for any three of five monitoring years, biennial monitoring shall continue for an additional ten years, and the operator shall undertake expanded analysis pursuant to subsection (f) and preparation of a lake management plan pursuant to subsection (g).

(f) Expanded Analysis.

(1) General. If during the mining or post-reclamation phase, any pit lake's average fish tissue mercury concentration exceeds the ambient mercury level for any three years, the operator shall undertake expanded analyses. The analysis shall include expanded lake water column profiling (a minimum of five profiles per affected wet pit lake plus one or more non-affected lakes for control purposes) conducted during the warm season (generally May through October) in an appropriate deep profiling location for each pit lake. The following water quality parameters shall be collected at regular depth intervals, from surface to bottom of each lake, following protocols identified in subsection (a): temperature, dissolved oxygen, conductivity, pH and oxidation-reduction potential (ORP), turbidity or total suspended solids, dissolved organic matter, and algal density by Chlorophyll or Phycocyanin. The initial analysis shall also include one-time collections of fine grained (clay/silt) bottom sediments from a minimum of six well distributed locations for each affected lake, and from one or more non-affected lakes for control purposes, to be analyzed for mercury and organic content.

(2) Scope of Analysis. The purpose of the expanded analyses is to identify and assess potential factors linked to elevated

methylmercury production and/or bioaccumulation in each pit lake. The scope of the expanded analyses shall include monitoring and analysis appropriate to fulfill this purpose, invoking best practices in the industry. In addition to the analyses described in subsection (f)(1) above, the analysis should also consider such factors as: electrical conductivity, bathymetry (maximum and average depths, depth-to-surface area ratios, etc.), and trophic status indicators (concentrations, Secchi depth, chlorophyll a, fish assemblages, etc.). Additional types of testing may be indicated and appropriate if initial results are inconclusive.

(3) Use of Results. The results of the expanded analyses undertaken pursuant to this subsection shall be used to inform the preparation of a lake management plan described below under subsection (g).

(g) Lake Management Activities

(1) General. If monitoring conducted during the mining or post-reclamation phases triggers the requirement to undertake expanded analysis and prepare and implement a lake management plan, the operator shall implement lake management activities designed by a qualified aquatic scientist or equivalent professional acceptable to the Director, informed by the results of subsection (f). Options for addressing elevated mercury levels may include (A) and/or (B) below at the Director's sole discretion and at the operator's sole expense.

(A) Lake Management Plan. Prepare a lake management plan that provides a feasible, adaptive management approach to reducing fish tissue mercury concentrations to at or below the ambient mercury level. Potential mercury control methods could include, for example: addition of oxygen to or physical mixing of anoxic bottom waters; alteration of water chemistry (modify pH or organic carbon concentration); and/or removal or replacement of affected fish populations. The lake management plan may be subject to external peer review at the discretion of the Director. Lake management activities shall be appropriate to the phase of the operation (eg. during mining or post-reclamation). The Lake Management Plan shall include a recommendation for continued monitoring and reporting. All costs associated with preparation and implementation of the lake management plan shall be solely those of the operator.

Upon acceptance by the Director, the operator shall immediately implement the plan. The lake management plan shall generally be implemented within three years of reported results from the expanded analyses resulting from subsection (f). If lake management does not achieve acceptable results and/or demonstrate declining mercury levels after a maximum of three years of implementation, at the sole discretion of the Director, the operator may prepare an alternate management plan with reasonable likelihood of mitigating the conditions.

(B) Revised Reclamation Plan. As an alternative to (A), or if (A) does not achieve acceptable results and/or demonstrate declining mercury levels after a maximum of three years of implementation, at the sole discretion of the Director, the operator shall prepare and submit revisions to the reclamation plan (including appropriate applications and information for permit amendment) to fill the pit lake with suitable fill material to a level no less than five (5) feet above the average seasonal high groundwater level, and modify the end use to agriculture, habitat, or open space at the discretion of the Director, subject to Article 6 of the Mining Ordinance and/or Article 8 of the Reclamation Ordinance as may be applicable.

(2) Implementation Obligations.

(A) If a lake management plan is triggered during the mining or post-reclamation phase and the subsequent lake management activities do not achieve acceptable results and/or demonstrate declining mercury levels, the operator may propose different or additional measures for consideration by the Director and implementation by the operator, or the Director may direct the operator to proceed to modify the reclamation plan as described in subsection (g)(1)(B).

(B) Notwithstanding the results of monitoring and/or lake management activities during the mining phase, the operator shall, during the post-reclamation phase, conduct the required ten years of biennial monitoring.

(C) If monitoring conducted during the post-reclamation phase identifies three monitoring years of mercury concentrations exceeding the ambient mercury level, the operator shall implement expanded analyses as in subsection (f), to help prepare and implement a lake management plan and associated monitoring.

(D) If subsequent monitoring after implementation of lake management activities, during the post-reclamation phase, demonstrates levels of fish tissue mercury at or below the ambient mercury level for any three monitoring years (i.e., the management plan is effective), the operator shall be obligated to continue implementation of the plan and continue monitoring, or provide adequate funding for the County to do both, in perpetuity.

Section 10-5.532. Use of overburden and fine sediments in reclamation.

Sediment fines associated with processed in-channel aggregate deposits (excavated as a result of maintenance activities performed in compliance with the CCIP) may be used for other purposes such as in the backfill or reclamation of off-channel pit lakes, for in-channel reshaping or habitat restoration, and/or as a soil amendment in agricultural fields provided the operator can demonstrate that no detrimental sediment toxicity exists (consistent with the state's Stream Pollution Trends Monitoring Program protocols) and fine-grained soil (<63 micron) do not exceed 0.4 mg/kg total mercury.

The operator shall use overburden and processing fines whenever possible to support reclamation activities for pit lakes. If topsoil (A-horizon soil), formerly in agricultural production, is proposed for use within a pit lake or its drainage area, the operator must sample the soils prior to placement and analyze them for pesticides and herbicides (EPA Methods 8141B and 8151A, or equivalent) as well as for total mercury (EPA Method 7471B, or equivalent). The operator shall collect and analyze samples in accordance with EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846 (as updated). Topsoil that contains pesticides or herbicides above the Maximum Contaminant Levels for primary drinking water (California Code of Regulations), or that contains fine-grained soils exceeding on average 0.4 mg/kg total mercury shall not be placed in areas that drain to the pit lakes.

Land reclaimed to a subsequent use that includes planting of vegetation (e.g., agriculture, habitat) shall be provided an adequate soil profile (i.e., depth and texture of soil) to ensure successful reclamation. At the discretion of the Director and at the operator's sole expense, the proposed reclamation plan for the project may be peer reviewed by an appropriate expert/professional, and recommendations, if any, shall be incorporated into the project as conditions of approval.

Compliance with this mitigation measure will ensure that impacts from mercury bioaccumulation are mitigated to a less-than-significant level (LTS).

Impact HYD-2: The CCAP Update would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the Project may impede sustainable groundwater management of the basin (LTS)

Proposed Revisions to In-Channel Plans and Regulations

In-channel activities that could occur under the existing CCAP program or CCAP Update would not decrease groundwater supplies or interfere substantially with groundwater recharge (e.g., no new impervious surfaces are proposed) such that the Project may impede sustainable groundwater management of the basin. Therefore, this potential impact as related to updates to in-channel plans and regulation is less than significant.

Proposed Revisions to Off-Channel Plans and Regulations

Groundwater is an important resource in the vicinity of the CCAP area and the entire County. Aquifer recharge and conjunctive water use have been goals of CCAP since its inception in 1996. The CCRMP (Policy 2.4-5) established the streamway influence boundary (the general area of the creek which has historically been subject to meandering). CCAP activities that can be conducted within streamway influence boundary are limited so that the stability of the creek channel is protected and the area adjacent to the creek remains suitable for sustainable groundwater management and aquifer recharge. The Mining Ordinance (Section 10-4.429(d) requires that proposed off-channel excavations located within the streamway influence boundary be set back a minimum of seven-hundred (700) feet from the existing channel bank, unless it is demonstrated that a smaller distance will not adversely affect channel stability. At no time may the setback be less than 200 feet. This setback requirement protects an active recharge area along lower Cache Creek. As discussed previously, within the CCAP area, Cache Creek is mostly a "losing" creek (see Figure 4.9-3) where the creek is actively recharging groundwater.

In addition, the OCMP (Policy 3.4-2) specifies that the County will coordinate with the Yolo County Flood Control and Water Conservation District in developing an integrated groundwater recharge plan for Cache Creek, in order to increase the available groundwater supply for municipal and agricultural uses. This has been substantively completed and is currently available to users.

The CCAP Update would expand the area designated SGRO and increase the potential wet pit mining area (Table 4.9-1, located at the end of this section; OCMP page 15). This potential increase in wet pit lakes could result in increased evaporative losses of water by exposing groundwater at the surface in wet pit lakes and wetlands. Potential evaporative losses from wet pit lakes are partially addressed by the proposed CCAP Update to the Mining Ordinance (Section 10-4.411.1) (see Table 4.9-1, located at the end of this section) that requires the footprint of wet pit lakes to minimized to reduce evaporative losses (among other things)

Section. 10-5.529 of the OCMP, which states “All permanent wet pits shall be reclaimed to include valuable wildlife habitat as a beneficial use of the water lost from wet pits due to evaporation” indicating that the evaporative losses provide a compensating beneficial impact in creation of new wildlife habitat. Therefore, potential impacts related to evaporation of groundwater under the existing CCAP program (and under the CCAP Update) are less than significant.

It has always been the policy of the CCAP program to reduce agricultural land loss, promote efficient aggregate resource management, and minimize evaporation water losses by encouraging applicants to reduce the size of the footprint of off-channel mining pits and encouraging deeper mining. However, it is possible that deeper mining (and potentially backfill or clogging of the pit walls with fines) could result in impacts to groundwater flow. The 1996 OCMP EIR found that maintaining steep slopes below the groundwater table in the wet pits (which is required by Section 10-5.530 of the Reclamation Ordinance) would discourage "clogging" of the aquifer and encourage the free flow of groundwater into and out of the wet pit lakes. The CCAP Update would not change the requirement for steep slopes below the groundwater table (i.e., no changes to Section 10-5.530 are proposed), and therefore potential impacts to groundwater flow from implementation of the CCAP Update are less than significant.

Impact HYD-3: Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which could result in flooding on- or off-site or impede or redirect flood flows (LTS)

This impact analysis addresses the following criteria including item i) from the 2017 Initial Study:

a) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;

iv) Impede or redirect flood flows?

i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?

Proposed Revisions to In-Channel Plans and Regulations

As indicated in Table 4.9-1, located at the end of this section, the CCAP Update proposes changes to the CCRMP related to 100-year flood flows and maintaining flood protection (see Table 4.9-1, located at the end of this section, which summarizes proposed changes to the CCRMP Vision section, modifications to CCRMP Objective 2.3-3, and relocation of performance standards to the CCIP and In-Channel Ordinance).

With the approval of the CCAP in 1996, commercial aggregate mining within the Cache Creek channel was discontinued for a variety of environmental reasons, and commercial aggregate mining was re-established off-channel. The CCRMP acknowledged (page 42) that the elimination of in-channel mining could result in sediment accumulation in the channel which may cause a reduction of channel capacity and increase flooding hazards. Modifications and maintenance of the Cache Creek channel would be monitored by the County and the TAC in accordance with the CCRMP and CCIP.

It is the nature of Cache Creek flows that during some years there is a net accumulation of sediment within the channel and during other years there is a net loss of sediment. Based on detailed topographic studies conducted for the CCAP Update, a net total of approximately ten million tons of sediment was deposited in lower Cache Creek between 1996 and 2011, which reduced flood flow conveyance capacity. However, there was net erosion of sediment between 2011 and 2017, which increased conveyance capacity during this time period. It is possible that over an extended period of time there will be a net increase in sediment accumulation which could result in a decrease of flood flow conveyance capacity over the CCAP Plan horizon.

The vision of the 1996 CCRMP included modification of the channel to establish and/or maintain a channel configuration that would convey the 100-year flood, which was supported by the following CCRMP objectives (Note: Modifications to all of these except Objective 2.3-7 is proposed as a part of the CCAP Update and described further below):

- Objective 2.3-1: Provide flood management as required to protect the public health and safety.
- Objective 2.3-3: Design and implement a more stable channel configuration that will convey a 100-year flood event.
- Objective 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.
- Objective 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 appropriately balanced.

Ensuring adequate capacity within lower Cache Creek to convey flood flows is dependent on the actions and interests of property owners along the creek. While adequate flood protection and flood flow conveyance is a goal of the CCAP, it is not a responsibility. A number of proposed edits proposed as a part of the CCAP Update make clarifications to the text to reflect this. Implementation of in-channel projects (including projects to maintain flood flow capacity) must be initiated/implemented by individual property owners. These property owners may be interested in controlling erosion (i.e., minimizing bank failures and loss of land adjacent to the creek) or flood protection for their properties near the creek channel.

The CCAP established a technical advisory committee (TAC) to provide scientific and technical review for all projects conducted under the CCIP (Section 10-3.210 In-Channel Ordinance). The

TAC is comprised of members with technical expertise in river systems, including hydraulic engineering, fluvial geomorphology, and biology and riparian restoration. The TAC oversees the collection and interpretation of topographic information (i.e., detailed topography of the Cache Creek channel), uses hydraulic models to periodically evaluate flood flow capacity, and makes recommendations about potential locations for bank stabilization and flood flow capacity projects.

In Section 10-3.103 of the In-Channel Ordinance (see Table 4.9-1, located at the end of this section), the proposed CCAP Update clarifies the types of in-channel projects that are allowed under the CCRMP/CCIP. While the CCAP Update clarifies and more fully describes the types of projects that are allowed, it does not fundamentally change project types. As stated in the CCAP Update (Section 10-3.103) allowed in-channel projects are limited to those that: maintain flood flow capacity; protect existing structures, infrastructure, and/or farmland; minimize bank erosion; implement the Channel Form Template; enhance creek stability; establish riparian vegetation; and/or result in recreation and open space uses consistent with the parkway plan.

The CCAP Update includes refinement and clarification to numerous policies and regulations related to flooding, including (refer to Table 4.9-1, located at the end of this section, for full text): CCRMP Objectives 4.3-1, 4.3-2, 4.3-3; CCRMP Actions 4.4, 4.4.4; and In-Channel Ordinance Section 10-3-405, Section and Section 10-3.505. The updates to these policies and regulations clarify that the goals of in-channel projects related to flood flow are to:

- Support flood management to protect public safety (Objective 4.3-1) and ensure that existing flood flow capacity is preserved (rather than maintaining a specific level of flood protection (e.g., 100-year flood protection), except at off-channel surface mining operations where 100-year protection of those facilities must be maintained by the mining operator (Section 10-4.416);

- Recommend actions to create a more stable channel (Objective 4.3-2) and implement the Channel Form Template (an updated Cache Creek channel shape) to assist in addressing erosion and flooding problems (Section 10-3-405);

- Manage activities and development within the floodplain to avoid hazards and adverse impacts on surrounding properties through the County's requirement for a Flood Hazard Development Permit for any work within the 100-year floodplain of the creek.

With regard to flood management, a primary goal of the CCAP has always been to maintain flood conveyance capacity so as to protect infrastructure in and directly adjacent to the channel (e.g., bridges, farmland), rather than to maintain capacity for a particular statistical event (i.e., the 100-year event).

The proposed modifications to the policies and regulations of CCAP related to flood flows would not result in environmental impacts; rather they clarify the purpose, goals, and methods used under the CCAP program to continue to provide means for needed flood control projects to be accomplished by property owners adjacent to Cache Creek. In addition the programmatic review provided by this EIR will support continued issuance by state and federal agencies, of general permits for implementation of the CCRMP and CCIP, which are necessary to enable and encourage individual property owners to participate in projects and activities that will effectively manage lower Cache Creek. Therefore, potential impacts related to altering drainage patterns which would impede or redirect flood flows are less than significant.

Proposed Revisions to Off-Channel Plans and Regulations

As indicated in Table 4.9-1, located at the end of this section, the CCAP Update would result in the rezoning of 1,188 acres within the OCMP planning area to add the Sand and Gravel Reserve (SGR) overlay, which would allow future mining consistent with the program on acreage not previously evaluated in the original OCMP and OCMP EIR. The potential new mining areas would be located within (and constrained to) the "Future Proposed Mining" areas shown on Figure 3-4. As shown on Figure 4-9.1, these Future Proposed Mining areas are generally located outside (but in some cases adjacent to) the FEMA 100-year flood hazard zone, and therefore would not be expected to be affected by the 100-year flood event (or smaller events). Since these potential new mining areas are not located within the FEMA 100-year flood hazard zone, mining activities that could include modification of the topography and construction of facilities would not impede or redirect flood flows. Moreover, Section 10-4.416 of the Mining Ordinance requires that all off-channel mining operations be provided with a minimum 100-year flood protection. This is reinforced by requirements for 100-year flood information and analysis as a part of the application process (see Section 10-4.502 of the Mining Ordinance.

No off-channel activities that would occur under the existing CCAP program or CCAP Update would directly alter the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would impede or redirect flood flows. Therefore, this potential impact is less than significant.

Impact HYD-4: The CCAP Update could conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan. (LTS)

The following plans are potentially relevant to the proposed CCAP program and CCAP update:

- Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region, Fifth Edition (revised May 2018)

- Sustainable Groundwater Management Act – Groundwater Sustainability Plan (under preparation)

Proposed Revisions to In-Channel Plans and Regulations

In-channel activities that would occur under the existing CCAP program or CCAP Update would not conflict with or obstruct implementation of the Basin Plan or the Groundwater Sustainability Plan as explained below:

- Water Quality Control Plan (Basin Plan). The in-channel CCAP activities focus on improving the stability and water quality of Cache Creek, which are similar to the goals of the Basin Plan.

- Groundwater Sustainability Plan. The Groundwater Sustainability Plan, which is currently under preparation and scheduled to be completed in 2022, will identify means and methods necessary for the groundwater basin to achieve a state of sustainable management. CCRMP/CCIP activities (including implementation of restoration projects) will not adversely affect sustainable groundwater management because no groundwater extraction or increase in impervious surfaces (which could reduce recharge) is proposed under the CCAP. Also, the CCAP supports and promotes groundwater recharge as one goal of the program.

Proposed Revisions to Off-Channel Plans and Regulations

- Water Quality Control Plan (Basin Plan). The Basin Plan includes (by amendment) a Total Maximum Daily Load (TMDL)[11] for mercury in the Cache Creek basin. This *Cache Creek, Bear Creek, and Harley Gulch TMDL for Mercury*,[12] which is the principle regulatory driver from the state with respect to mercury in the Cache Creek watershed, was approved as a Basin Plan amendment in 2005 by the Central Valley Regional Water Quality Control Board. As stated in the TMDL staff report:[13]

  > The Central Valley Regional Water Quality Control Board has determined that Cache Creek and Bear Creek are impaired because fish tissue and water from these water bodies contain elevated levels of mercury. Harley Gulch is impaired because of high aqueous concentrations of mercury. The Cache Creek, Bear Creek, and Harley Gulch TMDL water quality management plan includes: establishment of water quality numeric targets, assessment of pollutant sources, linkage between the numeric target and loads, assignment of load reductions, margins of safety, and a monitoring plan. The goal of this TMDL is to lower mercury levels in the Cache Creek watershed such that human and wildlife health are protected. In addition, because Cache Creek is a primary source of mercury to the Sacramento-San Joaquin Delta Estuary, lowering mercury levels in the Cache Creek watershed will assist in protecting human and wildlife health in the Delta. The TMDL encompasses the 81-mile reach of Cache Creek between Clear Lake Dam and the outflow of Cache Creek Settling Basin, Bear Creek from its headwaters to its confluence with Cache Creek, and the 8-mile length of Harley Gulch.

The TMDL staff report characterizes the Plan Area and related mining activities as follows:

> The lower reaches of Cache Creek have been mined for aggregate. The mining companies now conduct mining operations off-channel. As described in the linkage analysis, some of the off-channel gravel pits are being restored to wildlife habitats that include wetland areas. Mercury present in the sediment is likely to be methylated and made available to wildlife feeding in both the creek and gravel pits. Off-stream gravel mines restoration areas are assigned a load allocation of no net increase of mercury or methylmercury discharges. Regional Board staff may consult with Yolo County and with the gravel mining industry to determine how established gravel pits could be maintained and how new excavations could be constructed and operated in the future to ensure non-toxic methylmercury levels in biota. The final implementation plan may consider a requirement that the construction of new pits not export methylmercury to Cache Creek until fish tissue levels are in compliance with the TMDL targets.[14]

[11] On a broad level, the TMDL process leads to a "pollution budget" designed to restore the health of a polluted body of water. The TMDL process provides a quantitative assessment of water quality problems, contributing sources of pollution, and the pollutant load reductions or control actions needed to restore and protect the beneficial uses of an individual waterbody impaired from loading of a particular pollutant. More specifically, a TMDL is defined as the sum of the individual waste load allocations for point sources, load allocations for nonpoint sources, and natural background such that the capacity of the water body to assimilate pollutant loading (the loading capacity) is not exceeded (40 CFR §130.2). In other words, a TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still meet water quality standards which will insure the protection of beneficial uses. This calculation also includes a margin of safety and consideration of seasonal variations. In addition, the TMDL contains the reductions needed to meet water quality standards and allocates those reductions among the pollutant sources in the watershed.

[12] The Basin Plan amendment containing the TMDLs was adopted by the Central Valley Regional Water Quality Control Board on October 21, 2005 under Resolution No. R5-2005-0146. The amendment was approved by California's State Water Resources Control Board on July 19, 2006 under Resolution No. 2006-0054.

[13] Regional Water Quality Control Board, Central Valley Region, 2004. *Cache Creek, Bear Creek, and Harley Gulch TMDL for Mercury, Staff Report,* September.

[14] Ibid, page 103

The “export” of methylmercury to Cache Creek described above could occur if 1) surface water flows that carried a suspended sediment (and associated mercury) load from the mining and processing areas were discharged directly to Cache Creek; or 2) water from within the wet pits, where mercury may be methylated, flows through the subsurface and is discharged to Cache Creek.

Surface water flows. The CCAP, including the Update, restrict discharges to Cache Creek that could include elevated levels of mercury. Per the Mining Ordinance Section 10-4.437. Wastewater discharge.

> No wastewater shall be directly discharged to Cache Creek. Sediment fines generated by aggregate processing shall either be used for agricultural soil enhancement, habitat restoration sites, 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. Agricultural tailwater shall be diverted to catchment basins prior to its release to the creek.

In addition, Mining Ordinance Section 10-4.412. Dewatering, specifies that “water generated from dewatering activities must be beneficially used and discharged on-site” which ensures that water pumped from wet pits (which may contain mercury) is not discharged to Cache Creek.

Subsurface flow from wet pits. Under certain scenarios, it is possible that water from a wet pit lake could flow in the subsurface (as groundwater) toward, and be discharged to, Cache Creek. However, detailed hydrologic analysis of Cache Creek has occurred under the CCAP program and has determined that Cache Creek downstream of the Capay reach (Figure 4.9-3) is a losing stream (i.e., creek water flows into the groundwater regime) and therefore water from within the wet pit lakes does not flow into Cache Creek (it flows in the opposite direction – from Cache Creek into surrounding groundwater). Therefore, no net increase in the mercury load allocation to Cache Creek would occur when new wet pit lakes are created or operated within the CCAP area.

Based on reasoning above, activities under CCAP, and the CCAP Update, would not increase the mercury load to Cache Creek and the CCAP and CCAP Update are consistent with the TMDL and the Basin Plan. This potential impact is less than significant. (LTS)

Table 4.9-1: Proposed CCAP Updates Related to Hydrology and Water Quality

Hydrology and Water Quality	
	CCAP DOCUMENT CHANGE
Modification of Water Quality Testing Requirements	
CCRMP (page 52)	3.4-3 Provide for annual ~~testing (~~or more frequent ~~(~~if necessary) testing of surface water quality 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 ~~be comprehensive and respond to all applicable regulatory requirements. It should~~ include, but not be limited to: pH, ~~total dissolved solids,~~ temperature, turbidity, total and fecal coliform, mercury, ~~total petroleum hydrocarbons,~~ dissolved oxygen, nitrogen, and orthopohosphate. ~~orus, herbicides, and pesticides (EPA Methods 8140 and 8150), suspended and floating matter, odor, an color.~~ This information will~~ould~~ assist in habitat restoration efforts and allow the County to monitor water quality trends within the planning area. The County NRM~~Resource Management Coordinator~~ shall be responsible for the collection, management, and distribution of all water quality data, and should coordinate all data management activities (formatting, storage, quality control) with the appropriate TAC member. Testing (as described above) should also be conducted near in-channel projects prior to, during, and after construction/completion (i.e., at first high-flow inundation) to detect any potential non-compliance with Regional Water Quality Control Board (RWQCB) Water Quality Objectives. ~~The testing program(s) should be designed to measure all constituents for which there are RWQCB numeric and/or narrative regulatory limits. If non-compliance is found, modify future projects of similar type to eliminate such non-compliance.~~
Increase in Potential Off-Channel Mining Area	
OCMP (page 15)	**Planning Area for OCMP and CCRMP~~The Cache Creek Resources Management Plan~~** The planning area for the OCMP is defined as the area contained within the Mineral Resource Zones (28,130 acres), minus the planning~~in-channel~~ area regulated under the CCRMP (2,266 acres), or a total of 25,864 acres (see Figure 4). Within the OCMP planning area, 1,900 acres are currently approved for excavation which is a subset of the 2,464-acre total for all approved mine sites (area zoned Sand and Gravel Overlay or SGO), 1,001 acres are zoned currently to allow for future mining (Sand and Gravel Reserve Overlay or SGRO), and another 1,188 acres are proposed to be rezoned for future mining, as described below. The planning area for the CCRMP is equal to the active in-channel area of the creek system, as defined by the delineated~~present~~ channel bank line or the 100-year flood elevation, ~~described in the Westside Tributaries Study prepared by the U.S. Army Corps of Engineers,~~ whichever is wider ~~(see Figure 3)~~ modified as described in the CCRMP. The in-channel area encompasses 5,109~~around 4,956~~ acres, including 2,266~~1,600~~ acres within the CCRMP~~present channel~~ boundary, plus several thousand acres located in the floodplain north of the City of Woodland (see Figure 3). ~~Subtracting this acreage from the 28,130 acres included in the State MRZs, leaves a total of approximately 23,174 acres within the planning~~

	~~area of the Off-Channel Mining Plan. As described in the following section, however, only 2,887 acres of the plan area are proposed to be rezoned to allow for off-channel mining over the next fifty years, or about 12 percent of the OCMP planning area.~~
Mercury Bioaccumulation	
Reclamation Ordinance (page 11)	**Section 10-5.517. Mercury bioaccumulation in wildlife.** ~~Prior to the approval of reclamation of aggregate mining areas to permanent lakes, the County shall commission a sampling and analysis program, to be implemented in one existing wet pit mining area within the OCMP planning area, to evaluate the potential for increased methylmercury production associated with wet pit mining and reclamation of mining areas to permanent lakes. The program shall include the sampling of water and sediments from the bottom of the existing pit and analysis of the samples for organic content; pH; dissolved oxygen content; dissolved carbon content; and total mercury. In addition, samples of predatory fish (preferably largemouth bass) shall be collected and analyzed for mercury and methylmercury content. If the initial sampling indicates either of the following conditions, the County shall perform verification sampling:~~ ~~(a) Average concentrations of total mercury in excess of 0.000012 milligrams per liter (mg/l) in the water; and~~ ~~(b) Average mercury levels in fish samples in excess of 0.5 milligrams per kilogram (mg/kg).~~ ~~If verification sampling indicates exceedance of these mercury criteria, the County shall approve the reclamation of mining areas to permanent lakes only if the average level of mercury in fish collected from the existing mining pits is shown to be equal to or less than ambient (background) mercury levels determined from a representative sample of similar species of fish (of similar size) collected in the Cache Creek channel within the planning area. The determination of the ambient mercury level shall be performed by the County prior to the excavation of any new wet pit mine and at years 10, 20, and 30 in the permit time period, and shall be paid for by the mining permit operators on a fair-share basis. The County shall evaluate available data to determine any significant change in ambient concentrations of mercury in fish within the Cache Creek channel.~~ In the event of approval of reclamation of mined areas to permanent lakes, e<u>E</u>ach mining area to be reclaimed to a permanent lake as part of each approved long-range mining plan shall be evaluated annually by the operator for <u>a minimum of</u> five years after ~~creation of the lake~~<u>the pit fills with groundwater with an intensive fish mercury monitoring program, as outlined below</u> ~~for conditions that could result in significant methylmercury production~~. An additional ten years of biennial monitoring shall be performed after reclamation of each lake has been completed. The evaluations shall be conducted by a qualified <u>aquatic systems scientist</u>~~aquatic biologist or limnologist~~ acceptable to the County and shall include the following ~~analyses~~: ~~(c) Lake condition profiling during the period of June through September, including measurements of pH; eH (or redox potential); temperature; dissolved oxygen; and total dissolved carbon.~~ <u>(d)</u> Collection of a representative sample of fish specimens ~~(including a minimum of five (5) predator fish if available)~~ and analysis of the specimens for mercury content <u>including 30 adult (angling size) fish muscle samples and multi-individual whole fish samples of 3 species of young-of-year small fish, as available. Adult fish sampling should target 10 individuals from each of 3 species, distributed across the prevailing size ranges. Priority shall go to a predatory species like bass, with additional species including a midwater planktivore such as sunfish and a bottom feeder such as catfish, if present. If less than 3 species are present, sample up to 20 of the predatory</u>

species, if present. Small fish sampling should target 3 prevalent species, as available. These should be characterized either with 15 individual whole fish samples or 4 multi-individual whole fish composites (≥5 fish per composite) for each species. Composites should span the range of typical sizes present, but with the individuals within each composite being closely matched in size. Sampling and analysis shall be conducted using methodologies which are consistent with the California State Water Resources Control Board Toxic Substances Monitoring Program procedures, or more stringent procedures.

~~(e)~~ The results of the evaluation shall be summarized in a report and submitted to the County. The report shall include a comparison of the site specific data to available data on the background concentrations of mercury in fish within the Cache Creek watershed. The County shall be responsible for submitting the data on mercury levels in fish to the ~~California Department of Fish and Game and the~~ State Office of Environmental Health Hazard Assessment for consideration as related to existing Cache Creek ~~a determination of whether a~~ fish advisories[1] ~~should be issued~~ and shall post the information on the CCAP website.

~~(f)~~ If a fish advisory is applicable~~issued~~, the owner/operator shall ~~be required to~~ post warnings on fences surrounding the mining pit lakes which prohibit fishing in the lakes and describe the fish advisory.

If the average fish specimen mercury content exceeds the statistically verified ambient mercury concentrations for comparable fish species (of similar size) collected within the CCRMP planning area (defined as average fish mercury greater than 30 percent above corresponding baseline creek samples in the majority of pond samples) for two (2) consecutive years., ~~wet pit mining on property controlled by the mining operator/owner shall be suspended and~~ the owner/operator shall ~~either:~~ continue annual fish specimen sampling and initiate lake condition monitoring to identify factors linked to elevated methylmercury production and/or exposure in the pond. This shall include: (1) water column profiling of temperature and dissolved oxygen (determined at ≤1 m intervals, surface to bottom) approximately every 6 weeks between mid-May and mid-November (5 events/year); (2) determination of maximum depth; (3) estimation of pond bottom area and volume affected by seasonal anoxia; and (4) characterization of water quality and bottom sediment parameters most relevant to mercury bioaccumulation (the choice of specific analyses may change as mercury biogeochemistry science continues to develop, but may include: sediment organic percentage, total mercury, methylmercury, and/or 'reactive' mercury; and aqueous suspended solids and organic carbon).

If elevated mercury levels in fish persist during this period, following two years of lake condition monitoring for factor-identification and continued fish sampling, the owner/operator shall either:

(a~~g~~) Present a revised reclamation plan to the Director~~Yolo County Community Development Agency~~ which provides for filling the reclaimed lake to a level five (5) feet above the average seasonal high groundwater level with a suitable backfill material; or

(b~~h~~) Present a mitigation plan to the Director~~Yolo County Community Development Agency~~ which provides a feasible ~~and reliable~~ method for reducing methylmercury production or exposure to elevated mercury levels. Potential mitigation could include permanent aeration of the

[1] Fish advisories are issued by the State Office of Environmental Health Hazard Assessment (OEHHA). A fish advisory issued by this agency for Cache Creek has been in place for some time. Please refer to the following state web site for more information: https://oehha.ca.gov/fish/advisories/cache-creek

	bottom levels of the lake, alteration of the water chemistry ~~(increasing pH or dissolved organic carbon levels),~~ control of anaerobic bacteria populations, or removal and replacement of affected fish populations. The mitigation plan shall be subject to review and acceptance by the County. Following finalization, the plan shall be implemented by the operator and shall be posted to the CCAP web site by the County.~~would require review by the Regional Water Quality Control Board, California Department of Fish and Game, and the Yolo County Department of Environmental Health.~~ (The removal and replacement of fish, if within the same species, is not intended to be a long-term solution, though replacement with species that alter the existing food web may be effective.) ~~The reclamation plan shall be modified such that the mitigation approved for methylmercury reduction shall be applied to all mining areas proposed for reclamation to permanent lakes within the reclamation plan.~~
Depth of Mining	
Mining Ordinance (page 11)	**Section10-4.411.1 Depth of Mining** This ordinance regulates the size of the footprint of the mining operation, and establishes no regulatory depth limit for off-channel mining. Unless an environmental analysis concludes that unacceptable environmental impacts will result, mining operations shall be encouraged to excavate the full depth of available resources at any particular mining site. In conjunction with a minimize mining footprint, this will ensure efficiency in resource extraction, help minimize impacts to agriculture by containing the area of surface disturbance of any individual mining operation, and minimize impacts of water loss associated with evaporation from reclaimed lakes.
	Section 10-4.413. Drainage. Surface water may be allowed to ~~shall be prevented from~~ enter~~ing~~ mined areas, through either perimeter berms or ditches and grading, when designed and engineered pursuant to an approved reclamation plan and where effective best management practices (BMPs) to trap sediment and prohibit contamination are included. Appropriate erosion control measures shall be incorporated into all surface water drainage systems. S~~Natural and s~~tormwater drainage systems shall be designed to connect with natural drainages so as to prevent flooding on surrounding properties and County rights-of-way. Storm water runoff from mining areas shall be conveyed to lowered areas (detention basins) to provide detention of runoff generated during a 20-year, one-hour storm event. All drainage conveyance channels or pipes (including spillways for detention areas) shall be designed to ensure positive drainage and minimize erosion. The drainage conveyance system and storm water detention areas shall be designed and maintained in accordance with Best Management Practices for the reduction of pollutants associated with runoff from mined areas. The design and maintenance procedures shall be documented in the Storm Water Pollution Prevention Plan required for mining operations. The drainage system shall be inspected annually by a Registered Civil Engineer, Registered Geologist, or Certified Erosion and Sediment Control Specialist to ensure that the drainage system is functioning effectively and that adverse erosion and sedimentation are not occurring. The annual inspection shall be documented in the Annual Mining and Reclamation Report. If the system is found to be functioning ineffectively, the operator shall promptly implement the recommendations of the engineer.
	Section10-4.420.1 Mercury Bioaccumulation in Wildlife Each mining area to be reclaimed to a permanent lake as part of each approved long-range mining plan shall be evaluated annually by the operator for five years after the pit fills with groundwater with an intensive fish mercury monitoring program described in Section 10-5.517 of the Reclamation Ordinance.

Section 10-4.429. Setbacks.

All off-channel surface mining operations shall comply with the following setbacks:

(a) New processing plants and material stockpiles shall be located a minimum of one-thousand (1,000) feet from public rights-of-way, public recreation areas, and/or off-site residences, unless alternate measures to reduce potential noise, dust, and aesthetic impacts are developed and implemented;

(b) Soil stockpiles shall be located a minimum of five-hundred (500) feet from public rights-of-way, public recreation areas, and off-site residences, unless alternate measures to reduce potential dust and aesthetic impacts are developed and implemented;

(c) Off-channel excavations shall maintain a minimum one-thousand (1,000) foot setback from public rights-of-way and adjacent property lines of off-site residences, unless a landscaped buffer is provided or site-specific characteristics reduce potential aesthetic impacts. Where landscaped buffers are proposed, the setback for off-channel excavations may be reduced to a minimum of fifty (50) feet from either the property line or the adjoining right-of-way, whichever is greater. Where mining occurs within one-thousand (1,000) feet of a public right-of-way, operators shall phase mining such that no more than fifty (50) acres of the area that lies within one-thousand (1,000) feet of the right-of-way would be actively disturbed at any time, except where operations are adequately screened from public view. Where adequate screening exists in the form of mature vegetation and/or constructed berms that effectively block public views, the area of active disturbance within one-thousand (1,000) feet of the right-of-way shall not exceed the area that is screened by more than fifty (50) acres at any one time. Actively disturbed areas are defined as those on which mining operations of any kind, or the implementation of reclamation such as grading, seeding, or installation of plant material are taking place.

(d) Off-channel excavations shall provide a minimum 50-foot setback from the neighboring property line to allow for access around the pit during mining and after reclamation for maintenance, safety, and other purposes.

(~~c~~d) Proposed off-channel excavations located within the streamway influence zone~~boundary~~ shall be set back a minimum of seven-hundred (700) feet from the existing channel bank, unless it is demonstrated that a smaller distance will not adversely affect channel stability. Under no circumstances should off-channel excavations be located within 200 feet of the existing channel bank. ~~The evaluation~~Evaluations of proposed off-channel excavations within 700 feet of the ~~potential for adverse effects of~~channel bank ~~erosion or failure of the land separating pits located less than seven-hundred (700) feet from the active channel~~ shall ~~address~~demonstrate, at a minimum, the following:

(1) The two-hundred (200) foot setback area ~~shall~~does not include portions of the ~~former historic~~historically active ~~floodplain or~~channel.

(2)The two-hundred (200) foot setback area does not include formerly mined lands separated from the active channel by levees or unmined areas less than two-hundred (200) feet wide (measured perpendicular to the active channel).

~~(2) Identification of the former historic positions of the Cache Creek channels as delineated in the CCRMP Technical Studies, and determination if the proposed project is located within the limits of the historic channel.~~

(3) ~~Description of current~~Acceptable channel hydraulic conditions (based on existing or site-specific hydraulic models) for the Cache Creek channel adjacent to the site and extending not less than one-thousand

	(1,000) feet upstream and downstream of the site. (4) ~~Determination~~Acceptable level of ~~the~~ erosion potential of the ~~stream~~channel bank adjacent to the site ~~made~~based on ~~the basis of~~predicted stream flow velocity and ~~estimated~~ shear stress on bank materials during ~~100~~a 100-year ~~flood flows~~flow and ~~historic~~historical patterns of erosion. (5) ~~Analytical~~Acceptable level of stability of the slopes separating the mining area from the creek channel based on an analytical slope stability analysis in conformance with Sections 10-4.426 and 10-5.517 of this title~~. The analysis of the slopes separating the mining area from the creek channel shall include~~ that includes evaluation of stability conditions during 100-year ~~flood~~peak flows in the channel. (6) ~~Future proposed~~Appropriate bank stabilization designs, if ~~recommended, shall not conflict~~needed, consistent with channel design recommendations of the Cache Creek Resource Management Plan ~~unless~~or approved by the Technical Advisory Committee. (7) The condition of flood protection structures and the integrity of the land within the approved setback zone separating the mining areas and the channel shall be inspected annually by a Registered Civil Engineer and reported to the Director. The annual report shall include recommendations for remedial action for identified erosion problems (see also Reclamation Ordinance Section 10-5.506) Approval of any off-channel mining project located within seven-hundred (700) feet of the existing channel bank shall be contingent upon an enforceable agreement which requires the project operator to participate in the completion of identified channel improvement projects along the frontage of their property, consistent with the CCRMP and CCIP, including implementation of the Channel Form Template. The agreement shall require that the operator provide a bond or other financial instrument for maintenance during the mining and reclamation period of any bank stabilization features required of the mining project. The agreement shall also require that a deed restriction be placed on the underlying property which requires maintenance of the streambank protection by future owners of the property. Maintenance of the bank stabilization features following completion of reclamation shall be the responsibility of the property owner. (f) Off-channel excavations shall be set back a minimum of twenty-five (25) feet from riparian vegetation; and (g) Recreational facilities shall be located a minimum of one-hundred and fifty (150) feet from private dwellings, with a landscaped buffer provided to reduce noise and maintain privacy, unless the dwelling is proposed to be an integral component of the recreational facility. (h) No mining activities shall occur within two-thousand (2,000) feet of the community boundaries of Capay, Esparto, Madison, Woodland, and/or Yolo. This setback may be reduced by up to five-hundred (500) feet when existing mature vegetation, proposed landscape buffers of a sufficient height and density to create a visual buffer (consisting of native species and fence-row habitat appropriate to the area), or other site-specific characteristics reduce potential incompatibilities between urban land uses and mining. Commercial mining shall not take place east of County Road 96.
In-Channel Material Removal Requirements	
In-Channel ~~Maintenance Mining~~ Ordinance	**Section 10-3-405. Design Guidelines.** All in-channel activities shall be consistent with and fully implement the design guidelines for channel stabilization and maintenance contained in Chapter 5.0 of the CCIP. Where feasible and appropriate, as recommended by the TAC, the Channel Form Template shall be implemented as a part of the in-channel work.
	Section 10-3.40~~9~~6. ~~Excavation~~ Limitations on Removal of

	Material. ~~(a) Where gravel bars are to be~~ removed, there ~~excavated, aggregate removal~~ shall be ~~limited to the downstream portion~~minimal disturbance of ~~the deposit and may not exceed seventy-five (75) percent of the length of the bar. At least twenty-five (25) percent of the upstream portion of the gravel bar shall be retained, in order to allow for the establishment of~~ established, mature riparian vegetation and there shall be preservation of geomorphic controls on channel gradient where they exist. Complete removal of gravel bars may be recommended by the TAC and approved by the Director only if hydraulic conditions related to the bar are recognized to threaten structures and property. (b) Aggregate material to be removed from the streambed or streambank under approved in-channel projects shall be removed~~excavated~~ as soon as is practicable after deposition, prior to the establishment of vegetation. No stockpiles shall be left within the channel after material removal~~excavation~~ has been completed. (c) The amount of aggregate removed from the channel shall be limited to the average annual amount of sand and gravel (and associated fines) deposited since the last prior year of in-channel material removal ~~during the previous year~~ as estimated by the TAC based on channel topography and bathymetry,~~morphology data~~ not to exceed 690,800 ~~(approximately 200,000~~ tons annually on average~~)~~ over a ten-year period, except where ~~bank excavation~~bank widening is necessary ~~to widen the channel~~ as a part of implementing ~~the Test 3 Run~~ the Channel Form Template, ~~Boundary,~~ or where potential erosion and flooding problems exist. The amount and location of in-channel aggregate material removal shall be carried out according to the ongoing recommendations of the TAC and any related County approvals, with the voluntary cooperation of the landowners. (d) Aggregate material removed pursuant to this ordinance may be sold (CCRMP, Section 6.1, para. 5). This material is excluded from the tonnage allocation assigned to each off-channel operator pursuant to an approved FHDP (CCRMP, Section 6.1, para. 7). (e) The volume of aggregate material removed pursuant to this ordinance shall be reported to the County on an annual and total-per-permit basis.
Change in Drainage Requirements	
Off-Channel Mining Ordinance (page 12)	**Section 10-4.413. Drainage.** Surface water may be allowed to ~~shall be prevented from~~ enter~~ing~~ mined areas, through either perimeter berms or ditches and grading, when designed and engineered pursuant to an approved reclamation plan and where effective best management practices (BMPs) to trap sediment and prohibit contamination are included. Appropriate erosion control measures shall be incorporated into all surface water drainage systems. S~~Natural and s~~tormwater drainage systems shall be designed to connect with natural drainages so as to prevent flooding on surrounding properties and County rights-of-way. Storm water runoff from mining areas shall be conveyed to lowered areas (detention basins) to provide detention of runoff generated during a 20-year, one-hour storm event. All drainage conveyance channels or pipes (including spillways for detention areas) shall be designed to ensure positive drainage and minimize erosion. The drainage conveyance system and storm water detention areas shall be designed and maintained in accordance with Best Management Practices for the reduction of pollutants associated with runoff from mined areas. The design and maintenance procedures shall be documented in the Storm Water Pollution Prevention Plan required for mining operations. The drainage system shall be inspected annually by a Registered Civil Engineer, Registered Geologist, or Certified

	Erosion and Sediment Control Specialist to ensure that the drainage system is functioning effectively and that adverse erosion and sedimentation are not occurring. The annual inspection shall be documented in the Annual Mining and Reclamation Report. If the system is found to be functioning ineffectively, the operator shall promptly implement the recommendations of the engineer.
	Section 10-4.416. Flood protection. All off-channel surface mining operations shall be provided with a minimum one-hundred (100) year flood protection. Off-channel excavations shall be designed to minimize the potential for~~possibility of~~ levee breaching and/or pit capture. In addition, excavations shall be designed to prevent ~~Flood protection shall be provided from flooding associated with~~ overtopping of channel banks~~the alluvial separators~~ or levees along Cache Creek and all tributaries and drainage channels (including, but not limited to, Willow Slough and Lamb Valley Slough). The flood protection upgrades shall be designed and constructed to provide the necessary 100-year protection without creating a net increase of in upstream or downstream flooding elevations. Upstream flooding could be increased if additional levee construction serves to confine flows to a narrow width, thereby increasing the water surface elevation. Downstream flooding could be increased if floodplain storage areas were removed from the drainage system by constructing levees in areas where they did not exist before (or raising levees that are overtopped in floods up to the 100-year event). Where feasible, a~~A~~lternative or non-structural flood management designs ~~systems~~ (potentially using detention basins, infiltration galleries, and/or floodplain storage in noncritical areas) shall be incorporated~~required as a condition of project approval~~. New development (such as buildings, levees, or dikes) located within the floodplain shall conform to all applicable requirements of the Yolo County Flood Protection Ordinance~~,~~ and the Federal Emergency Management Agency (FEMA)~~, and the State Reclamation Board~~.
	Section 10-4.502. Applications: Contents. Except as provided for in Section 10-4.503 of this article, all documentation for the surface mining permit shall be submitted to the Director at one time. Ten (10) complete paper copies of the application, and one electronic version, shall be provided to the County. An executive summary and a table of contents shall be submitted with each application. Applications for proposed surface mining permit shall include, but shall not be limited to, the following: (3) The methods to be used for on-site and off-site surface water drainage and erosion control during surface mining operations, including provisions for ensuring flood protection of the site for the one-hundred (100) year event;
Water Quality	
CCRMP	**4.3 Objectives** 4.3-1 Support ~~Provide~~ flood management objectives as required to protect the public health and safety. ~~4.3-2~~ Recommend actions to create~~Determine an appropriate flood capacity standard for Cache Creek, so that the extent of~~ a more stable channel configuration and flood flow conveyance capacity consistent with regional flood management programs~~may be designed~~. 4.3-3 Support regional efforts to protect against~~Ensure no measurable increase in~~ downstream flood impacts on communities such as Yolo and Woodland.
	CCRMP Vision At the same time, implementation of the CCRMP has resulted in more natural channel forming processes that have deposited gravel bars and eroded the channel bed and banks in certain areas as Cache Creek adjusts to a rising bottom elevation. Implementation of the Test 3 Run Boundary since 1996 has

mostly occurred passively as sediment deposited in the CCRMP area has not been extracted. Significant regrading of the streambed to create a series of terraces and low-flow channel as well as creek bed hardening at bridges, both envisioned under the Test 3 Run Boundary, have not been implemented. However, the net deposition of sand and gravel in the CCRMP area has allowed Cache Creek to operate more like a natural river system. Going forward, findings from the evaluation of channel change since 1996, coupled with the new hydraulic modeling tool developed for the CCRMP area, will guide targeted channel improvements that further reduce channel bottlenecks, minimize erosion, and support riparian restoration.

There wereare ~~several actions that need to be taken in order~~intended to assist Cache Creek in attaining a more stable condition that were inherent in adoption of the CCRMP. One of the most important measures wasis ~~to significantly reduce the amount of aggregate removed from within the channel. In-stream~~ extractions allowed under the CCRMP ~~mining should~~ cannot exceed the average annual replenishment of sand and gravel (including associated fines) since the last prior year of removal, excluding implementation of channel reshaping pursuant to the Channel Form Template described below.~~, and, in fact, should be far less than that amount in most years in order to allow the creek to aggrade and reduce the amount of scour.~~ Since 1996, extractions have been far less than annual replenishment, and approximately 10.4 million tons of sand and gravel have aggraded in the CCRMP area. At the same time, the CCRMP haswould resulted in the reshaping of portions of Cache Creek according to the conceptual design provided in the Test 3 Run Boundary~~ (see Figure 4)~~. The Test 3 Run Boundary~~This proposal requires~~ envisioned regrading the streambed to create a series of terraces and low-flow channel. These actions ~~will~~ stabilize the channel and allow it to operate more like a natural system. In addition, selected banks and levees maywill be excavated to provide gentle transitions into and out of the channel bottlenecks created by the bridge structures. In some areas, jetties maywill be constructed to encourage expansion of the banks, through sediment deposition and/or the encouragement of riparian vegetation. The overall goal of the Test 3 Run Boundary wasis to smooth the abrupt width and slope changes that occur along Cache Creek.

Since adoption of the CCRMP in 1996, the County's ability to implement the Test 3 Run Boundary has been limited to those requests by private property owners to undertake projects in or adjacent to Cache Creek for which a FHDP has been required.

For off-channel mining applications implementation of the Test 3 Run Boundary was been linked to Section 10-4.429(d) of the Mining Ordinance which requires that off-channel excavations be set-back a minimum of 700 feet from the channel bank, unless an engineering analysis can demonstrate that measures incorporated into the project can ensure that a lesser setback will provide similar protection against channel destabilization. The minimum setback under the code is 200 feet from the existing channel bank. Where a setback of less than 700 feet has been allowed, the County has required the applicant to also implement the Test 3 Run Boundary along the creek frontage of their operation.

The Test 3 Run Boundary was intended to be a dynamic tool for management of the active creek boundary, that would be updated and modified as appropriate based on data collected in the field and modeling conducted pursuant to the program. As the program has been administered over time,

the County has allowed for "technical corrections" of the boundary to reflect site-specific conditions and engineering. As a part of the 2017 Technical Studies the Test 3 Run Boundary was evaluated based on 2011 creek topography, over 20 years of recent monitoring data, and the results of new two-dimensional hydraulic modeling of Cache Creek. The result was an update to the Test 3 Run Boundary called the Channel Form Template (see Figure 4). The Channel Form Template replaces the Test 3 Run Boundary, and provides similar guidance for smoothing abrupt channel width transitions.

Supplementing ~~these efforts~~ The CCRMP also envisioned~~would be~~ the provision of a regular flow of surface water in Cache Creek through much of the year. While this has not yet been accomplished as of the 2017~~6~~ plan update, this remains a goal of the plan to be achieved if feasible. This ~~would~~ could create a more stable low-flow channel that would ~~reinforce the regrading~~support the goals of the Channel Form Template~~performed in the Test 3 Run~~. In addition, increased surface flows would accelerate recovery of native vegetation and benefit native species of wildlife, invertebrates, and fish. Continued engagement with the YCFCWCD will be undertaken to determine the options for increasing surface flows, especially in warmer times of the year.

Although commercial in-stream mining would be precluded, sand and gravel removal would not be prohibited altogether. Cache Creek will continue to be a managed system in order to protect agricultural land, off-channel mining operations, and nearby communities from the effects of floods and erosion. Under the CCIP, the County ~~would~~ takes a strong role in providing this management, based on the recommendations of the TAC. ~~a Technical Advisory Committee~~. ~~To reflect this shift in priorities, changes will be required in the operating concepts that currently regulate mining within Cache Creek. As discussed earlier, both the theoretical thalweg and the present in-channel boundary do not accurately represent existing channel conditions and it is recommended that they be replaced by new standards based on concepts provided in the Technical Studies.~~

Future in-channel modifications ~~will be limited to the 100-year floodplain and~~ must consider~~take not only~~ the elevation and slope of the streambed, as well as ~~into account, but the slope of the streambed and the ratio of~~ the width to depth ratio of the channel. In-channel work will continue to generally be guided by specific channel slope standards and typical design cross-section~~s profiles that have been~~ developed for ~~each reach of~~ the creek. Since one of the primary goals of the CCRMP is to allow aggradation of the streambed, channel reshaping activities will preserve the upstream and downstream ~~remain six feet above the~~ existing thalweg elevation, unless local channel stability, desired habitat creation, or ~~maintenance of the existing 100-year~~ flood flow capacity requires otherwise. In addition, off-channel mining must~~will have~~ continue to consider the potential for the streambank to move, either through erosion related to the rising bottom elevation of Cache Creek or as a result of channel reshaping according to the Channel Form Template~~Test 3 Run Boundary~~ or as a result of maintenance extraction of gravel.

~~Maintenance of the creek will have a number of goals, several of which are competing and will require careful management. Retaining 100-year flood capacity will be a high priority. Flood insurance policy is changing, as the federal government expects local communities to take a more pro-active role in preventing flood damage from occurring. As a part of this effort, the regional flooding problem associated with Cache Creek must be resolved. A~~

	~~coordinated approach involving the County, the Yolo County Flood Control and Water Conservation District, the City of Woodland, the U.S. Army Crops of Engineers, and local property owners is vital in this regard. One jurisdiction cannot divert its floods to the next jurisdiction and consider the problem solved. Each group must be willing to shoulder its share of the burden so that all may benefit.~~ Although flood flow conveyance capacity ~~control~~ is important, ~~the County is not interested in converting Cache Creek into a concrete-lined drainage. Management M~~management of the Creek has to consider other values as well. Conditions must be created to allow native riparian vegetation to ~~flourish~~reestablish, as long as it does not adversely affect streamflow. Growth along the banks is especially encouraged, both for erosion control and to ~~contain~~ direct the highest flow velocities ~~within~~ towards the center of the creek. Streambank transitions and scour reduction measures should continue to be implemented to protect structures along Cache Creek, especially bridges, which represent a major public investment. Groundwater management is also ~~a concern~~extremely important as compliance with the Sustainable Groundwater Management Act (SGMA) proceeds.~~, and~~ ~~t~~The CCRMP encourages coordination with YCFCWCD~~the Flood Control District~~ to enhance groundwater recharge, where possible, in order to ~~provide more~~ increase water supply reliability for both urban and agricultural users in the County. ~~Implementing these programs will require extensive monitoring and factual~~ analysis. The County will ~~take advantage of the data already available, however new resources of information will need to be developed. These may include re-installation of the stream gauge at Capay, surface water quality testing, riparian vegetation surveys, and aerial photography~~continue to leverage the data collected through annual creek inspections described in Chapter 6 of the CCIP, the ongoing water quality monitoring program, and periodic updates to the CCAP. The 2017 Technical Studies resulted in an organized database that should be maintained and added to in the future to guide continued adaptive management. ~~This~~ The information in this database is~~would be~~ reviewed by ~~a~~the TAC. ~~Technical Advisory Committee~~ The TAC is tasked with making recommendations to the County on the types and extent of maintenance activities necessary to maintain and enhance the diverse resources associated with Cache Creek~~make Cache Creek more healthy and productive~~. As a part of this monitoring, the CCRMP is required to ~~would~~ be updated a minimum of every ten years. This ~~would~~ allows the County regular opportunities to review the success and/or failure of past efforts and to set new goals that reflect changing environmental conditions and social priorities. The first update occurred in 2002 and the second in 2017.
Reclamation Ordinance	**Section 10-5.532. Use of overburden and fine sediments in reclamation.** Sediment fines associated with processed in-channel aggregate deposits (excavated as a result of maintenance activities performed in compliance with the CCIP) ~~shall not~~may be used in the backfill or reclamation of off-channel permanent lakes where it can be demonstrated that no detrimental sediment toxicity exists (including unacceptable levels of mercury), and where fines will not reduce the porosity of the permanent lake in an adverse way. Fines that result from the processing of in-channel sand and gravel shall not be used for in-channel reshaping or habitat restoration efforts or as soil amendments in agricultural fields. Overburden and processing fines shall be used whenever possible to support reclamation activities around reclaimed wet pits. These materials

	may be used in reclamation activities without testing for agricultural chemicals. If topsoil (A-horizon soil), formerly in agricultural production, is proposed for use within the drainage area of a wet pit, the soils must be sampled prior to placement and analyzed for pesticides and herbicides (EPA 8140 and 8150). Samples shall be collected and analyzed in accordance with EPA Test Methods for Evaluating Solid Waste Physical/Chemical Methods, SW-846, Third Edition (as updated). Topsoil that contains pesticides or herbicides above the Maximum Contaminant Levels for primary drinking water (California Code of Regulations) shall not be placed in areas that drain to the wet pits. Land reclaimed to a subsequent use that includes planting of vegetation (e.g., agriculture, habitat) shall be provided an adequate soil profile (i.e., depth and texture of soil) to ensure successful reclamation. Proposed soil profiles associated with specific proposed reclamations plans shall be subject to expert review and evaluation during the CEQA process for that project. If the project is not subject to additional CEQA review, at the discretion of the County, the proposed reclamation plan for the project may be peer reviewed by an appropriate expert/professional, and recommendations, if any, shall be incorporated into the project as conditions of approval.
Other Regulations Relevant to Water Quality	
In-Channel ~~Maintenance Mining~~ Ordinance	**Section 10-3.40~~7~~8. Hazards and Hazardous Materials**. (a) All heavy equipment used for channel improvement projects shall be kept in good working order to reduce emissions and preclude the leakage of oils, fuels, and other substances that may adversely affect property, the environment, or human health and safety. Fueling and maintenance activities shall not occur within one-hundred (100) feet of the Channel Form Template boundary or active channel, whichever is wider. All procedures for handling, storage, and disposal of hazardous materials shall be described in a Storm Water Pollution Prevention Plan if required for the projects. Any long-term project (e.g., extensive erosion control, gravel removal) shall have a chemical spill prevention and emergency plan filed and approved by the appropriate local agency. The plan must include training of the equipment operator and workers in spill reporting and how to minimize environmental damage. (b) Firms or individuals performing work within the channel shall immediately notify the Director and/or the Yolo County Office of Emergency Services of any events such as fires, explosions, spills, land or slope failures, or other conditions at the site which could pose a risk to property, the environment, or human health and safety outside the permitted area. Upon request by any County agency, the firm or individual shall provide a written report of any such event, within thirty (30) days, which shall include, but not be limited to, a description of the facts of the event, the corrective measures used, and the steps taken to prevent a recurrence of the incident. This condition does not supersede nor replace any requirement of any other government agency for reporting incidents. (c) A Hazardous Materials~~copy of the approved Business Emergency Response~~ Plan~~s~~ and the ~~approved~~ Spill Prevention ~~Control and~~ Countermeasure Contingency Plan~~s~~, if required, shall be filed with the Yolo County Environmental Health ~~Department~~Division, prior to the commencement of work within the channel. (d) Wastewater from in-channel projects shall not be directly discharged to Cache Creek. Measures such as berms, silt fences, sediment ponds, hay bales, and/or revegetation shall be used to control erosion. Agricultural tailwater shall be diverted to catchment basins prior to release to the creek. (e) Sediment fines generated by ~~aggregate~~ processing of in-channel sand and gravel shall not be used for agricultural soil enhancement or creek~~stream~~ revegetation projects. In-channel sediment fines shall only~~not~~ be used as

	backfill material in off-channel habitat restoration if it can be demonstrated that sediment quality is acceptable based on applicable regulations and standards.~~, due to potential high mercury content.~~ (f) All internal combustion engine driven equipment and vehicles shall be kept tuned according to the manufacturer's specifications and properly maintained to minimize the leakage of oils and fuels. No vehicles or equipment shall be left idling for a period of longer than ten (10) minutes. (g) For bank repair projects using fill, appropriate leaching tests on fill materials shall be conducted to determine if it contains leachable constituents at concentrations of potential concern. If potential fill material is found to contain constituents at levels exceeding applicable thresholds, that fill materials shall not be used.