

**YOLO COUNTY  
CACHE CREEK AREA PLAN  
POLICY DOCUMENTS**

***OFF-CHANNEL MINING PLAN  
CACHE CREEK RESOURCES MANAGEMENT PLAN  
CACHE CREEK IMPROVEMENT PROGRAM***

**UPDATED FINAL**  
**OFF-CHANNEL MINING PLAN (OCMP)**  
**for LOWER CACHE CREEK**

**Yolo County**

***Updated December 17, 2019***  
***Adopted July 30, 1996***

**UPDATED FINAL**  
**OFF-CHANNEL MINING PLAN**  
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**Clarifications to Updated Final OCMP (2019)**

On August 5, 2021, the following minor modifications were made to the document:

1 - A footnote was inserted on pages 10, 13, and 27 that clarifies the total acreage that was rezoned to SGR-O as a result of the 2019 CCAP Update (Ordinance No. 681.234).

2 - Figure 5 (pg. 14) was updated to reflect the associated rezoning.

3 - The parenthetical of OCMP Action 2.4-2 (pg. 29) was updated to reflect the County code sections where the requirement is found.

***Updated December 17, 2019 (Board Resolution 19-176)***  
***Adopted July 30, 1996 (Board Resolution 96-117)***

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## **CHAPTER 1.0 – INTRODUCTION**

Pursuant to local requirements, the Off-Channel Mining Plan (OCMP) was comprehensively reviewed and updated in 2017. New hydraulic and topographic modeling was conducted along Cache Creek using HEC-RAS v5.0 and topographic data collected in 2011. Biological resources within the program area were comprehensively assessed. Over twenty years of data collected as a part of the program were analyzed for patterns and trends. This information was reported in an update to the 1995 Technical Studies entitled 2017 Technical Studies, which provided information in support of proposed updates, clarifications, and modifications to the program documents.

### **1.1 HISTORY AND BACKGROUND**

Cache Creek has long served as a regional source for aggregate. Mining within the creek dates back to the early 1900's, when sand and gravel were removed and shipped by rail to be used in the reconstruction of San Francisco after the devastating 1906 earthquake. Many of the early excavations were small and scattered along a wide expanse, meeting both local needs as well as large public projects, such as the Golden Gate Bridge. With the post-World War II economic boom in the 1950's, however, the scale and intensity of mining began to increase. The building of airports, schools, hospitals, highways, dams, and residential suburbs created a strong need for concrete and other construction materials. The production of sand and gravel in Cache Creek has continued to escalate over the past several decades, responding to the robust growth of both California and the Sacramento metropolitan region.

#### **Aggregate Resources Advisory Committee**

Yolo County has been actively involved in studying and attempting to resolve surface mining issues along Cache Creek for over two decades. Concerns over the environmental impacts of in-stream mining led to the formation by the Board of Supervisors of the Aggregate Resources Advisory Committee (ARAC) in 1975. The ARAC commissioned Woodward-Clyde Consultants to prepare a report, analyzing the potential relationships between adverse environmental conditions and the aggregate excavations operating along Cache Creek. The study was released in 1977, and made several suggestions regarding future management of the creek, including: require use permits for all mines operating at the time; establish a maximum depth of excavation; encourage the development of off-channel mining; allow for the channel to be widened in appropriate areas; emphasize erosion control measures; and improve monitoring. It was recommended that these issues be evaluated in the context of County adopted aggregate resources management policies.

In response to the recommendations made by the ARAC, and as required by the State Surface Mining and Reclamation Act (SMARA) enacted in 1976, the Board of Supervisors adopted in-channel mining and reclamation ordinances. The ordinances, adopted in 1979, required all surface mining operations to apply for use permits and reclamation plans. This was accomplished the following year, with the approval of eight permits/reclamation plans and certification of an

Environmental Impact Report (EIR) (prepared by Environ) which analyzed the impacts of mining along the creek. The EIR concurred with the ARAC's recommendation for the development of a broad-based aggregate resource management program. In addition, Environ made several other suggestions, including: allow for the development of off-channel mining; protect mineral resources against encroachment; permit mining within the A-P (Agricultural Preserve) Zone; consider reclaimed uses other than agriculture in the A-P Zone, such as groundwater storage and/or recharge; revise the interim ordinances; and gather more data about the creek.

### **Aggregate Technical Advisory Committee**

The Aggregate Technical Advisory Committee (AgTAC) was formed by the Board of Supervisors in 1979 to develop a Resource Management Plan (RMP) for the Cache Creek area. A draft RMP was submitted in 1984, containing eleven alternative scenarios for the future of the creek. The recommended plan outlined the creation of an engineered floodway to ensure that there would be sufficient capacity to safely accommodate 100-year flood events. In-stream mining would be minimized to maintenance levels, while aggregate mining would take place in deep, off-channel pits. Improvements and maintenance of the creek were to be managed by a separate public or private agency. Finally, AgTAC reiterated support for revising the mining and reclamation ordinances, as well as a review of the compatibility of the A-P Zone requirements with off-channel mining.

A draft Program Environmental Impact Report was prepared by Dames and Moore in 1989, examining the alternatives discussed in the draft AgTAC plan. Before any recommendations could be adopted; however, the draft EIR was subjected to significant controversy regarding the adequacy of its analysis. As a result, the document was abandoned by the County in 1991. Over the next two years, a series of public workshops were held by the County in order to develop a specific project description to form the basis of a Resource Management Plan. This effort was later taken up by a subcommittee of the Board of Supervisors, who made their findings in March of 1994.

### **Cache Creek Area Plan**

The Cache Creek Area Plan (CCAP) is comprised of the Off-Channel Mining Plan (OCMP) and Cache Creek Resources Management Plan (CCRMP). The OCMP is a scientifically based aggregate resource management plan that allowed for off-channel mining adjacent to Cache Creek. It facilitated the development of a sufficient supply of aggregate to meet current and future market needs, while greatly increasing the level of environmental protection and monitoring. It provided a planning area boundary, and restricted mining to certain areas within that boundary for a 50-year period. It identifies specific goals, objectives, and actions to guide mining activities that go well beyond the state-mandated requirements of the State Mining and Reclamation Act (SMARA). The OCMP was adopted on July 30, 1996 (Board Resolution 96-117), and underwent a comprehensive update in 2017.



The CCRMP is a scientifically based river management plan that eliminated in-channel commercial mining, established an "improvement program" for implementing on-going projects to improve channel stability, encouraged restoration along the creek banks pursuant to a carefully developed policy and regulatory framework, and established a framework for future recreation along the Creek. The CCRMP was adopted August 20, 1996 (Board Resolution 96-132), underwent a focused update that was adopted on July 23, 2002 (Board Resolution 02-130), and a comprehensive update in 2017. An historic overview of the development of the two plans is provided below.

In June 1994, the Board of Supervisors adopted a conceptual framework of goals and objectives for the OCMP and CCRMP<sup>1</sup>. A work schedule was also approved by the Board, describing four primary tasks: (1) adoption of a resource management plan to protect and restore the creek; (2) adoption of an off-channel mining plan and implementing ordinances; (3) processing of long-term off-channel mining and reclamation applications; and (4) processing of temporary off-channel mining and reclamation applications to allow operations to continue while the necessary plans are being developed.

In addition to adopting the conceptual framework, the Board also directed the preparation of the "*Technical Studies and Recommendations for the Lower Cache Creek Resource Management Plan*" (1995 Technical Studies). The 1995 Technical Studies provide baseline and historical information about the streamway fluvial morphology, groundwater resources, and riparian habitat, so that an accurate assessment could be made of the creek's condition and appropriate management strategies. Constraints and opportunities for activities such as mining, flood control, channel stabilization, groundwater management, and habitat restoration were also identified in the report. The 1995 Technical Studies include an extensive list of recommendations on improving the natural resources of Cache Creek. On October 24, 1995, the Board of Supervisors accepted the 1995 Technical Studies and directed staff to utilize them as the basis for preparing both the OCMP and the CCRMP.

Throughout 1995 and the first half of 1996, the CCRMP, Cache Creek Improvement Program (CCIP), OCMP, and various implementing ordinances were drafted. Program EIRs were prepared and certified for both plans and accompanying ordinances. The entire program was adopted the Board of Supervisors in 1996, and subsequently placed by the Board before the voters on the November 1996 ballot against an opposing citizen's initiative. Over 60 percent of the voters supported the CCAP and that same proportion voted against the citizen's initiative. Moreover, the CCAP carried in every supervisorial district. Implementation of the plan began in earnest in 1997.

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<sup>1</sup> The Yolo County Cache Creek Resources Management Plan (CCRMP) was adopted August 20, 1996, with an update on July 23, 2002. In 2002, the BLM released a draft of their Cache Creek Coordinated Resource Management Plan (CCCRMP). The BLM CCCRMP was adopted December 14, 2004. Though similarly named these plans are completely independent.

The entire CCAP program (sometimes referred to as the “gravel program”) is now administered through the following local regulations:

- CCRMP implemented by the CCIP (Appendix A) and In-Channel Ordinance (Appendix B and County Code Title 10, Chapter 3)
- OCMP implemented by the Off-Channel Surface Mining Ordinance (County Code, Title 10, Chapter 4) and the Surface Mining Reclamation Ordinance (County Code, Title 10, Chapter 5)
- Other important ordinances include (but are not limited to):
  - Gravel Mining Fee Ordinance (County Code, Title 10, Chapter 11)
  - Sand and Gravel Combining Zone County Code, Title 8, Chapter 2, Article 23.1)
  - Sand and Gravel Reserve Combining Zone (County Code, Title 8, Chapter 2, Article 23.8)
  - Development Agreements Ordinance (County Code, Title 8, Chapter 5)
  - Flood Protection Ordinance (County Code Title 8, Chapter 4)

## **1.2 PLANNING AREA**

Over time, California's supply of aggregate has become increasingly limited. The highways and roads, universities, public transit systems, dams, and homes that have been built throughout the state have generated a strong demand for construction materials over the past several decades. At the same time, however, increasing urbanization in other areas of the state has also threatened the continued extraction of sand and gravel. In some instances, neighborhoods, industries, and parks have been built over valuable mineral deposits. More frequently, urban development has moved closer to existing mine sites, forcing them to shut down or curtail their operations due to the nuisances and environmental impacts associated with the resulting land use conflicts.

SMARA includes provisions to encourage the production and conservation of minerals to ensure that a sufficient supply will be available for the state's future growth. In order to assist local jurisdictions in the identification of significant aggregate resources near urbanizing areas, the State Geologist is assigned the responsibility of classifying the extent and quality of mineral deposits within metropolitan regions around the state. As a part of this program, the State Department of Conservation (DOC) issued Special Report (SR) 156, "Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Sacramento-Fairfield Production-Consumption Region" in 1988. Included within this report is an analysis of the sand and gravel resources located along Cache Creek.

An updated report was released in June 2019 (Special Report 245, Mineral Land Classification: Concrete Aggregate in the Greater Sacramento Area Production Consumption Region, 2018). SR 245 consolidates and redefines the regional consumption area. The report provides a revised estimate of remaining available aggregate along Cache Creek that does not appear to factor in

the conclusions of the 2017 Technical Studies related to in-channel aggradation or aggregate extraction off-channel since the 1988 report. For these reasons no changes to County estimates of available aggregate resources have been made in response to this report as County estimates are believed to be more accurate.

The planning area for the OCMP is defined as the area contained within the Mineral Resource Zones (MRZs) delineated by the DOC as potentially containing mineral aggregate resources, minus the planning area for the CCRMP. The planning area for the CCRMP is equal to the active in-channel area of the creek system, as defined by the delineated channel bank line or the regulatory 100-year flood elevation, whichever is wider, modified as described in the CCRMP. The planning area for the CCRMP encompasses approximately 2,266 acres. Subtracting this area from the 28,130 acres included in the State MRZs (see following section), leaves a total of approximately 25,864 acres within the planning area of the OCMP. The area permitted for excavation as of 2017 totals 1,900 acres<sup>2</sup> of the total. Since the mineral resource zones classified in Special Report 156 form the basis for planning area of the OCMP, it is important to describe how these boundaries were developed, and the extent of the aggregate resources that they contain.

### **Mineral Resource Classification**

The aggregate deposits within the Sacramento-Fairfield region were formed through the deposition of large volumes of sand, gravels, and cobbles from mountain streams. As these streams enter the flat Sacramento Valley from the adjoining mountain ranges, the abrupt change in slope causes the heavy aggregate to fall out and form alluvial fan deposits. The extent of these deposits was determined using a wide range of information, including geologic maps, engineering test results, aerial photos, data from the mining industry, interviews, well and drilling records, and field investigations. From this information, the areas along Cache Creek were divided by the DOC into one of four Mineral Resource Zones. These zones are used by the State to define areas containing valuable deposits. Once all Mineral Resource Zones have been identified, then the local jurisdiction must take each of the mineral resource zones into account when making land use decisions, including the discouragement of uses that would inhibit harvesting, and consideration of the importance of the mineral to the market region as a whole. The guidelines for establishing these MRZs are as follows:

**MRZ-1:** Areas where adequate information indicates that no significant mineral deposits are present, or where it is judged that little likelihood exists for their presence. This zone is applied where, based upon economic principles and geologic data, it is determined that the likelihood for the occurrence of significant mineral deposits is slight or nonexistent.

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<sup>2</sup> CEMEX - 586 acres; Granite Capay - 312 acres; Granite Esparto - 313 acres; Syar - 248 acres; Teichert Esparto - 148 acres; Teichert Woodland - 252 acres; Teichert Schwarzgruber - 41 acres.

**MRZ-2:** Areas where adequate information indicates that significant mineral deposits are present, or where it is determined that a high likelihood for their presence exists. In addition, there are two economic requirements that must be met if land is to be classified as MRZ-2: (1) the deposit must be composed of material that is suitable as a marketable commodity; and (2) the deposit must meet a threshold value (gross selling price) equal to at least \$5,000,000 (1978 dollars).

**MRZ-3:** Areas containing mineral deposits, the significance of which cannot be evaluated from available data.

**MRZ-4:** Areas where available information is inadequate for assignment to any other Mineral Resource Zone.

Mineral Resource Zone acreage within the OCMP plan area is as follows: the MRZ-1 is 1,458 acres; the MRZ-2 is 18,452 acres; and the MRZ-3 is 8,220 acres.

The aggregate resources along Cache Creek contain large concentrations of a high-grade sand and gravel called "Portland Cement Concrete" or PCC. Much of this material has not been identified as PCC-grade through formal engineering tests. Where MRZ-2 mineral resources have not been tested, they are believed to be of PCC quality because the materials are of a similar age and composition, and were deposited under similar geologic conditions as those aggregates which have been proved to be of PCC-grade. The use of extrapolation was done only when the unproven deposit extended from a formation where PCC-grade aggregate has been produced.

### **The Greater Sacramento Production-Consumption Region**

Aggregate is a low-value, high-bulk commodity. The relatively inexpensive cost of production, combined with the heavy weight and bulk of the material, means that transportation represents a major component in the price charged for sand and gravel. The shipping costs of aggregate can account for as much as 50 percent of the price of the delivered product. Because transportation costs are critical in determining the price of sand and gravel, the economic feasibility of developing deposits is evaluated on a regional basis.

The CCAP area was previously included within the former Sacramento-Fairfield Production-Consumption (P-C) Region, which encompassed portions of El Dorado, Placer, Sacramento, Solano, and Yolo Counties; the greater Sacramento metropolitan area; the Cities of Fairfield, Vacaville, Davis, and Woodland; and the Cache Creek aggregate resource area. SR 254 has consolidated six former P-C regions, including the CCAP, into one large market region identified as the Greater Sacramento Area (GSA) P-C Region (see Figure 1). The CCAP area is identified as one of only two net producers of aggregate within that region, with the Yuba/Marysville area identified as the other.

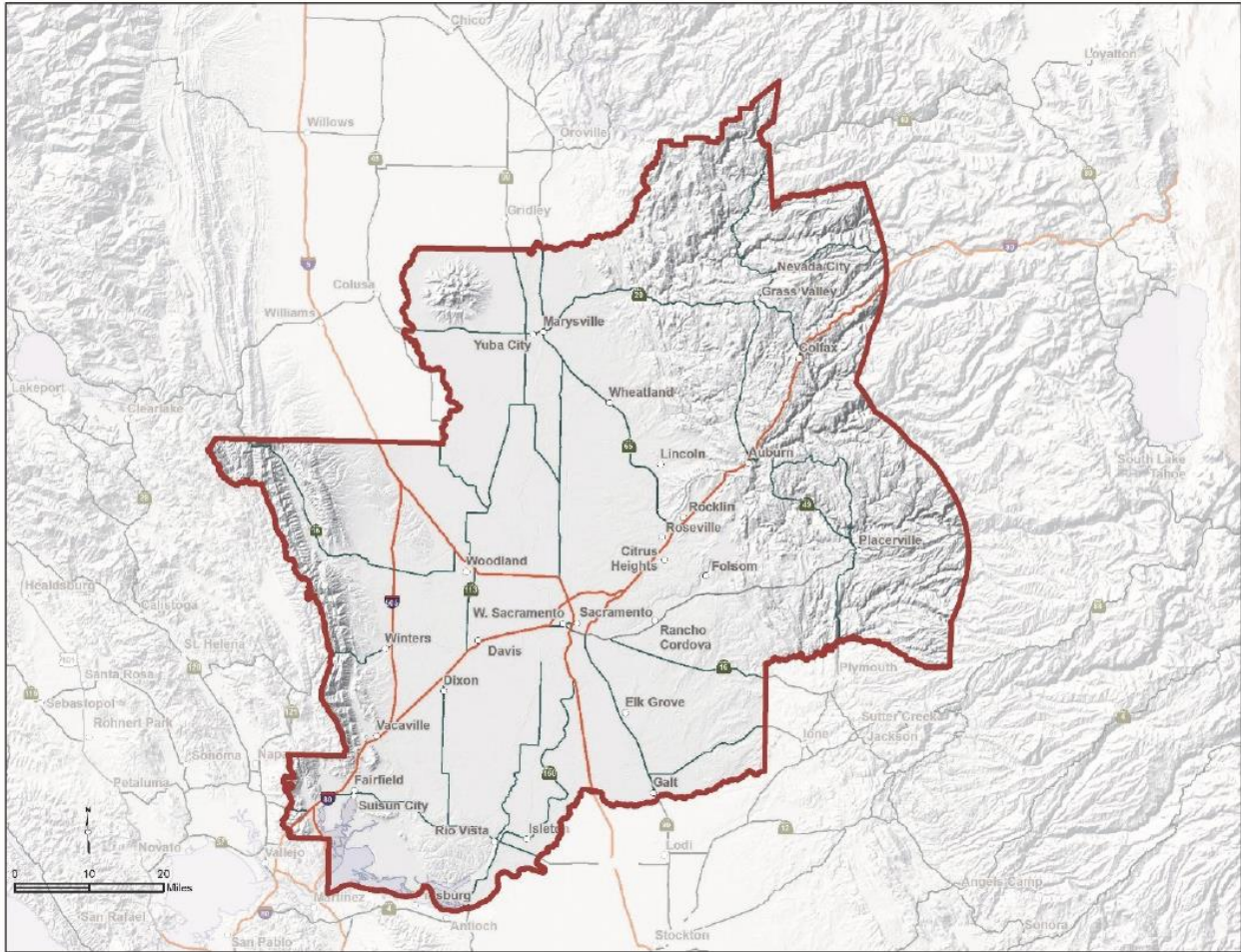
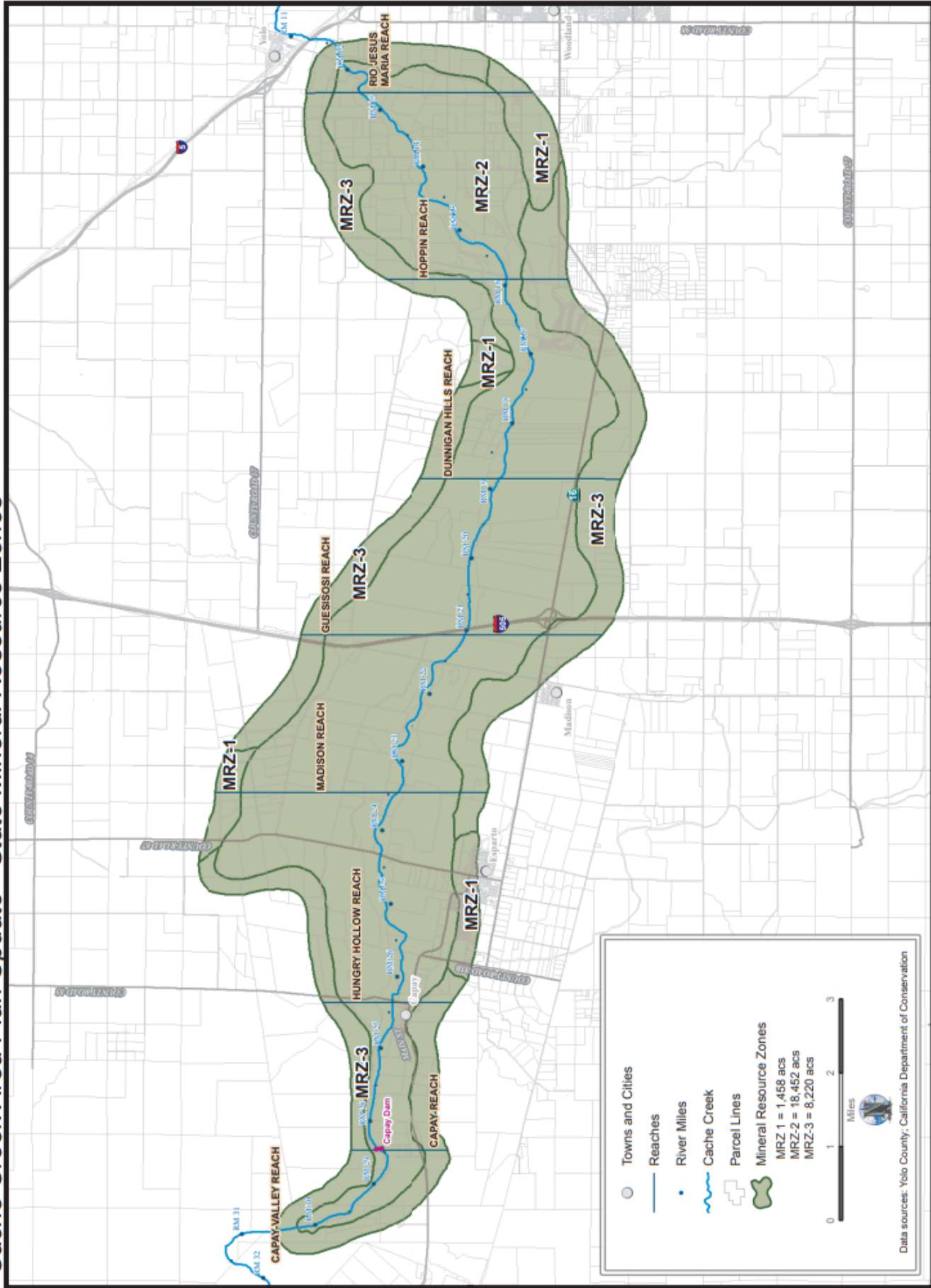


Figure 1. Boundary of Greater Sacramento Area P-C Region (SR 245, October 2018)

### Estimated Cache Creek Aggregate Resources

The 1988 classification study provided an estimate of the amount of sand and gravel deposited along Cache Creek. This estimate was based on information collected in 1982, which focused on the MRZ-2 area. The 2019 classification study does not appear to reflect off-channel and in-channel tonnage information known to the County and therefore, the following estimates may differ from the estimates provided in the 2019 DOC report. The Yolo County MRZ-2 area extends along Cache Creek from upstream of the Capay Dam to the town of Yolo (see Figure 2). For the purposes of the classification study, this area was divided into four sectors and sixteen subsectors, in order to make the ensuing calculations easier to manage and more accurate. The Mineral Resource Zone was further defined by excluding setbacks from roads, canals, pipelines, etc. The resulting MRZ-2 area encompasses approximately 18,452 acres (a little under 29 square miles).

# Cache Creek Area Plan Update - State Mineral Resource Zones



May 10, 2017

Figure 2

In 1996, when the OCMP was adopted, approximately 918 million tons of PCC aggregate reserves were remaining in the Cache Creek mineral resource zone. Since approval of the OCMP, approximately 176 million tons<sup>3</sup> have been authorized for extraction in seven approved mining permits leaving approximately 742 million tons in reserves. Although portions of this 742 million tons may not be economical to mine at the present time, markets and technologies change. SMARA encourages the protection of these deposits to ensure their future availability.

### **Alternative Sources of Aggregate**

Based on the DOC analysis of aggregate reserves in the region, which was last conducted in the 1980's, other sources of aggregate resources include the American River and Morrison Creek. These reserves were considerably smaller than the Cache Creek reserves (less than half) and have been mined subsequent to the last DOC special report. An estimate of current remaining reserves outside of Cache Creek at the time of this update are not known; however, DOC staff have started an update of the 1980's research.

There are other sources of aggregate that have not been tested or evaluated by the DOC and their utility has not been established. These other sources of aggregate material include:

1. Dredger tailings found east of Yuba City and Marysville.
2. Alluvium underlying Mather Air Force Base in Sacramento.
3. Sand and gravel beneath downtown and southern Sacramento.
4. Alluvial deposits and tailings found within and surrounding Folsom.
5. Future in-channel deposits.

The Yuba City/Marysville area is located 40 miles north of Woodland. As discussed earlier, transportation costs account for much of the price of sand and gravel. In this region, hauling the product such a distance results in a significant increase in cost, that makes this source economically infeasible for local use. The Mather Air Force Base, South Sacramento, and Folsom sources are located within areas that are already urbanized or are expected to develop in the near future. The Folsom Dam has restricted the amount of aggregate that reaches the American River, and mining within the American River Parkway is restricted to existing operations. In-channel deposits, therefore, within the Parkway are not expected to provide a significant amount of aggregates in the future. As discussed in the CCRMP, commercial mining within Cache Creek is prohibited, and marketable aggregate that is derived from excavation performed for channel stability purposes will not be sufficient to meet regional needs.

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<sup>3</sup> CEMEX - 32.17 million tons; Granite Capay - 32.26 million tons; Granite Esparto - 30.00 million tons; Syar - 33.30 million tons; Teichert Esparto - 25.88 million tons; Teichert Woodland - 17.88 million tons; Teichert Schwarzgruber - 4.65 million tons.



As an alternative to sand and gravel, it is possible to take hard rock and crush it to PCC-grade specifications. Suitable deposits of rock may be found in two places within the P-C region: (1) a wide band in the foothills extending from Folsom to Placerville, east of Sacramento; and (2) smaller pockets located in the hills to the north and west of Fairfield. It should be noted; however, that the additional expenses involved in crushing rock prevent it from being economically competitive with PCC-grade alluvial deposits at this time. Furthermore, none of the alternative sources mentioned above are located within Yolo County.

### **Planning Area for OCMP and CCRMP**

The planning area for the OCMP is defined as the area contained within the Mineral Resource Zones (28,130 acres), minus the planning area regulated under the CCRMP (2,266 acres), for a total of 25,864 acres (see Figure 3). 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 SG-O), 1,001 acres are zoned currently to allow for future mining (Sand and Gravel Reserve Overlay or SGR-O), and another 1,188 acres are proposed to be rezoned for future mining, as described below.<sup>4</sup>

The planning area for the CCRMP is equal to the active in-channel area of the creek system, as defined by the delineated channel bank line or the 100-year flood elevation, whichever is wider, was modified as described in the CCRMP. The in-channel area encompasses 5,109 acres, including 2,266 acres within the CCRMP boundary, plus several thousand acres located in the floodplain north of the City of Woodland (see Figure 4).

### **Off-Channel Mining and Future Regional Aggregate Demand**

The State Mining and Geology Board requires that classification reports include an estimate of the quantity of aggregate needed to supply the production consumption region over the next fifty years. In order to obtain this estimate of total future demand at the time the OCMP was being written, the State Geologist calculated an average consumption of 10.2 tons/person/year of aggregate within the region for the years 1960-1980. Approximately forty percent of the total aggregate during this time period was used in projects requiring PCC-grade materials. The per capita consumption rate was identified as higher than normal at the time, but was typical for metropolitan regions with low population density and extensive urban development. It was noted that the per-capita consumption rate could change significantly in the future, either decreasing as urban area infrastructure systems mature and stabilize, or increasing in times of disaster reconstruction and economic growth.

More recently, based on records spanning 1980 to 2010, the DOC calculated per-capital consumption of aggregate in California at about 5.7 tons per person per year or about 44 percent

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<sup>4</sup> In December 2019, in conjunction with approval of the CCAP Update, the County rezoned an additional 788 acres to add the SGR-O, bringing the total SGR-O acreage to 1,789. This is explained in footnotes added to Figure 5.



# Cache Creek Area Plan Update - Off-Channel Mining Plan Planning Area

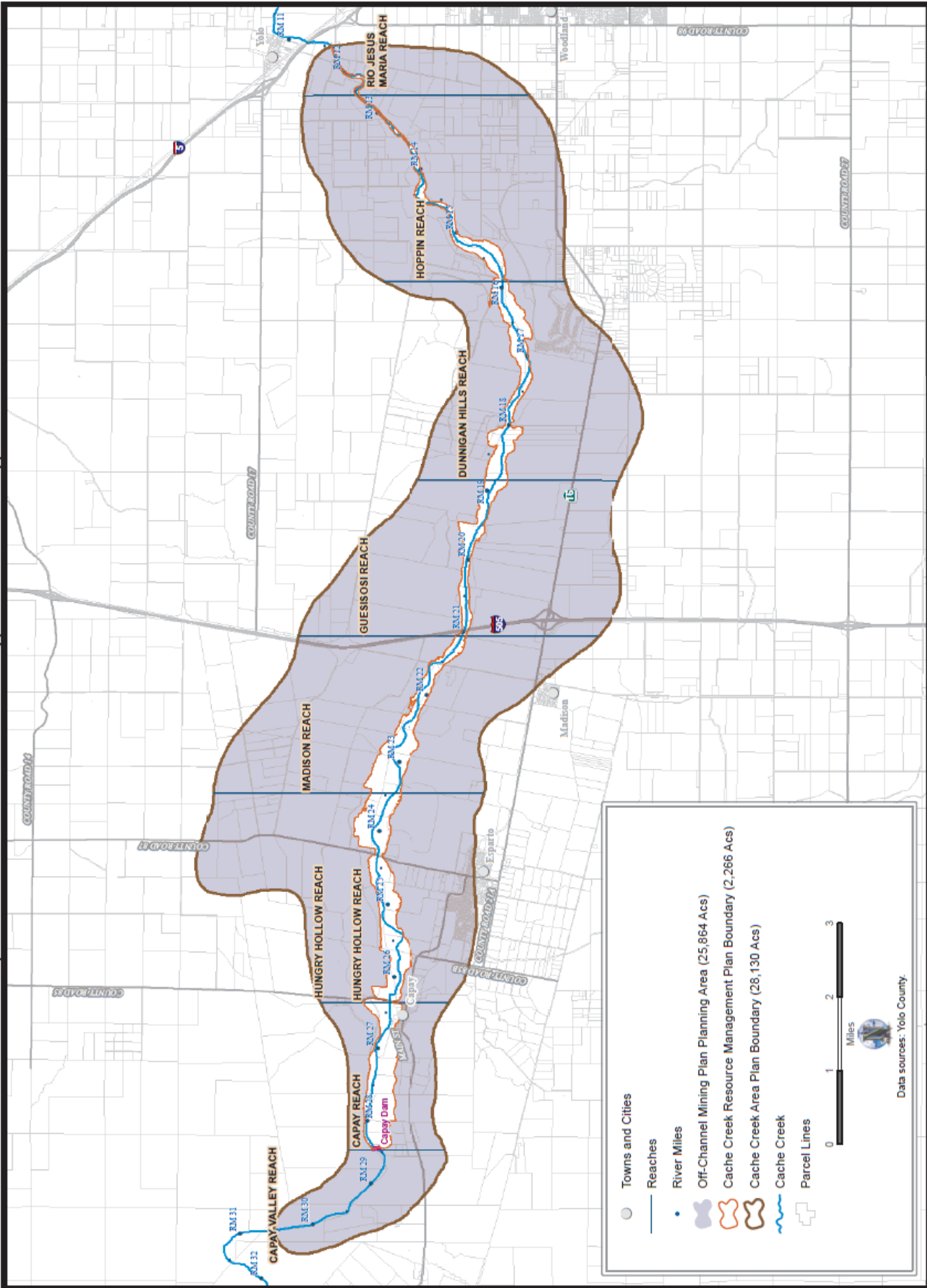


Figure 3

May 10, 2017

# Cache Creek Area Plan Update - In-Channel Boundary

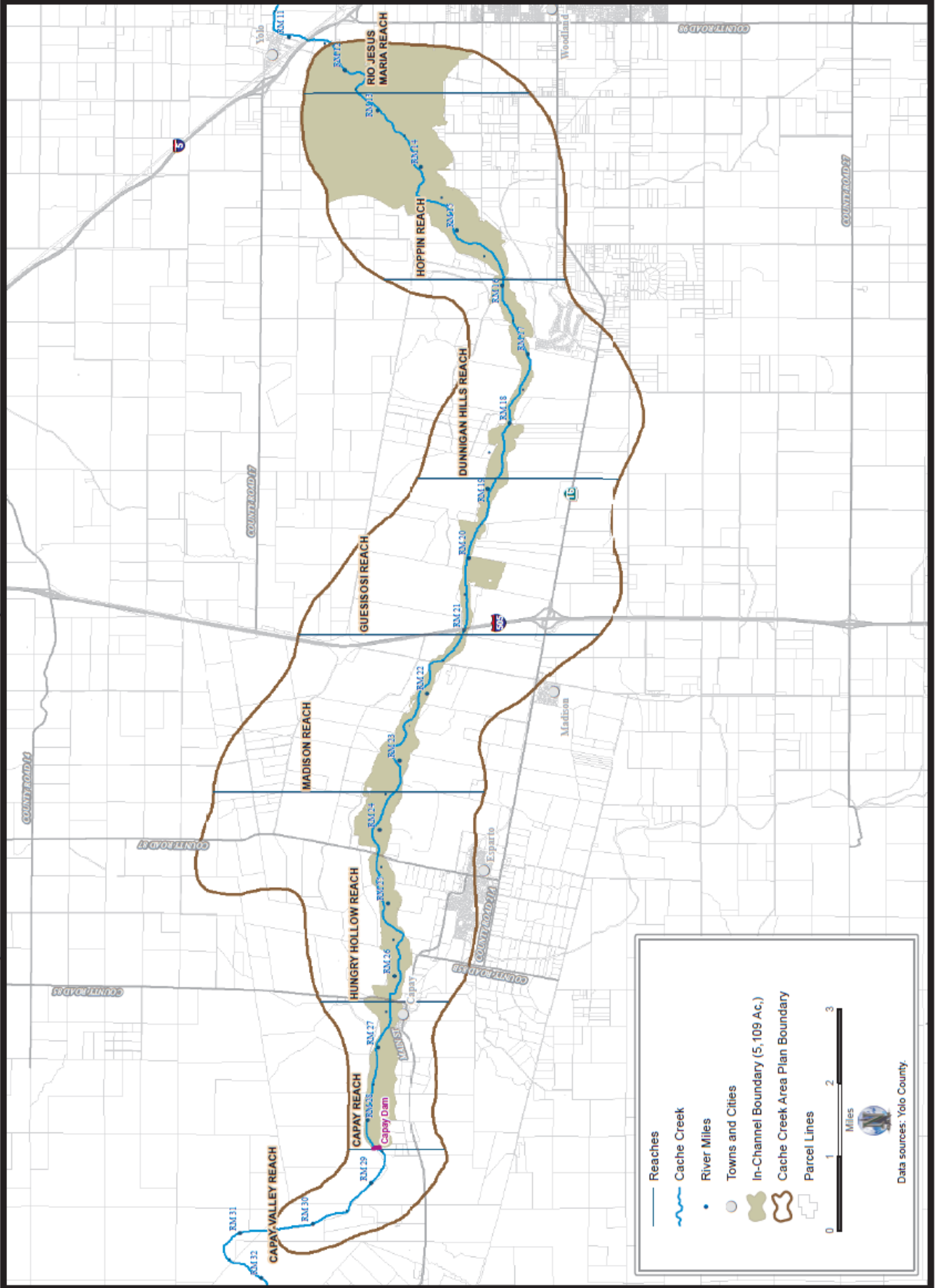


Figure 4

May 10, 2017

less than the assumptions described above. However, even with this greater efficiency, based on the current and projected population in the Sacramento-Fairfield Production-Consumption region of which Yolo County is a part, the state estimated in 2012 that permitted aggregate in the region would be exhausted within 11 to 20 years.<sup>5</sup>

In the most recent classification study (SR 256, 2019) the State estimated average annual per capita consumption at 7.6 tons and estimated more than fifty years of resources based on the expanded Greater Sacramento Area P-C Region and more recently permitted reserves.

Using population forecasts obtained from the California Department of Finance, which assumed an average 1.25 percent annual growth and the per capita consumption the State Geologist was able to estimate that total aggregate demand between 1983 and 2033 would total 888.6 million tons, of which 40 percent (355.2 million tons) would need to be PCC-grade quality.

The OCMP was approved based on a fifty-year horizon, from 1997-2046. By extrapolating the population projections contained in the State's classification study and assuming that aggregate production from Cache Creek remains steady at approximately 26 percent of the total regional production, it was estimated that 308 million tons mined (271 million tons sold) of aggregate would be required over the fifty-year horizon. Based on the above calculations, it was determined that about 173 million tons mined (152 million tons sold) would be required to meet aggregate demand through 2028. To meet estimated demand production over this period would have to average approximately 5.8 million tons mined (5.1 million tons sold) per year.

Since approval of the OCMP in 1996, the County has approved seven mining permits allowing for removal of a total of 176 million tons of material on 1,900 acres (2,464 total acres for combined mining operations). Unless extended, one of these permits will expire in 2027, four in 2028, one in 2029, and one in 2041. Approved mining areas are designated Sand and Gravel Overlay (SG-O) on the County Zoning Map. Future planned but not approved mining is zoned Sand and Gravel Reserve Overlay (SGR-O). There are currently 1,001 acres designated in this category.<sup>6</sup> In addition, some areas of additional likely mining have been identified on another 1,188 acres through work done for the draft Yolo Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP). Figure 5 identifies those areas where mining is approved or reasonably foreseeable over the next 50 years.

### **Horizon Year**

The horizon year for this plan is 2068. Similar to the use of this term in other long-range planning efforts, this reflects how far into the future the plan guidance extends. It also defines the period for consideration of cumulative effects for purposes of environmental impact analysis.

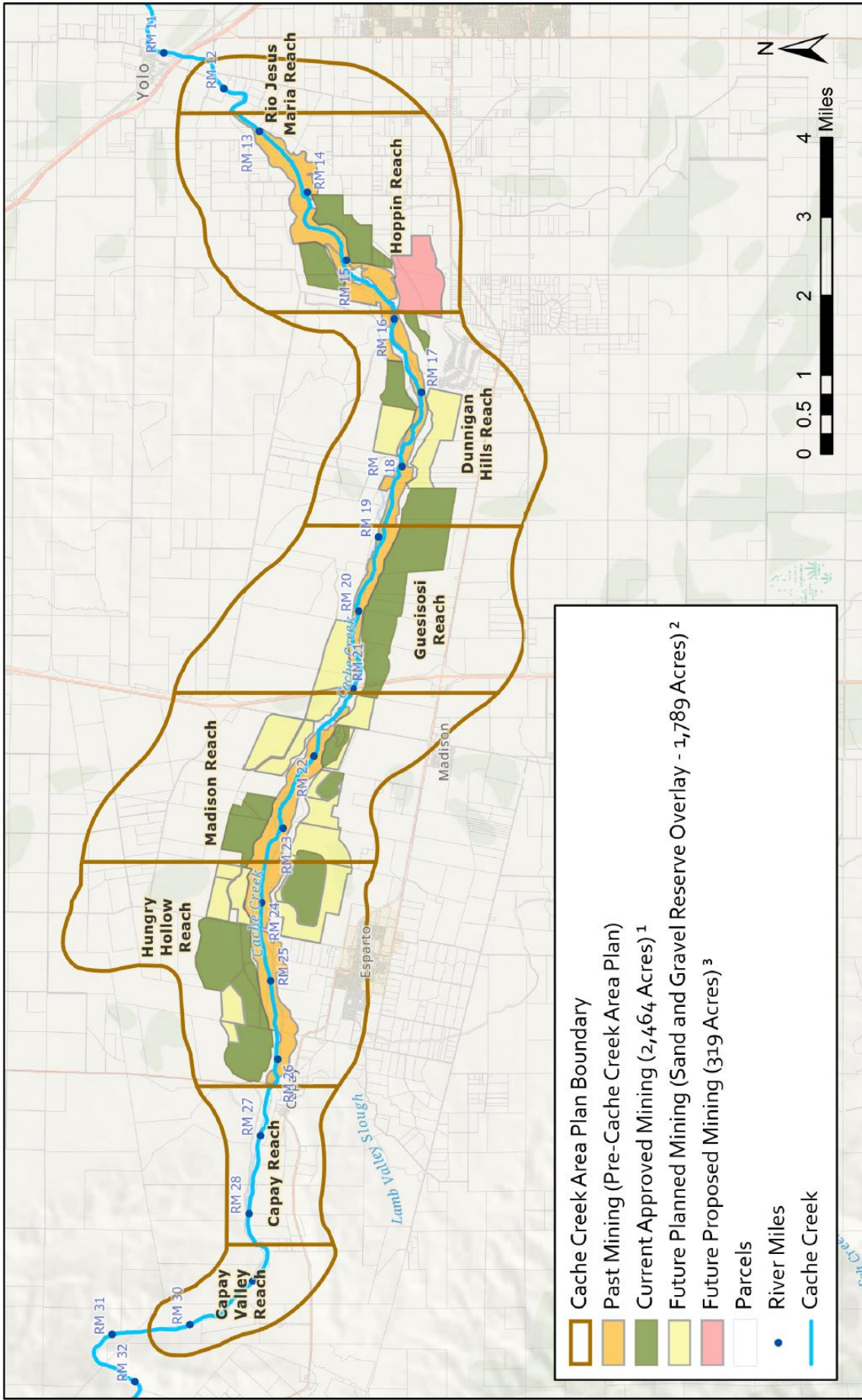
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<sup>5</sup> Aggregate Sustainability in California, 2012, California Geological Survey, Department of Conservation

<sup>6</sup> In December 2019, in conjunction with approval of the CCAP Update, the County rezoned an additional 788 acres to add the SGR-O, bringing the total SGR-O acreage to 1,789. This is explained in footnotes added to Figure 5.

# Cache Creek Area Plan - Past, Current, and Future Mining

9/17/2020



<sup>1</sup> Due to minor inaccuracies in the database and polygon boundaries, this total may be overstated by +/- 5 acres.  
<sup>2</sup> Prior to adoption of the CCAP Update in December 2019, total SGR0 zoned acreage was 1,001 acres. With adoption of the CCAP Update, the SGR0 was added to an additional 788 acres, for a total of 1,789 acres.  
<sup>3</sup> This reflects the actual proposed mining acreage in the Teichert Shifter application. An additional +/- 81 acres assumed for rezoning as a part of the CCAP Update represented portions of the Shifter property not ultimately included in the Teichert Shifter application.  
 Folder: I:\GIS\Projects\Natural Resources\Large Scale Cache Creek Maps

OCMP Figure 5

### **1.3 RELATIONSHIP TO OTHER REGULATIONS AND PLANS**

#### **The Surface Mining and Reclamation Act**

Yolo County's regulatory efforts are complemented and directed by the California Surface Mining and Reclamation Act (SMARA), which was enacted in 1976. The act created a regulatory framework for the mining industry, requiring all new excavations to obtain approval of a reclamation plan describing the methods to be employed in ensuring that the site could be beneficially used once operations had been completed. Since adoption, substantial amendments have been added to address problems not covered in the original legislation. Lead agencies are required to annually inspect each mine located within their jurisdiction to monitor permit compliance. Each operator is required to put up financial assurances, as a guarantee that money will be available to properly reclaim the property should the mining company abandon the site. In addition, the State Mining and Geology Board has adopted standards, in order to ensure that reclamation work is consistently implemented. The requirements of SMARA must be followed by all lead agencies as a minimum; however, the County may adopt stricter measures where it deems appropriate.

One of the primary problems that SMARA was designed to address concerned the loss of regionally significant aggregate deposits to land uses, such as urban growth, that would preclude mining. Included within SMARA is a requirement for the State Geologist to map areas of the state subject to urban expansion, in order to determine the presence or absence of significant mineral resources. This information is transmitted to the lead agency, so that policies can be incorporated into local General Plans to protect identified significant mineral deposits from inappropriate uses, so that they may be harvested in the future.

As discussed earlier, the DOC released Special Report 156 in 1988<sup>7</sup>, which classified the sand and gravel deposits along Cache Creek as being significant mineral resources. The DOC released Special Report 245 in 2019<sup>6</sup>, which updated some information in the 1988 report. Section 2762(a) of SMARA requires that the lead agency (Yolo County) incorporate mineral resource management policies into its general plan within twelve months after receiving a mineral land classification report prepared by the State Geologist. These policies must accomplish the following:

1. Acknowledge the information provided by the State Geologist regarding the extent of mineral resources within the jurisdiction.
2. Coordinate the management of land uses within and surrounding areas of statewide and regional significance to restrict the encroachment of incompatible uses.

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<sup>7</sup> Special Report 156, Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Sacramento-Fairfield Production-Consumption Region, 1988, California Department of Conservation, Division of Mines and Geology.

<sup>6</sup> Special Report 245, Mineral Land Classification: Concrete Aggregate in the Greater Sacramento Area Production Consumption Region, 2018, California Department of Conservation, California Geological Survey.

3. Emphasize the conservation and development of identified mineral deposits.

In addition, Section 3676 of the State Mining and Geology Board Reclamation Regulations requires that mineral resource management policies incorporate, but not be limited to, the following:

1. A summary of the information provided by the classification study, including, or incorporated by reference, maps of the identified mineral deposits as provided by the State Geologist; and a discussion of state policy as it pertains to mineral resources.
2. Statements of policy as required in Section 2762(a) of SMARA.
3. Implementation measures that:
  - a. Discuss the location of identified mineral deposits and distinguish within those areas between resources which are designated for conservation and those which may be permitted for future extraction.
  - b. Provide appropriate maps to clearly define the extent of identified mineral deposits, including those resources designated for conservation and those which may be permitted for future extraction.
  - c. Include at least one of the following:
    - i. Adopt appropriate zoning that identifies the presence of identified mineral deposits and restricts the encroachment of incompatible land uses in those resource areas that are to be conserved.
    - ii. Require that a notice describing the presence of identified mineral deposits be recorded on property titles within the affected area.
    - iii. Impose conditions of approval upon incompatible land uses in and around areas which contain identified mineral deposits, in order to mitigate any significant land use conflicts.

Section 2774 of SMARA requires that every lead agency adopt ordinances that establish procedures for the review and approval of reclamation plans, financial assurances, and surface mining permits. Regulations must be periodically reviewed and revised, as necessary to ensure that they remain in accordance with State policy. The ordinances implementing the OCMP have been updated to reflect the update of the OCMP, as well as the new relevant requirements mandated in recent SMARA amendments.

Prior to adoption of the updated OCMP, State Mining and Geology Board review and comment is required under Section 2762(c) of SMARA. Any future proposed amendments to the OCMP



and its policies must also be sent to the Mining and Geology Board for review and comment, prior to their adoption. Similarly, Section 2774.3 of SMARA requires the off-channel surface mining and reclamation ordinances be reviewed by the State Mining and Geology Board, and certified as being in accordance with State policy if it meets or exceeds the requirements of SMARA and the Reclamation Regulations.

The update of the OCMP was prepared in accordance with Sections 2761 through 2764 of Division 2, Chapter 9, of the Public Resources Code (SMARA). The updates are also in conformance with Article 9, Sections 3675 through 3676 of Division 2, Chapter 9, of the Code of Regulations (the Reclamation Regulations of the State Mining and Geology Board).

### **The Yolo County General Plan**

The County of Yolo 2030 Countywide General Plan includes goals, policies and actions that guide Yolo County in ensuring continued productivity and conservation of the County's mineral reserves.

Goal CO-3: Mineral Resources. Protect mineral and natural gas resources to allow for their continued use in the economy.

Policy CO-3.1: Encourage the production and conservation of mineral resources, balanced by the consideration of important social values, including recreation, water, wildlife, agriculture, aesthetics, flood control, and other environmental factors.

Policy CO-3.2: Ensure that mineral extraction and reclamation operations are compatible with land uses both on-site and within the surrounding area, and are performed in a manner that does not adversely affect the environment.

Action CO-A37: Designate and zone lands containing identified mineral deposits to protect them from the encroachment of incompatible land uses so that aggregate resources remain available for the future. (Policy CO-3.1)

Action CO-A39: Encourage the responsible development of aggregate deposits along Cache Creek as significant both to the economy of Yolo County and the region. (Policy CO-3.1)

Action CO-A40: Encourage recycling of aggregate materials and products. (Policy CO-3.1)

Action CO-A41: Regularly review regulations to ensure that they support an economically viable and competitive local aggregate industry. (Policy CO-3.1)

Action CO-A42: Implement the Cache Creek Area Plan to ensure the carefully managed use and conservation of sand and gravel resources, riparian habitat, ground and surface water, and recreational opportunities. (Policy CO-3.1)

Action CO-A43: Monitor updates to the State Mineral Resource classification map and incorporate any needed revisions to the County's zoning and land use map. (Policy CO-3.1)

Action CO-A44: Coordinate individual surface mining reclamation plans so that the development of an expanded riparian corridor along Cache Creek may be achieved. (Policy CO-3.1)

Action CO-A46: Maintain standards and procedures for regulating surface mining and reclamation operations so that potential hazards and adverse environmental effects are reduced or eliminated. (Policy CO-3.1, Policy CO-3.2)

Action CO-A47: Ensure that mined areas are reclaimed to a usable condition that is readily adaptable for alternative land uses, such as agriculture, wildlife habitat, recreation, and groundwater management facilities. (Policy CO-3.1)

Action CO-A48: Regularly update surface mining and reclamation standards to incorporate changes to State requirements, environment conditions, and County priorities. (Policy CO-3.1)

Action CO-A54: Implement the Cache Creek Area Plan. (Policy CO-3.2)

The OCMP has been evaluated and determined to be consistent with the various goals and policies of the County General Plan. The OCMP, together with the CCRMP, constitute the Cache Creek Area Plan (CCAP), which provides the policy framework for implementing this program to manage the wide variety of resources associated with the creek, including habitat, water resources, aggregate, agriculture, and recreation. The County's off-channel surface mining ordinance, reclamation ordinance, and in-channel maintenance ordinance all implement the policy framework. These ordinances include specific performance standards that ensure that the goals and objectives spelled out in the OCMP and CCRMP are achieved. Provisions are also made in the CCRMP for an on-going Technical Advisory Committee (TAC) charged with monitoring and studying Cache Creek as it responds to the programs carried out within the plans and ordinances. The Committee makes recommendations, as appropriate, to ensure that management is responsive to the dynamic nature of the creek. Although each plan was prepared as a stand-alone document, they were adopted as two co-equal parts of the CCAP and have been implemented in concert with one another since adoption.

### **Cache Creek Area Plan**

An "area plan" is a focused planning policy document that is part of a general plan. The OCMP meets all the requirements of State land use law to function as an area plan for the MRZ planning area defined herein. It addresses all of the elements specified in Section 65302 of the California Code of Regulations, to the extent that the subject of the element exists in the planning area. As allowed by State law, the degree of specificity and level of detail of the discussion of each such element reflects local conditions and circumstances. A brief summary of how the General Plan requirements are satisfied is provided below.



### *Planning Area*

By taking in the entire Mineral Resource Zone area as designated by the State, the OCMP addresses all land and resources which bear a relationship to mineral resource planning along Cache Creek.

### *Time Horizon*

The Plan contains projections of conditions over a 30- and 50-year horizon, and provides for accommodating those conditions over the long term.

### *Diagrams and Implementation Programs*

The Plan contains appropriate diagrams and specific discussion regarding implementation.

### *Consistency*

The Plan has been examined for consistency, and found to be both internal consistent and consistent with appropriate federal and State policies and regulations.

### *Land Use Element Issues*

The Plan contains data, analysis, policies, and programs related to the density, intensity, location, and distribution of mineral resources and aggregate production in the planning area. The Plan clearly specifies where mineral resource extraction is allowed, the circumstances under which it is allowed, how it shall be extracted, and the maximum intensity with which it can be extracted.

It examines the distribution of open space and agricultural land both before and after mining. The availability of mineral resources is assessed. It also addresses recreational facilities and opportunities as a result of mining reclamation.

Other typical Land Use Element issues such as educational facilities, public buildings and grounds, solid and liquid waste facilities, and areas subject to flooding are addressed only in the context of having relevance to the mining of off-channel terrace deposits.

Consistency with the Airport Land Use Plan has been addressed in the environmental analysis, and found not to be an issue.

### *Circulation Element Issues*

The Plan identifies the location and extent of major thoroughfares, transportation routes, and other local public utilities and facilities in the planning area. Haul routes and trip generation as related to maximum projected aggregate production is examined, and participation is required in a program to maintain levels of service and safety.

### *Housing Element Issues*

The Plan identifies nearby housing for purposes of assessing the potential for impact from mining activities. It indirectly addresses new construction needs by ensuring the provision of aggregate resources sufficient to meet future demands. It discusses in detail existing and planned regulation of the production of aggregate, which has relevance in terms of creation or removal of constraints to the production of housing. Opportunities for energy conservation are addressed in relation to increased transportation costs for imported aggregate under scenarios of increased or decreased regulation (supply).

### *Conservation Element Issues*

The Plan addresses conservation, development, and utilization of natural resources in the Cache Creek MRZ, including the creek and its hydraulic forces, soils within the planning area, tributaries and other waters that affect the planning area, biological resources, and mineral resources.

### *Open Space Element Issues*

The Plan includes identification of areas required for the preservation of plant and animal life, including sensitive habitat. The areas of proposed mining and other components of the Streamway Influence Zone are identified as requiring on-going monitoring and study. A detailed program for stabilizing and restoring Cache Creek is included as an adjunct to the OCMP (please refer to the CCRMP). Land within the CCRMP boundary has been designated as Open Space (OS) in the County General Plan.

The managed production of mineral resources under the OCMP is a focus of the Plan. General opportunities for recharge of the groundwater basin are identified.

Scenic resources and cultural resources have been identified in the planning area and policies and programs for preservation or mitigation are included in the Plan. Future recreation nodes that would provide access to areas targeted for future open space and passive recreation are identified. Buffers between mining and the creek, and between various activities associated with mining are required.

### *Noise Element Issues*

Existing noise sources and noise associated with mining activities have been identified and are regulated in the Plan. Methods for noise control and attenuation are provided.

### *Safety Element Issues*

The effects of seismically induced surface rupture, ground shaking, ground failure, and dam failure are addressed. Policies and specific regulations to address these concerns are provided.

Slope instability issues, general geologic hazards, and flooding are given extensive treatment as related to appropriate controls during mining and after reclamation.

### *Other*

Coastal issues and timber harvesting issues are not relevant to the OCMP planning area, and have not been addressed in the Plan.

### **Yolo County Mining and Reclamation Ordinances**

Commercial in-stream surface mining ended with the adoption of the OCMP and CCRMP in 1996 and the subsequent relinquishment of vested in-stream rights by all operators along Cache Creek. On June 24, 2008, the County Board of Supervisors adopted the In-Channel Ordinance (Yolo County Code Title 10, Chapter 3) to regulate in-stream extraction activities that implement the bank stabilization, channel maintenance, and habitat restoration necessary to carry out the CCRMP and CCIP.

Chapter 4 of Title 10 of the Yolo County Code is the County's Off Channel Mining Ordinance. This ordinance regulates aggregate mining that is allowed to be conducted along Cache Creek in the off-channel area pursuant to SMARA and the requirements of the CCAP.

Chapter 5 of Title 10 is the County's Surface Mining Reclamation ordinance. This ordinance regulates reclamation of mining pursuant to SMARA and the requirements of the CCAP.

### **The Cache Creek Resources Management Plan**

The OCMP is a companion plan to the Cache Creek Resources Management Plan (CCRMP), which is a river management plan that governs land use activities and environmental restoration within the present channel banks and 100-year floodplain. The two plans, which together comprise the CCAP adopted as a part of the County General Plan, recognize that in-channel and off-channel environments are different and require unique approaches that address their varying needs. At the same time, however, the County also recognizes that Cache Creek and its surrounding areas form an integrated system, and that activities which occur in one area affect the other. The Streamway Influence Zone (see Figure 6) described originally in the recommendation of the 1995 Technical Studies and reaffirmed in 2017 shows the approximate area subject to these interrelationships, based on the historical extent of meander migration. Thus, although the planning areas for the two plans are mutually exclusive, both plans include integrated goals and policies that maximize the positive interrelationships between in-channel and off-channel concerns.

## **1.4 REQUIRED APPROVALS**

### **Certification of the Program EIR**

Section 15168 of the Guidelines for the California Environmental Quality Act (CEQA) provides for the preparation of a Program EIR. A Program EIR may serve as an environmental document for a series of individual projects that are located within the same geographical area, or are sequentially related, or have similar environmental effects. There are several advantages to a Program EIR. It provides a more thorough consideration of potential environmental impacts, especially cumulative effects, and encourages a broader discussion of project alternatives. Program EIRs also reduce redundancies in the environmental review process, as well as allow for greater County flexibility in dealing with policy issues.

Subsequent projects approved pursuant to a Program EIR still require additional environmental documents. However, Program EIRs allow subsequent environmental documents to focus on issues unique to the site that were not specifically addressed in the Program EIR. This allows decision makers and interested parties to concentrate on the primary concerns associated with a particular project, without revisiting other issues on which there is general agreement. Although they help to streamline the process, Program EIRs and any subsequent focused project-level EIRs do not restrict public participation. They still require circulation of the documents and a comment period, notification of interested parties, and public hearings.

A Program EIR was certified for the OCMP in 1996. The County requires the preparation of focused project-level EIRs for each long-term, off-channel surface mining permit and reclamation plan application submitted for sites located within the planning area.

### **Adoption of the Off-Channel Mining Plan**

Both the OCMP and the companion CCRMP are intended to be evolutionary documents that adjust and change in response to new creek conditions. Adoption of the OCMP in 1996 allowed the County to begin taking the first steps in managing the resources along Cache Creek; however, the plan was not seen as a static vision of what the ultimate disposition of the creek would be in the future. Rather, it was expected that the OCMP would undergo periodic review and updating, as additional data is gathered through monitoring and the success of habitat restoration projects and channel stabilization are known. The OCMP is required to be updated every ten years to respond to new regulatory requirements. This will allow sufficient time for trends to become evident, yet still be early enough to change any policies that are having an unexpectedly adverse effect on resource management before significant harm is done. Amendments to the OCMP are to be appropriately processed under CEQA.

# Cache Creek Area Plan Update - Streamway Influence Zone

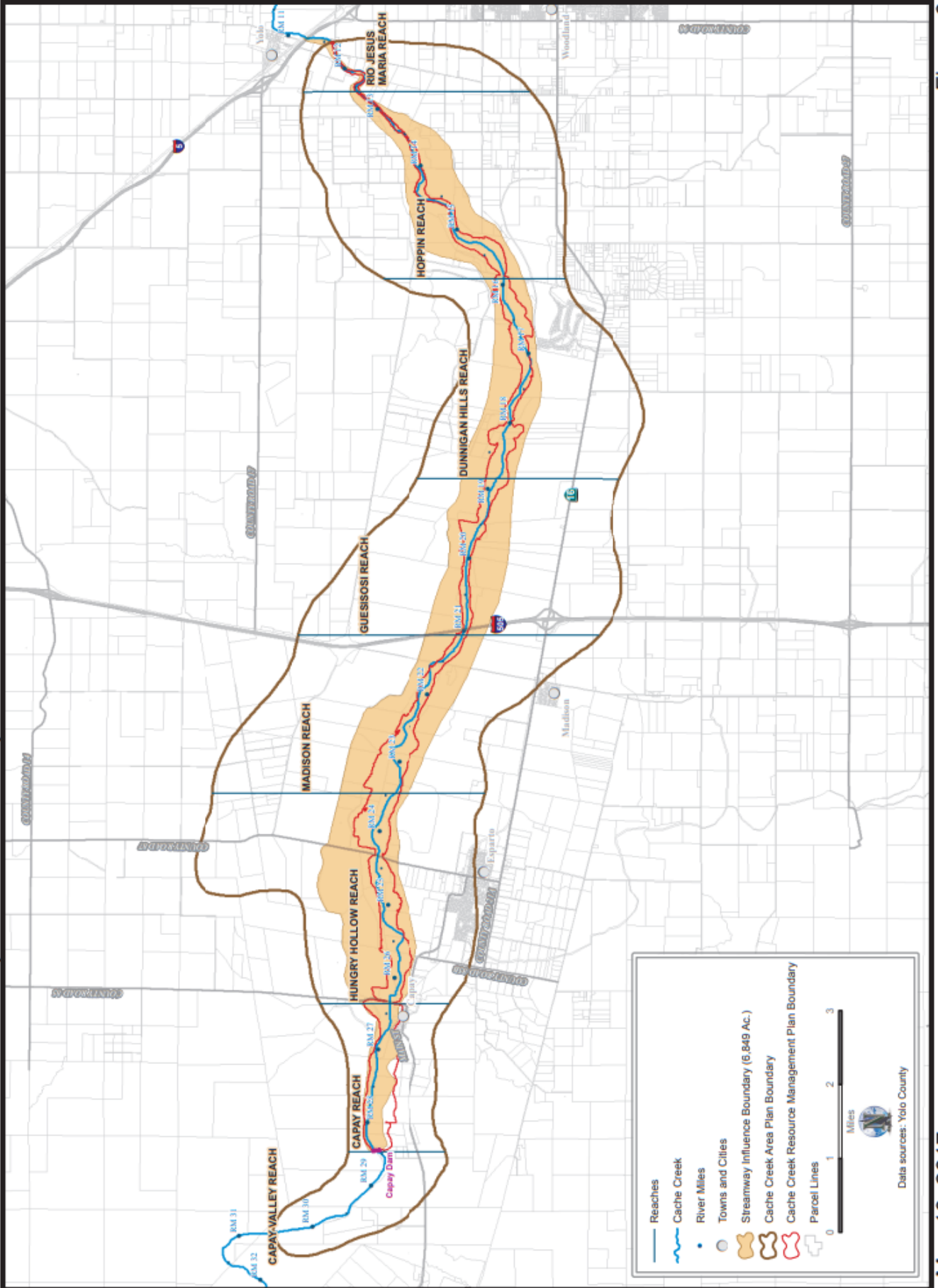


Figure 6

May 10, 2017

## **Adoption of the Surface Mining and Reclamation Ordinances**

In order to simplify the administration of managing the resources along Cache Creek, in-channel management requirements and off-channel mining regulations have been given separate chapters within the County Code Chapter 3 (In-Channel Ordinance), Chapter 4 (Off-Channel Surface Mining Ordinance), Chapter 5 (Surface Mining Reclamation Ordinance) respectively of Title 10.

In the fall of 1998, the County requested a ruling from the State Mining and Geology Board regarding whether implementation of the CCRMP/CCIP would be subject to, or exempt from, SMARA. The Board determined that the CCRMP/CCIP did not qualify for an exemption from SMARA due to the amount of sand and gravel expected to be removed over the 30-year horizon of the plan. Subsequent to that action, special legislation was passed to amend SMARA to recognize the CCRMP/CCIP as the functional equivalent of a Reclamation Plan for purposes of SMARA compliance (Assembly Bill 297, H. Thomson, Statutes of 1999). This law had a five-year sunset date, but was subsequently reauthorized every five years. On August 29, 2016, Governor Brown signed Senate Bill 1133 (Wolk) which removed the sunset clause and made this statute permanent.

In June 2008, the County's In-Channel Ordinance was adopted to regulate in-stream extraction activities that implement the bank stabilization, channel maintenance, and habitat restoration necessary to carry out the CCRMP and CCIP.

## **Approval of Zone Changes**

The OCMP has designated an area for future surface mining to meet the long-term future aggregate needs of Yolo County and the surrounding region. Those areas permitted for mining are designated with the SG-O zone in order to identify the land as being appropriate for mining in the near-term. Surface mining operations within Yolo County may only occur on properties designated SG-O on the County's Zoning Map. The SG-O may be combined with either the A-N (Agriculture Intensive) or A-X (Agriculture Extensive) zones outside of the CCRMP boundary.

Those areas where mining could occur in the future are zoned SGR-O. This designation indicates that gravel mining is appropriate for the site at a future date. The SGR-O zone also serves to notify existing and future property owners, as well as land use decision-making bodies, that mining will likely occur in these areas. Potentially incompatible uses that are proposed to be located on sites adjoining SGR-O zoned properties should take the likelihood of future mining into account and be designed accordingly.

## **Mining Within an Agricultural Preserve**

The California Land Conservation (Williamson) Act, which governs the administration of agricultural preserves, was amended in 1994 to restrict the types of uses allowed on contracted land. All new uses must meet all of the findings described in Section 51238.1 to protect

agricultural activities and agricultural land. Compatible uses may include permitted uses on prime agricultural land which contain conditions or mitigations that ensure the long-term productive capability. Specific criteria for permitted uses on non-prime agricultural land are also provided. In general, the use must be consistent with the intent of the Williamson Act to conserve agricultural land, open space uses, and/or natural resources. To meet this finding, the use of mineral resources must also comply with Section 51238.2.

Section 51238.2 was added to the California Land Conservation Act in 1994, specifically addressing surface mining within contracted land. It states that any mineral extraction operation which is unable to meet the findings described above may still be approved as a compatible use, as long as there is the commitment to preserve prime land for agricultural purposes and non-prime land for open-space use are not significantly impaired. All such mining operations must include conditions that comply with the State Reclamation Regulations.

## **1.5 ORGANIZATION OF PLAN**

The OCMP contains seven chapters including six elements, each dealing with a specific resource associated with the Cache Creek area. The elements contained within the OCMP are as follows:

- Chapter 2.0 Aggregate Resources
- Chapter 3.0 Water Resources
- Chapter 4.0 Floodway and Channel Stability
- Chapter 5.0 Agricultural Resources
- Chapter 6.0 Biological Resources
- Chapter 7.0 Open Space and Recreation

Each element begins by briefly describing the past and current status of the resource under consideration. Next is a summary of the general direction proposed by the OCMP to manage this resource in the future. Following these initial discussions are a series of goals, objectives, and actions that explain how the general direction will be carried out and what measures will be used to ensure its success. Although each element has its own goals and objectives that address management of the specific resource, the plan was written so that these policy statements are mutually supportive and coordinated to minimize conflict.

## CHAPTER 2.0 – AGGREGATE RESOURCES ELEMENT

### 2.1 INTRODUCTION

#### Present Conditions

Off-channel mining is allowed on SG-O zoned land outside of the CCRMP boundary but within the OCMP Planning Area (see Figure 4). There are currently seven mining operations that have approvals to mine under the regulatory framework of the OCMP. These operations include: (1) CEMEX, located south of Cache Creek and west and east of I-505 (±586 acres); (2) Granite Capay, located north of Cache Creek between County Road 85 and County Road 87 (±312 acres); (3) Granite Esparto, located north of Cache Creek and just west of County Road 87 (±313 acre); (4) Syar Industries, located south of Cache Creek between County Road 87 and County Road 89 (±248 acres); (5) Teichert Esparto, located north of Cache Creek between County Road 87 and I-505 (±148 acres); (6) Teichert Woodland, located north and south of Cache Creek and west and east of County Road 94B (±252 acres); and (7) Teichert Schwarzgruber, located south of Cache Creek at the northern terminus of County Road 97 (±41 acres). In total, there are approximately 1,900 acres approved for excavation and 2,464 acres (including the excavation acreage) permitted as part of the mining operations (total acreage zoned Sand and Gravel Overlay or SG-O).

As previously noted, the seven operations summarized above are collectively approved to extract 176 million tons of sand and gravel. From 1996 through 2015, approximately 72 million tons have actually been extracted, leaving 115 million tons approved but not yet mined. Based on estimates of the size of the Cache Creek mineral reserves, approximately 742 million tons of aggregate will remain even after this approved tonnage has been extracted.

#### OCMP Vision

As is stated in SMARA, the extraction of sand and gravel is essential to the continued economic well-being of the state and to the needs of society. However, mining must also be balanced against other valuable considerations, including water resources, agriculture, wildlife, aesthetics, and recreation. Due to concerns about the impacts of in-stream mining to structures, property, and riparian habitat, commercial in-stream mining was prohibited under the CCRMP in 1996. The OCMP and CCRMP provided the policy and regulatory framework for a redirection of the focus of the gravel industry from in-channel to off-channel operations. Mining facilities and operations within Cache Creek currently were considered "vested." This meant that the County could not adversely affect those rights without compensation. By providing what was, in effect, a sort of transfer of property rights, the gravel mining in the creek channel was discontinued, and exchanged for rights to mine in the off-channel areas.

The OCMP allows for the development of a sufficient supply of aggregate to meet future needs, while increasing the level of environmental protection and monitoring. In order to provide a sufficient source of sand and gravel 2,464 acres are designated for off-channel surface mining.



An additional 1,001 acres have been designated SGR-O<sup>8</sup>. This overlay delineates where the County will encourage future mining, so that land use decisions can be planned accordingly. It also ensures that additional reserves will be available for development once current mining operations are completed. In addition to the SGR-O designated lands, another 1,188 acres have been identified as likely sites for future mining. Remaining areas within the MRZ areas that are feasible for mining may be considered in the future. In addition to the use of overlay zones, the OCMP contains a commitment to maintain the existing agricultural zoning within the planning area. This not only reinforces the County's general policy of encouraging the agricultural industry, but will ensure that mining is buffered from residential and other sensitive land uses.

Although the County recognizes that mining is important to the regional economy, it also acknowledges that mining is an activity that carries with it the potential for adverse environmental impacts. The OCMP includes provisions to regulate surface mining to reduce or prevent adverse effects. Specific performance standards have been incorporated into the off-channel mining and reclamation ordinances that complement and go beyond the requirements already mandated by SMARA and the State Reclamation Regulations. The OCMP also imposes a 30-year maximum term for any off-channel mining permit, as well as 10-year reviews that allow for the addition of new environmental regulations to the permit, if appropriate. A 20-year extension to the mining permit may be granted, if approved aggregate reserves have not yet been exhausted. All plants and facilities will sunset when permits to mine expire, thereby precluding the future "unregulated" processing of imported material. Similarly, the requirements for annual reporting have been substantially expanded, to provide staff with better information to monitor both mining operations and reclamation efforts.

Off-channel aggregate deposits are essentially non-renewable resources. While new sand and gravel deposits are laid down by Cache Creek, the geological processes involved in replenishment take centuries to occur. By placing a cap on the amount of aggregate that can be mined in any one year, the use of a non-renewable resource can be regulated to ensure its continuing availability. In addition, by restricting production, the potential environmental impacts that vary with the amount of aggregate extracted (e.g., traffic, air quality, noise) can be effectively limited. Setting a maximum annual production level must balance a variety of factors, including the environmental impacts that result from mining, the regional market demand for sand and gravel, the direct and indirect costs/benefits of aggregate production, and the economic interests of the mine operators.

## **2.2 GOALS**

2.2-1 Protect lands containing identified mineral deposits from the encroachment of incompatible land uses so that aggregate resources remain available for future use, as needed.

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<sup>8</sup> In December 2019, in conjunction with approval of the CCAP Update, the County rezoned an additional 788 acres to add the SGR-O, bringing the total SGR-O acreage to 1,789. This is explained in footnotes added to Figure 5.

- 2.2-2 Encourage the production and conservation of mineral resources, balanced by the consideration of important social values, including recreation, watershed, wildlife, agriculture, aesthetics, flood control, and other environmental factors.
- 2.2-3 Prevent or minimize the adverse environmental effects of surface mining.
- 2.2-4 Eliminate or minimize hazards to the public health and safety that are associated with surface mining operations and reclamation.
- 2.2-5 Ensure that mined areas are reclaimed to a usable condition which are readily adaptable for alternative land uses, such as agriculture, wildlife habitat, recreation, and groundwater management facilities.
- 2.2-6 Provide a responsive process to consider future changes in environmental and regulatory conditions.
- 2.2-7 Maintain an economically viable and competitive local aggregate industry that provides a stable job base and tax revenue to Yolo County and contributes to other resource enhancements through the investments in improved technology and reclamation planning.

### **2.3 OBJECTIVES**

- 2.3-1 Recognize that the aggregate deposits along Cache Creek are significant to the economy of Yolo County, as well as surrounding jurisdictions.
- 2.3-2 Discourage the encroachment of incompatible land uses into areas designated for future off-channel surface mining operations.
- 2.3-3 Provide standards and procedures for regulating surface mining operations and reclamation so that hazards are eliminated or minimized and potential adverse environmental effects are reduced or prevented.
- 2.3-4 Coordinate individual surface mining reclamation plans so that the development of an expanded riparian corridor may be achieved.
- 2.3-5 Create regular opportunities to incorporate new information into the OCMP.
- 2.3-6 Structure mining so that the disturbance of the existing landscape is minimized and will be reclaimed so that the property can be used and enjoyed in perpetuity by current and future generations.
- 2.3-7 Avoid damage to important cultural resources, in order to document and/or preserve the historic and prehistoric record.

- 2.3-8 Ensure through the CEQA process and ongoing permit compliance review that operators are paying their fair share of the costs of impacts to local roadways from truck use associated with each approved mining operation. This obligation is separate and distinct from the Mining Fee Program.

## **2.4 ACTIONS**

- 2.4-1 Provide an open space buffer around the community boundaries of Capay, Madison, Esparto, Woodland, and Yolo to reduce potential conflicts between urban areas and nearby surface mining operations. Commercial mining shall not take place east of County Road 96. *(See Section 10-4.429(h) of the County Mining Ordinance.)*
- 2.4-2 Hazardous materials business plans (or equivalent) must be submitted annually, as required by the California Health and Safety Code, unless the types of hazardous materials used change, in which case revised business plans must be submitted within thirty (30) days of the change. *(See Section 10-4.403 and 10-4.419.1 of the Mining Ordinance.)*
- 2.4-3 Establish a "sunset clause" for each surface mining permit. This would set defined length of time during which mining may occur. Any extensions beyond the permit expiration would require further environmental review and discretionary approval. The term of mining should be balanced so as to allow sufficient time for the operator to amortize investments, without sacrificing regulatory effectiveness. The maximum length of time for which any surface mining permit may be approved is thirty (30) years, with ten (10) year reviews to examine actual environmental impacts and to apply any relevant environmental regulations or statutory changes promulgated by a responsible or trustee agency with authority over a particular environmental resource (such as air, water, habitat, state lands, etc.), including Yolo County. The reviews will also be used to verify whether per-ton fees are sufficient to meet actual costs. The mining permit may be extended for a maximum period of twenty (20) years, if necessary, subject to the same ten-year review requirements. *(See Section 10-4.426 of the County Mining Ordinance.)*
- 2.4-4 Revise the existing mining and reclamation ordinances contained in the Yolo County Code to incorporate recent amendments to SMARA; performance standards to prevent hazards and reduce potential environmental impacts; and programs to carry out the policies included within the OCMP. *(Completed in 1996.)*
- 2.4-5 Rezone those lands necessary to meet aggregate needs for the next thirty years with the SG-O Zone. Those lands designated for mining within the next 30 to 50 years shall be rezoned with the SGR-O Zone. The SG-O and SGR-O Zones will serve to notify existing and future property owners that mining operations may occur within these properties, in order to discourage the encroachment of incompatible uses.
- 2.4-6 Update the OCMP every ten years. This will allow the plan to be amended so that the results of monitoring programs and reclamation efforts can be taken into account.

- 2.4-7 Require that all surface mining applications within the OCMP plan area include a proposal for providing a "net gain" to the County, as determined by the following criteria:
- a. Reclamation to multiple or conjunctive uses;
  - b. Enhancement and enrichment of existing resources;
  - c. Restoration of past sites where the requirements of reclamation at the time no longer meet community expectations in terms of good stewardship of the land; and/or
  - d. Provision of new dedications and easements to supplement/benefit the Cache Creek Parkway including reclaimed mining sites, restored habitat, trail connections, and related enhancements.

*(See Section 10-4.502(i) of the County Mining Ordinance.)*

- 2.4-8 Monitor and regulate aggregate extraction in a manner that supports the ability of mining operations to perform long-range business planning and helps ensure that they will carry out their project responsibilities. The costs to the County of administering and monitoring the aggregate industry shall be borne by the mining operators.

*(Permit compliance is addressed in Article 7 of the Mining Ordinance commencing with Section 10-4.701. Program costs are addressed through the Gravel Mining Fee Ordinance, Section 8-11.01 et. seq. of the County Code. The Fee Ordinance was updated in 2007 as part of ten-year review.)*

- 2.4-9 Reduce the amount of sand and gravel mined, by not including any waste concrete and asphalt processed as recycled materials for use in construction, as part of an operation's maximum annual production. *(See Section 10-4.405 of the County Mining Ordinance)*

- 2.4-10 Encourage off-channel excavation operations to access additional aggregate reserves through the use of wet pits, in order to increase mining efficiency and to minimize the surface land area disturbed by mining.

- 2.4-11 Define the OCMP boundaries to include approved and planned future mining operations.

- 2.4-12 Establish a maximum annual production level for off-channel mining of 5.97 million tons sold. This total production limit applies to all off-channel mining included within the plan area. Individual producers may exceed their maximum annual allocation in order to meet temporary market demand. Aggregate sold in excess of the maximum annual production shall be subject to additional surcharges, which shall be used to benefit the Cache Creek area. *(See Section 10.4.405 of the Mining Ordinance and Section 8-11.01 of the Fee Ordinance.)*

- 2.4-13 Sunset the aggregate processing plants and facilities at the greater of thirty (30) years following the commencement of mining under the approved permit, unless extended under subsequent permits to mine additional aggregate deposits. *(Addressed in each development agreement.)*
- 2.4-14 Recognize the funding provided by Cache Creek Aggregates, Solano Concrete, Syar Industries, and Teichert Aggregates in preparing the OCMP and related documents. Prior to the approval of any new surface mining permits within the OCMP boundary, the County shall adopt a fee ordinance that requires new surface mining applicants to pay their proportionate fair-share cost of preparing the OCMP, implementing ordinances, and the Program EIR. *(Completed. Agreement No. 94-298 was entered into December 6, 1994 and expired ten year later in December 2004.)*
- 2.4-15 Establish a mechanism for compensating property owners who may have vested in-channel mining rights without having yet received reasonable financial consideration resulting from the mining associated with said permits, and who do not own land within the OCMP plan area. *(Completed in 1996 through the execution of development agreements.)*
- 2.4-16 Execute development agreements between the County and mining operators in order to document in a contractual setting the transfer of mining rights in Cache Creek, whereby in-channel mining will be discontinued in exchange for rights to mine off-channel. The development agreements will also provide a mechanism for documenting the linkage of the plants to the mining permits; the payment of a per-ton fee for implementation of the OCMP and CCRMP; funding of the Cache Creek Conservancy; implementation of approved net-gain projects; dedication of reclaimed lands; and compensation of property owners who would not otherwise receive consideration. *(Completed for original applications; on-going for subsequent applications.)*
- 2.4-17 Withhold the granting of each surface mining permit applied for under the OCMP, until the CCRMP has been adopted and in-channel mining rights have been relinquished by the applicant. *(Completed in 1996 through the execution of development agreements.)*
- 2.4-18 Institute an exchange of property rights, whereby existing in-channel mining permits and allocations are discontinued, and exchanged for rights to mine off-channel aggregate deposits. *(Completed in 1996 through the execution of development agreements.)*
- 2.4-19 Surface mining permits and the production allocations associated with the permits apply only to the subject lands for which they are approved and may not be transferred. Mining permits are use permits which run with the land and are not transferrable to alternate locations without additional analysis and permit amendment.

- 2.4-20 Create a fund to ensure that money is available to address unforeseen environmental concerns and problems once mining and reclamation activities have been completed. The aggregate industry shall be fully responsible for subsidizing the fund. *(See Section 8-11.02(b) of the Fee Ordinance and Section 10-4.803 of the Mining Ordinance.)*
- 2.4-21 Ensure that each mining operation adheres to approved haul routes and approved ingress/egress locations. Ensure through conditions of approval and other appropriate mechanisms that mining operations are funding their fair share of roadway and related impacts, including both one-time improvements and ongoing operations and maintenance, along approved haul routes and in proximity to approved operation ingress/egress locations.

## **CHAPTER 3.0 – WATER RESOURCES ELEMENT**

### **3.1 INTRODUCTION**

#### **Present Conditions**

Cache Creek is located within a groundwater basin that is generally defined by the Coast Range to the west, the Sacramento River to the east, the Colusa Basin watershed to the north, and the Putah Creek watershed to the south (see Figure 7). Groundwater quality is hard to very hard in this area, due to above average concentrations of constituents such as calcium, and magnesium. Boron is the constituent of most concern, brought down by tributaries of Cache Creek from saline springs in the Rumsey Hills.

The single-most significant factor affecting groundwater storage is rainfall. Groundwater levels drop rapidly due to increased pumping and decreased recharge during times of drought, and rise back up again after wet periods. Secondly, the most important change has been the development of irrigated agriculture. The diversion of surface water has reduced in-channel recharge and increased the levels of total dissolved salts in the aquifer, while the widespread use of well pumping has altered groundwater flow patterns and cycled the water through the aquifer more rapidly. Both activities have significantly increased the consumption of water for crops, which has resulted in an overall lowering of the water table from levels seen at the turn of the century. Nevertheless, the basin has a substantial capacity for recovery.

#### **OCMP Vision**

In order to make the best use of the recovery capacity of the groundwater basin, the Yolo County Flood Control and Water Conservation District (YCFCWCD) retains their canals and ditches in an unlined condition. The YCFCWCD seeks to place more water into the aquifer to increase the availability of groundwater. In the past, the YCFCWCD has expressed interest in experimenting with groundwater recharge using reclaimed mining pits. Given the interrelated goals of both agencies, the County will continue to work with the YCFCWCD in coordinating efforts to protect and improve both the quantity and quality of groundwater supplies.

The 1995 Technical Studies noted that groundwater data, especially as related to water quality was poorly developed and unorganized. Having a sufficient body of information was identified as crucial for monitoring development that extends into the groundwater table, such as off-channel excavations. The OCMP addresses this deficiency by requiring that each off-channel mining operation maintain a detailed monitoring program, to include both groundwater level measurements and water quality tests the number and extent of which vary as mining and reclamation activities progress. As a part of the 2019 CCAP Update, the data that has been generated through the program was assembled and analyzed for long-term trends and influences. This effort has served as the basis for specific recommendations regarding water resource management policies that are included as a part of this update.

# Cache Creek Area Plan Update - Groundwater Basin Boundaries

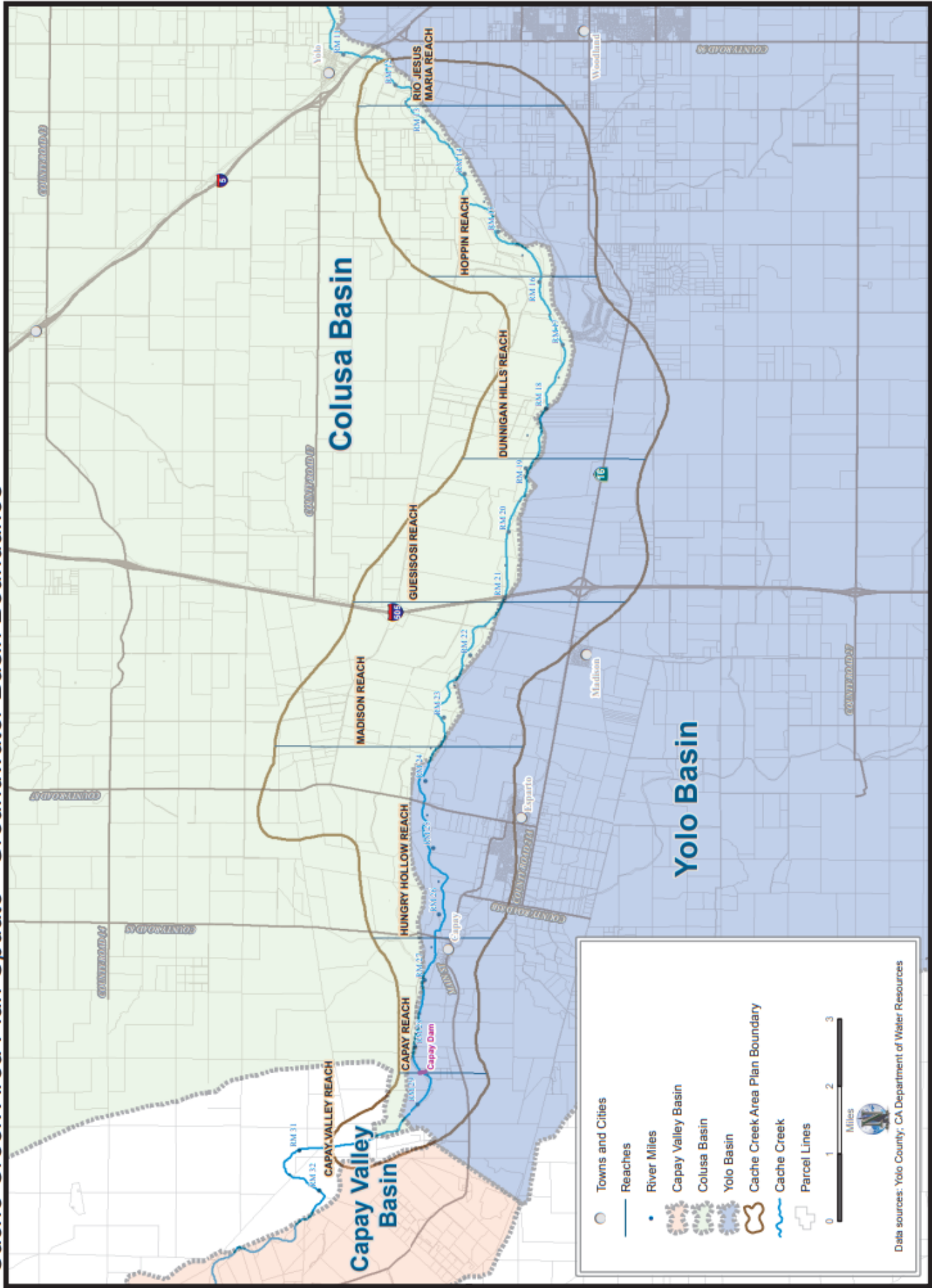


Figure 7

May 10, 2017



Although water is a vitally important issue to both agriculture and urban areas, the OCMP acknowledges that other resources have a need for water that must be accommodated. Open bodies of water, such as those that may result from wet pit mining allowed under the OCMP, may lose water regularly due to evapotranspiration. This amount can be reduced through the avoidance of shallow water depths of less than 10 feet. However, these same shallow depths provide the necessary conditions for recreational uses and wetland habitat. The OCMP encourages the balanced use of wet pits, so that they may serve the variety of goals expressed for Cache Creek.

Other areas around the state use permanent lakes reclaimed from mined lands in a number of diverse ways in order to benefit the local economy and/or the environment. Recreational parks have been established at Oak Lake in Stanislaus County and at Shadow Cliffs Park, near Livermore in Alameda County. Also, near Livermore is the "Chain of Lakes," which links several former mine pits into a groundwater storage and recharge facility. Surface water is conveyed through a series of gravel excavations that have been converted into sealed settling basins, before it is introduced into a permanent lake for recharge into the aquifer. The Chain of Lakes is operated by the Alameda County Water District. Sand and gravel operators along the San Joaquin River, near Fresno, have reclaimed their mines into permanent lakes and wetland habitat. These lands have been dedicated to the Department of Fish and Wildlife, which operates them as wildlife areas, with limited tours in the springtime for bird watchers and other enthusiasts. The habitat areas are located immediately next to the San Joaquin River Parkway and serve to increase the amount of open space along the riparian corridor. Through careful management, permanent lakes created through mining can be used in a variety of beneficial ways.

There is a tremendous potential for off-channel excavations to provide a range of opportunities for Cache Creek, including the groundwater management, recreation, and habitat uses discussed above. As an example, in December 2014, the Board of Supervisors formally agreed to partner with the Yolo Habitat Conservancy to allow certain reclaimed properties that will be dedicated to the County as a part of the CCAP to be included in the countywide HCP/NCCP. It is important, however, to ensure that proposed mining pits are designed so as not to adversely affect the existing aquifer flow patterns, water table levels, or groundwater quality for the surrounding area. Backfilled pits can create localized obstructions to groundwater flow, while pits located too close to nearby wells may serve as a conduit for potential contamination. In order to address these issues, the OCMP includes specific performance standards for protecting both groundwater and surface water quality and quantity. These standards apply both to the off-channel mining operations, as well as their reclaimed uses.

## **3.2 GOALS**

- 3.2-1 Promote the conjunctive use of surface and groundwater to maximize the availability of water for a range of uses, including habitat, recreation, agriculture, water storage, flood control, and urban development.

- 3.2-2 Maintain the quality of surface and groundwater so that nearby agricultural productivity and available drinking water supplies are not diminished.
- 3.2-3 Improve the gathering and coordination of information about water resources so that effective policy decisions can be made.

### **3.3 OBJECTIVES**

- 3.3-1 Encourage the development of a countywide water management program, including the participation of the YCFCWCD and other relevant agencies, to coordinate the monitoring and analysis of both surface and groundwater supplies.
- 3.3-2 Ensure that off-channel surface mines are operated such that surface and groundwater supplies are not adversely affected by sedimentation, lowering of the water table, and/or contamination during mining and reclamation.

### **3.4 ACTIONS**

- 3.4-1 Consider evaporation losses as an acceptable result of exposed groundwater, when reclaimed wet pit areas are included as a part of proposed riparian habitat or recreational facilities.
- 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. *(See Section 10-4.417 of the Mining Ordinance.)*
- 3.4-4 The County shall designate staff and resources to coordinate with city, county, regional, state, and federal agencies that may wish to receive copies of data generated from the off-channel mining operations regarding water resource issues, including the towns of Capay, Esparto, Yolo, and Madison; the City of Woodland; the Yolo County Flood Control and Water Conservation District; the Water Resources Agency; the Central Valley Regional Water Quality Control Board; and the California Department of Water Resources. The database shall be expanded to include other relevant sources of information, so that it can be used as reference material for regional water planning efforts. A data inventory shall be developed including a data management system with formal protocols.

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. *(See Sections 10-4.412, 10-4.417, 10-4.427, and 10-4.502(b)(2) of the Mining Ordinance.)*

## CHAPTER 4.0 – FLOODWAY AND CHANNEL STABILITY ELEMENT

### 4.1 INTRODUCTION

#### Present Conditions

Cache Creek has changed extensively due to human influences over the past 100 years. Generally speaking, by the time in-channel mining was eliminated from the program in 1996, that portion of the creek within the planning area had become narrower, faster, and deeper than it was a century or more ago. Some reaches of the creek were less than a third as wide as they once were, in some cases a difference of nearly a half-mile. Overall, the area of Cache Creek had decreased by over two-thirds, from 5,000 acres in 1905 to just under 1,600 acres in 1996. These changes created higher shear stress conditions in Cache Creek that resulted in accelerated erosion, streambed lowering, and loss of riparian vegetation.

Nearly 10.4 million tons of sand and gravel have been deposited in Cache Creek throughout the CCRMP area since 1996, resulting in increased channel bed elevations and development of more diverse channel conditions and establishment of more riparian vegetation. However, the channel is still significantly narrower than it was a century ago and elevated shear stresses now interact with more sediment than was the case in 1996. Cache Creek in 2017 is still in the process of establishing a dynamic equilibrium since the cessation on in-channel commercial mining.

Most of the 10.4 million tons of deposition occurred during the extreme high flows in the winter of 1997-1998. Subsequent high-flow years have both eroded and deposited sand and gravel from reaches of Cache Creek. Stated more simply, really big floods add sand and gravel to Cache Creek, while normal winter high flows move sand and gravel from reach to reach. These conditions have resulted in areas of Cache Creek with high rates of channel change and others with much more stable conditions.

Assuming the prohibition of in-stream mining, and assuming the creek was left to its own devices, long-term simulations in the 1995 Technical Studies indicated that a more balanced condition would likely be achieved over the next 100 years. However, the continued diversion of surface water during the irrigation season would inhibit the development of a stable low-flow channel that would encourage stabilization of the creek. In addition, Cache Creek is a dynamic watercourse, subject to extreme flood events, that make the establishment of a natural equilibrium difficult given other constraints along the creek. While the net deposition of sand and gravel since 1996 has been nearly four-times greater than anticipated in 1996, restoring Cache Creek to the condition it was in over one hundred years ago (prior to mining) is not possible. However, the past twenty years have shown that careful management, even the mostly passive management that has been possible since the program's inception, helps the river repair itself and achieve a condition closer to a natural equilibrium.

## OCMP Vision

In 1996, the County realized that the assumptions behind the regulation of in-channel and off-channel mining in the 1970's, 1980's, and early 1990's had become obsolete. Adoption of the CCAP replaced those obsolete concepts (e.g., theoretical thalweg<sup>9</sup>) with a policy framework and regulations better suited to community values, modern theories of environmental regulation, and the physical characteristics of the creek system. These concepts included a data-based delineation of in-channel versus off-channel areas and a Streamway Influence Zone (see Figures 3,4, and 6), which depicts the extent to which the creek affects off-channel land uses.

In addition, the CCAP included a conceptual configuration for the reshaping of Cache Creek, to maintain flood flow conveyance capacity and decrease channel instability. The boundaries of this new configuration were described originally in the 1995 Technical Studies as the "Test 3 Run Boundary," which was created from the results of a HEC-6 sediment transport computer model that assumed the banks of Cache Creek would be smoothed to remove abrupt width and slope changes, and that the channel sections upstream and downstream from the bridges along Cache Creek would be hardened to allow smooth flow transitions into and out of the narrow bridge openings. Few channel modifications of this type have been completed since 1996, and hardening of the bridge transitions did not occur. However, the analysis of changes and trends in geomorphic, hydraulic, and biological conditions since 1996 has shown that nearly 10.4 million tons of sediment have deposited in Cache Creek since in-channel mining was halted, and more natural channel slope and sinuosity has been restored in some reaches. In addition, native riparian forest and other habitat types have increased along much of the channel, while flood flow conveyance capacity has remained mostly unchanged.

Based on this more data-driven understanding of Cache Creek and the new hydraulic modeling of the creek conducted as part of the 2017 Technical Studies, the Test 3 Run Boundary has been updated and renamed the "Channel Form Template" (CFT) to better reflect the intent (see Figure 8).

As the OCMP and CCRMP are reviewed every ten years, updates will be undertaken, based on the information provided by required monitoring programs. These updates will account for the habitat restoration and channel stabilization efforts that have been completed, as well as for property owners who chose not to participate in the reconfiguration of Cache Creek. Thus, the in-channel boundary and the Channel Form Template will continue to shift in the future as Cache Creek continues to adjust to aggradation occurring under current management practices, especially after extreme peak flows. Limited flooding and erosion are beneficial, in that healthy riparian systems require a dynamic balance between erosion, deposition, and periodic inundation to maintain vegetation regeneration and succession. Therefore, the OCMP is not intended to be a static document, but a dynamic one, evolving to meet the shifting conditions of

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<sup>9</sup> The theoretical thalweg is the middle of the deepest part of the channel of a river or stream; the bottom of the low-flow channel. The County's mining regulations in effect prior to the CCAP allowed in-stream mining down to this depth. The purpose of the thalweg was to minimize streambed lowering as a result of in-channel mining.

# Cache Creek Area Plan Update - Channel Form Template

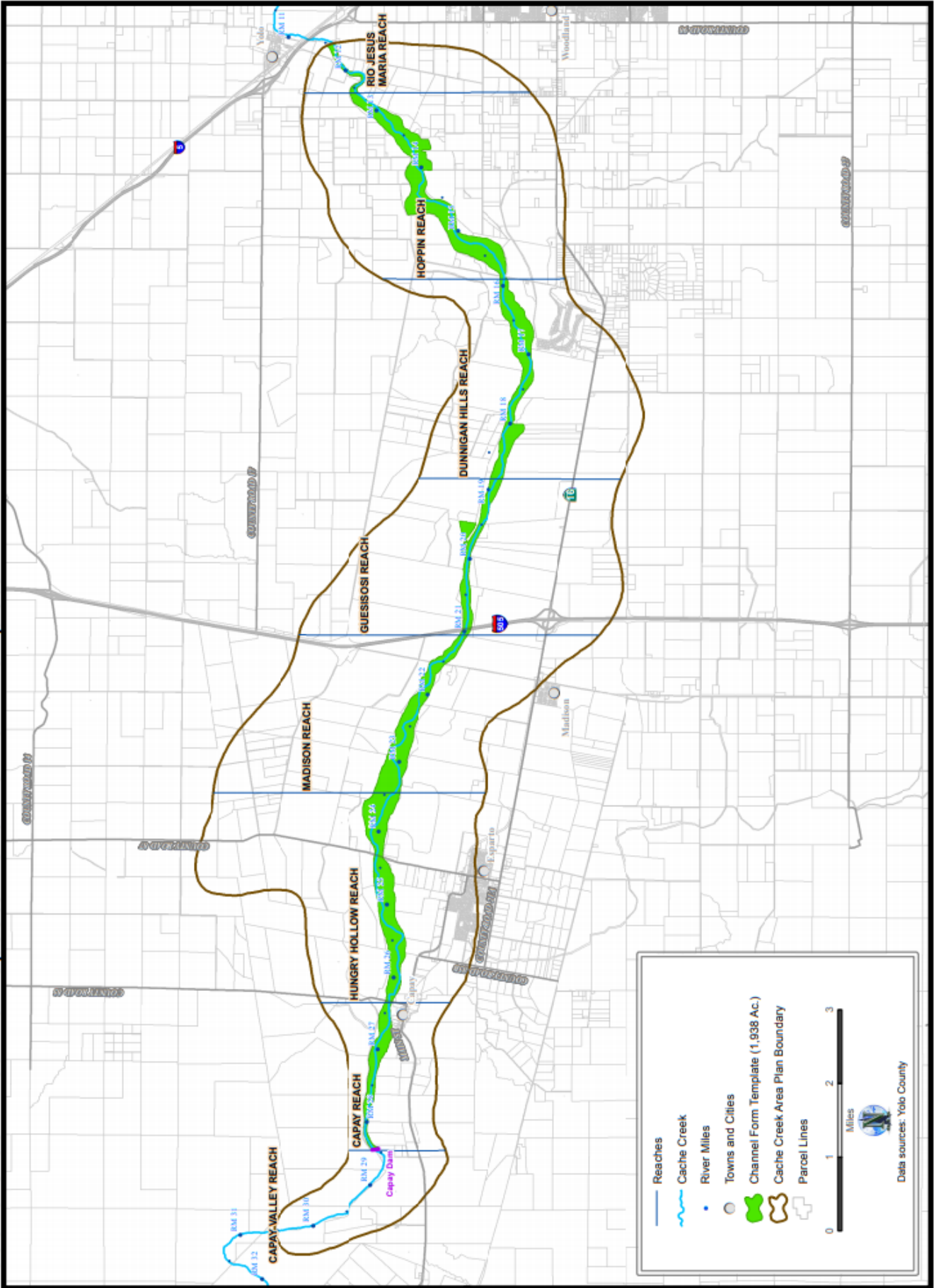


Figure 8

June 1, 2017

the creek in the future. Nevertheless, the in-channel boundary and Channel Form Template shall guide management of the creek to achieve a natural equilibrium state, and the design of off-channel excavations shall take this into account.

Channel stability issues are more thoroughly discussed in the CCRMP, which deals specifically with the regulation of in-channel uses; however, the two plans overlap within the Streamway Influence Zone. The 1995 Technical Studies estimated that Cache Creek may meander as much as 700 feet in a single flood event, threatening to erode levees and significantly changing the geomorphology of the creek through uncontrolled pit capture. In recognition of the interrelationships between off-channel and in-channel uses within this area, the OCMP requires that off-channel excavations be set back a minimum of 700 feet, unless a project-specific, site-specific 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 is 200 feet from the existing channel bank.

While measures can be included as a part of individual mining applications to provide protection against pit capture and channel instability, the presence of mining and other land use activities within the historical floodplain (as defined by the Streamway Influence Zone) affect the creek's configuration. In order to offset these effects and as a further means of ensuring that there is a continuing effort to protect off-channel mining areas from 100-year floods, each mine operator shall participate in channel maintenance and reshaping activities through conditions on their operations and shall contribute to the funding of the CCIP through the payment of per-ton fees.

The OCMP contains provisions for requiring that mining operations be protected from the 100-year flood, and ensuring that program activities do not increase flood risk affecting other land use activities. The OCMP does allow for engineered features to facilitate controlled flooding of off-channel mining pits during peak flows that exceed the 100-year flood. Although such measures could reduce flow rates in the early stages of a flood, they may not be sufficient to resolve flooding downstream. As pointed out in the 1995 Technical Studies, the creek is severely restricted by the bridges and levees located at Interstate 5 and eastward. The OCMP does not directly address flooding issues due to a lack of jurisdiction. Solutions must be developed on a regional basis, taking the entire riparian system of Cache Creek into consideration. The County strongly supports the inter-agency approach to resolve flooding and other regional issues related to Cache Creek.

## **4.2 GOALS**

- 4.2-1 Recognize that Cache Creek is a dynamic system that naturally undergoes gradual and sometimes sudden changes during high flow events.
- 4.2-2 Coordinate land uses and improvements along Cache Creek so that the adverse effects of flooding and erosion are minimized.

- 4.2-3 Establish a more natural channel floodway capable of conveying floodwaters without damaging essential structures, causing excessive erosion, or adversely affecting adjoining land uses.

### **4.3 OBJECTIVES**

- 4.3-1 Support flood management objectives as required to protect the public health and safety.
- 4.3-2 Recommend actions to create a more stable channel configuration and flood flow conveyance capacity consistent with regional flood management programs.
- 4.3-3 Support regional efforts to protect against downstream flood impacts on communities such as Yolo and Woodland.

### **4.4 ACTIONS**

- 4.4-1 Recognize that mining activities located within the Streamway Influence Zone, as described in the 1995 Technical Studies, have a potential to influence the flow characteristics of the creek. In response, mine operators shall be required to participate in funding the Cache Creek Improvement Program (CCIP), as outlined in the CCRMP, and implement the Channel Form Template (CFT) as described in Section 10-4.429 of the Mining Ordinance. Funding may be provided through a per ton surcharge or other mechanism to support activities that stabilize the creek channel. *(See Section 8-11.02(a) of the Fee Ordinance)*
- 4.4-2 Evaluation of proposed significant modifications to the floodplain, including off-channel mining areas, shall be made with reference to the channel improvement strategy and guidelines presented in the Cache Creek Resources Management Plan. This will ensure a consistent frame of reference and allow consideration of such modifications in the context of an integrated creek management program. *(See Section 10-4.429(d) of the Mining Ordinance)*
- 4.4-3 Work with other entities, including, but not limited to, the YCFCWCD, the U.S. Army Corps of Engineers, the California Department of Resources, the Federal Emergency Management Agency, landowners, and regional groups in developing a coordinated solution for managing the watershed of Cache Creek. *(In December 2010, the TAC identified a primary and alternate Flood Coordinator. The County Office of Emergency Services (OES) designated the position of TAC Flood Coordinator as a Technical Specialist to the County OA EOC during periods of activation.)*
- 4.4-4 Manage activities and development within the floodplain to avoid hazards and adverse impacts on surrounding properties. This shall be accomplished through enforcement of the County Flood Damage Ordinance and ensuring that new development complies with the requirements of Flood Hazard Development Permits. *(This is addressed through the*



*County's requirement for a Flood Hazard Development Permit (FHDP) for any work within the 100-year floodplain of the creek. In correspondence dated July 14, 2005, the Chief Engineer of the State Reclamation Board confirmed that the Reclamation Board's authority is from I-5 downstream and the County's authority extends from I-5 upstream. In 2008, the State Reclamation Board became the Central Valley Flood Protection Board.)*

- 4.4-5 Allow for the design of spillways or other engineered features that provide controlled flooding of off-channel mining pits during events which exceed the 100-year flood. *(See Sections 10-4.413, 10-4.416, and 10-4.502(a)(3) and (b)(8) of the Mining Ordinance.)*
- 4.4-6 Enter into a Memorandum of Understanding with the YCFCWCD to provide a regular source of surface water flow in Cache Creek throughout the year, when annual precipitation is sufficient. The timing and volume of flows should be coordinated with the TAC, in order to create a stable low-flow channel and allow for the natural revegetation of in-channel areas along the creek, where appropriate.
- 4.4-7 Deleted.
- 4.4-8 Establish a setback from the banks of Cache Creek outside of which off-channel mining project must remain. The setback fulfills the following policy objectives:
- Sufficient buffer to protect off-channel mining areas from lateral river adjustments;
  - Additional buffer against failure for un-engineered levees and natural streambanks;
  - Adequate area in which to maneuver heavy equipment during an emergency;
  - Access for continuing maintenance activities;
  - Flexibility for future channel sculpting during implementation of the CCIP;
  - Available space for revegetation and habitat restoration efforts along the creek;
  - Potential future corridor for recreational activities; and
  - Consistent and uniform treatment of channel banks throughout the OCMP planning area.

*(This was incorporated into Section 10-4.429(d) of the Mining Ordinance. The setback also creates a potential future corridor for recreational activities and allows for consistent and uniform treatment of channel banks throughout the OCMP planning area.)*

## CHAPTER 5.0 – AGRICULTURAL RESOURCES ELEMENT

### 5.1 INTRODUCTION

#### Present Conditions

As described in Chapter 2, the planning area largely consists of lands zoned A-N (Agricultural Intensive) and A-X (Agricultural Extensive). Agricultural uses are an allowed use in these zones and are not subject to any discretionary approval by the County, except where building permits or property adjustments and divisions are required.

Since its inception, the CCAP has required 1:1 mitigation for permanent loss of prime farmland, with no separate mitigation requirements for non-prime land or for land impacted on an interim basis during the term of the mining but ultimately reclaimed to agricultural uses. There are a variety of reasons for this including:

- The County’s mining program is already one of the most stringent in the state and exceeds the requirements of SMARA for operator obligations.
- The CCAP imposes burdens for the protection of open space and agriculture on the mining industry that exceed those imposed on other land uses.
- The CCAP includes a requirement for special community benefits called “net gains” that include the provision of property dedications and easement for/on reclaimed mining sites, restored habitat, trail connections, and related community enhancements (see OCMP Action 2.4-7).
- Integral to the program is a focus on managing lower Cache Creek resources to balance and maximize multiple competing goals.
- Each operator along Cache Creek has an agreement with the County to fund the entire program plus specified open space and restoration activities through the payment of fees for each ton of aggregate sold (see OCMP Action 2.4-16).
- The program is already structured to minimize the geographic impacts of mining by limiting it to a defined area and by encouraging the removal of the full depth of available resources.
- The program includes an obligation to develop and implement the Cache Creek Parkway Plan.

- The program includes, and has since 1996, special protections and monitoring of groundwater and recharge, management of the creek for the protection of adjoining land uses, and permanent protection of reclaimed lands as open space or agriculture.
- Aggregate mining is a unique land use in that it is interim by definition – permits are limited to a maximum term of 30-years (Mining Ordinance Section 10-4.426) and reclamation to a beneficial end use (e.g., agriculture, open space, or habitat) is not only required, but ensured through special bonding called “financial assurances.”
- Aggregate mining is also unique in that it is the only land use that can result in the creation of net new prime agricultural land through reclamation.
- Aggregate mining is an important economic development engine for the County.

In order to address inconsistency between the County Code and the CCAP as related to mitigation for agricultural conversion, the CCAP Update expanded the obligation to mitigate beyond prime farmlands to also include unique farmlands, and farmlands of statewide significance consistent with the requirements of CEQA. This update also required mitigation equivalent to, but not necessarily identical to, the increased ratios in the County Code. It applies the same 3:1 and 2:1 mitigation ratio requirements from Section 8-2.404 of the County Code that apply elsewhere throughout the county, but allows new mining applications to demonstrate equivalency (down to a minimum 1:1 base mitigation ratio) to the applicable ratio using several options identified in Section 10-5.525 (Farmland Conversion) of the Reclamation Ordinance. These options include improvements to farmland quality, permanent easements, dedication of additional net gain lands beyond those already required under the CCAP program, and/or other benefits consistent with the Cache Creek Parkway Plan that would not otherwise already be achieved through agreements and obligations of the program.

### **OCMP Vision**

The OCMP acknowledges Yolo County's continued commitment to the preservation of agricultural land and farming activities. Strict performance standards governing the reclamation of farmland and maintenance of the A-N and A-X Zones throughout the planning area have been included to further protect agricultural uses. However, the goal of the OCMP is to balance the various resources that coexist along Cache Creek. In order to expand opportunities for habitat, recreation, and groundwater recovery, the CCAP acknowledges that some agricultural land will be lost.

This approach is consistent with the scope of the Williamson Act, which not only includes the preservation of agricultural land, but also applies to the preservation of wildlife habitat, recreation space, and open space. The OCMP is intended to provide for the full range of land uses along Cache Creek, of which agriculture is a component. In fact, in terms of acreage, agriculture will remain the primary activity within the planning area.

In order to maintain as much land as possible within agricultural preserves, the Williamson Act contract may continue through both the mining and reclamation phases, as long as the proposed project is consistent with the applicable Williamson Act findings. This would especially apply to projects which would mine the majority of a parcel under contract, but continuously reclaim as mining occurs so that a portion of the parcel is always in agricultural production. Temporary conservation easements on undisturbed farmland may offset the impacts of mining on contracted land, until successful reclamation is achieved.

In accordance with both the Williamson Act and other applicable State regulations, the OCMR requires that any surface mining operation on contracted property that includes prime farmland, which proposes agricultural uses in its proposed reclamation plan, must return the land to agricultural productive capacity similar to that before mining commenced. Non-prime agricultural land shall be reclaimed so it is capable of producing crops commonly grown in the area at an economically sustainable rate.

## **5.2 GOALS**

- 5.2-1 Improve soil and water resources so that a diverse agricultural economy, supporting a variety of crops and products, is maintained.
- 5.2-2 Ensure the compatibility of land uses adjacent to agricultural operations, so that productivity is not adversely affected.
- 5.2-3 Recognize that although multiple uses are encouraged along Cache Creek, agriculture remains the primary economic activity in the region.

## **5.3 OBJECTIVES**

- 5.3-1 Encourage the preservation of prime and important farmland along Cache Creek, while giving consideration to other compatible beneficial uses, such as groundwater storage and recharge facilities, surface mining operations, riparian habitat, and public recreation. Reclamation of agricultural lands to other uses; however, is discouraged wherever agricultural reclamation is feasible.
- 5.3-2 Ensure the use of appropriate agricultural management practices in reclaiming mined areas to productive farmland.

## **5.4 ACTIONS**

- 5.4-1 Maintain the existing A-N (Agricultural Intensive) or A-X (Agricultural Extensive) base zoning within the off-channel planning area, except where it serves as a holding area for growth within the community spheres of Capay, Madison, Esparto, and Yolo, so as to preserve the agricultural character of the region.

5.4-2 Deleted

5.4-3 Provide for the protection of farmland within the planning area, including mined and reclaimed farmland, through the use of agricultural preserves and/or conservation easements. *(Each approved mining permit under the CCAP contains a condition of approval that states: "Upon the completion of reclamation within each phase of the project, the operator shall enroll each reclaimed parcel in Williamson Act contracts, and provide long-term easements or an equivalent (e.g., deed restrictions) to protect open space and agriculture.")*

5.4-4 Ensure that all proposed surface mining operations that include reclamation to agricultural uses comply with the requirements of the Land Conservation (Williamson) Act and the State Mining and Geology Board Reclamation Regulations.

5.4-5 Assess property taxes on permitted mineral reserves within contracted land, in order to account for the increased value of the property and ensure that the tax incentives associated with agricultural preserves are not misapplied.

5.4-6 Encourage off-channel excavation operations to access additional aggregate reserves through the use of wet pits, in order to minimize the amount of agricultural land disturbed by mining.

5.4-7 Ensure maximum public benefit from reclaimed uses by establishing the following priority to be used to assess the adequacy of proposed reclamation plans:

1. Reclamation to viable agricultural uses;
2. Reclamation to native habitat;
3. Reclamation to public recreation/open space uses; and
4. Reclamation to other uses.

## CHAPTER 6.0 – BIOLOGICAL RESOURCES ELEMENT

### 6.1 INTRODUCTION

#### Present Conditions

In California's Central Valley, intact riparian ecosystems are critically important habitat for numerous native wildlife, fish, and invertebrate species. Riparian forests are particularly valuable for both common and special-status species of birds, mammals, insects, and other species seeking food, shelter, dens, or nesting sites. Riparian areas also provide many important ecosystem services for people including hiking, birdwatching, hunting, fishing, education, and carbon sequestration that may reduce the effects of climate change.

Prior to the 1850's, Cache Creek was likely bordered by extensive riparian forests composed of cottonwoods, willows, and oaks, spanning a broad vegetated floodplain. Much of the forest was eliminated in the early to mid-1900's, largely as the result of cattle grazing, timber harvesting, clearing of fields for agriculture and homesteads, and water diversion. In-stream mining that began with small operations in the early 1900's, and which grew to industrial-scale operations in subsequent decades, further decreased riparian forests and native vegetation in general.

The 1995 Technical Studies estimated that only 200 acres (ac.) of riparian forest remained within the present-day CCAP area. Substantially more willow scrub and herbaceous (non-woody) vegetation was estimated to have remained, yet large stretches of the creek were devoid of any significant vegetation. However, a more refined re-analysis of the 1995 vegetation data as part of the 2017 Technical Studies revealed that riparian forest area was substantially underestimated at the time of the Technical Study. In 1995, there was an estimated 353.8 ac. of riparian forest, 589.0 ac. of oak woodland, 529.9 ac. of willow scrub, and 113.5 ac. of herbaceous vegetation within the CCAP area. As of 2015, there was an estimated 372.5 ac. of riparian forest, 593.9 ac. of oak woodland, 259.6 ac. of willow scrub, and 1835.5 ac. of herbaceous vegetation within the CCAP area. Changes in these values from 1995 to 2015 represent actual changes in vegetation in addition to significant differences in methodology used to classify vegetation and estimate acreage between the two time periods.

The most extensive riparian forests are presently found in the Dunnigan Hills reach, in which large patches of gallery forests comprised of cottonwoods, willows, oaks, black walnuts, buckeyes, and other species of trees and shrubs can be found. Bands of dense willow/mulefat scrub line the channel, interspersed with patches of herbaceous wetland vegetation. Large patches of riparian forest are also found in the Capay, Guesisosi, and Hoppin reaches. Herbaceous vegetation has increased significantly along the channel banks in the Dunnigan Hills and Hoppin reaches, primary in the form of dense stands of cattails and tules. Much of the remaining off-channel riparian habitat consists of isolated forest patches, small stands of oak trees in agricultural fields and rangelands, and willow scrub with some taller trees growing along the canals and ditches that run through the area. Notably, substantial recovery of woody vegetation has occurred in

historically mined areas, including off-channel sites, within the Guesisosi and Dunnigan Hills reaches, and to a lesser extent within the Hungry Hollow and Madison reaches.

Numerous threats to the remaining vegetation were identified in the 1995 Technical Studies, including the narrow creek channel, lack of surface water, invasive plant species, and lowered groundwater levels. These factors are still present in 2017. The narrow width of the channel increases the velocity of the streamflow, making it more likely that native plant seedlings are scoured away during high flows. The diversion of surface water often occurs during the growing season for riparian vegetation and removes the primary source of water in losing reaches of the creek. Lowered groundwater levels leave tap roots withered and reduces colonization by new native seedlings, especially in riparian forest patches on upper terraces. In addition, the invasion of aggressive non-native species inhibits the recovery of diverse native habitat. The latter two factors are especially relevant for vegetation within the off-channel lands that characterize the OCMP area.

However, additional threats to native vegetation have arisen over the past two decades, including off-highway vehicle (OHV) use, brush fires, numerous new invasive species, and the lack of active revegetation after fires and invasive species treatment. Rampant OHV use along lower Cache Creek damages or removes native vegetation, potentially promotes invasive species, and likely has negative impacts on wildlife such as nesting birds. Fires set by landowners to clear brush in forested areas have spread to encompass entire forest stands, resulting in large-scale damage to riparian forests. Numerous new invasive species have established along lower Cache Creek, including Ravenna grass, perennial pepperweed, tree of heaven, nonnative thistles, tree tobacco, Himalayan blackberry, fig, poison hemlock, barbed goatgrass, and medusahead. These species compete directly with native plants and generally have little value for native wildlife. Finally, the lack of active revegetation with native species after fires and invasive species treatment has allowed many of these invasive species to rapidly increase and spread across the area. Some patches of arundo, Ravenna grass, and tamarisk (formerly widespread in large, continuous patches) have either persisted along backwater channels or under dense forest canopy, or have re-sprouted after being treated in previous years. More recent invasive species, such as perennial pepperweed and Himalayan blackberry, are widespread and often occur in large, homogeneous patches that exclude native vegetation.

Wildlife and invertebrate species are also important components of the biological resources present within the OCMP area. The 1995 Technical Studies presented an overview of native species that were known to be present within the CCAP area, as well as those species that could be present given suitable habitat. Some of these species, such as Western pond turtle (*Actinemys marmorata*) and bank swallow (*Riparia riparia*) are associated with either the creek itself or adjacent habitat, and thus not present or potentially present within the OCMP area. Notable species that were present or potentially present within the OCMP area at the time of the 1995 Technical Studies included Swainson's hawk (*Buteo swainsoni*; present), tricolored blackbird (*Aegelaius tricolor*; present), Cooper's hawk (*Accipiter cooperi*; potentially present), yellow warbler (*Stenophaga petechia*; potentially present), ring-tailed cat (*Bassariscus astutus*; potentially present), Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*;

present), Sacramento anthicid beetle (*Anthicus sacramento*; potentially present), as well as numerous common species such as black-tailed deer (*Odocoileus hemionus columbianus*).

As of 2017, notable species observed within the OCMP area include Swainson's hawk, tricolored blackbird, yellow warbler, bald eagle (*Haliaeetus leucocephalus*), burrowing owl (*Athene cunicularia*), golden eagle (*Aquila chrysaetos*), loggerhead shrike (*Lanius ludovicianus*), long-eared owl (*Asio otus*), Northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), ring-tailed cat, bobcat (*Lynx rufus*), mountain lion (*Puma concolor*), American badger (*Taxidea taxus*), nonnative wild pig (*Sus scrofa*), Valley elderberry longhorn beetle, California red-legged frog (*Rana aurora halophilus*), and potentially Sacramento Valley red fox (*Vulpes vulpes* spp. *patwin*). More than 100 additional common species of snakes, lizards, birds, mammals, and invertebrates also occur across the OCMP area.

Threats to native wildlife and invertebrates include non-native competitors and predators such as brown-headed cowbird (*Molothrus ater*) and bullfrog (*Rana catesbeiana*); poaching; rodenticides that can poison native mammalian and avian predators; damage to or loss of habitat due to development, drought, or disturbances including fires and OHV use; and establishment and spread of invasive plant species that reduce habitat value.

### **OCMP Vision**

Although the OCMP cannot reestablish the diversity and extent of riparian habitat that existed 150 years ago, there is substantial opportunity for improving the degraded situation that occurs today. Habitat enhancement and restoration projects should be implemented within the OCMP area to complement similar projects within the CCRMP area in order to conserve and protect biological resources within the CCAP area. Habitat enhancement refers to removal of invasive species, woody debris, and other impediments to the recovery and persistence of biological resources. Habitat restoration includes both passive and active restoration; the former is essentially equivalent to habitat enhancement in that impediments to habitat recovery are removed, while the latter is generally a more-intensive form of management in which native seeds or seedlings are planted after site preparation and invasive species removal. Habitat enhancement and restoration within the OCMP area should complement similar efforts within the CCRMP by creating larger patches of functional habitat, reducing fragmentation, increasing patch connectivity, increasing habitat complexity, and providing a habitat buffer around the CCRMP to reduce invasion by nonnative species. All of these outcomes directly benefit native vegetation, wildlife, and invertebrate species. Habitat enhancement and restoration within the OCMP area should also be consistent with the goals, objectives, and conservation guidelines of the County's Habitat Conservation Plan and Natural Community Conservation Plan (Yolo HCP/NCCP).

Habitat enhancement efforts should focus on control of invasive species, including but not limited to arundo, barbed goatgrass, Himalayan blackberry, Italian thistle, medusahead, milk thistle, Ravenna grass, tamarisk, perennial pepperweed, tree tobacco, and yellow starthistle. These species are abundant throughout the CCRMP and OCMP areas, but tend to co-occur with



native vegetation and are thus more common in more vegetated reaches such as Capay, Dunnigan Hills, and Hoppin. The spatially-explicit framework for invasive species mapping, treatment, and monitoring within the CCRMP area should be implemented within the OCMP area to maximize cost-efficiency and success. Areas treated for invasive species should be replanted with native species to minimize re-invasion and improve habitat. Invasive species treatment efforts should focus on County-owned properties, but also include off-channel mining pits that are in the process of revegetating, properties with large remnant populations of arundo and/or tamarisk, and other locations as deemed appropriate.

Habitat restoration efforts should focus on County-owned properties to ensure site access and to align with the on-going development and implementation of the Cache Creek Parkway Plan. For example, significant restoration opportunities exist for the Capay Open Space Park (native grassland and riparian forest), the Millsap property (oak woodland and riparian forest), the Wild Wings property (native grassland and oak woodland), the Woodland Reiff property (native grassland and oak woodland), and the Correll-Rodgers property (riparian forest). Former off-channel mining sites, such as those within the Dunnigan Hills and Hoppin reaches, are also good candidates for habitat enhancement and restoration.

In general, restoration efforts should be prioritized within the area generally located between Interstate 505 and Road 94B, which is a fairly stable and gaining reach of the creek. A gaining reach is one where the streambed is lower than the surrounding groundwater elevation, which allows water to seep from the aquifer and collect in the channel, thus providing a consistent source of surface water. Depth to groundwater is an important factor to consider for all restoration projects implemented within the OCMP area, since groundwater depth will largely dictate the pool of species that can be used in restoration.

It is anticipated that much of the habitat restoration work along Cache Creek will continue to be undertaken by Cache Creek Conservancy staff and contractors. In addition, reclamation plans for off-channel mining along Cache Creek call for several hundred acres of habitat to be created, largely consisting of wetland areas adjoining permanent ponds and lakes. Perhaps the most critical component in ensuring the success of these efforts is the maintenance of a year-round flow in Cache Creek. The availability of water is presently driven by the demands of irrigated agriculture, leaving little surface water for habitat restoration.

In addition to riparian habitat enhancement and restoration, provisions should be made for wildlife and invertebrate species within the OCMP area especially special-status species known to be present or historically present, which include Swainson's hawk, white-tailed kite, Northern harrier, tricolored blackbird, American badger, and Valley elderberry longhorn beetle. Where populations of these and other special-status species already exist, mitigation measures must be incorporated into approved project to ensure that their habitat is maintained. Mitigation measures should be developed in conjunction with the State Department of Fish and Wildlife, and/or the U.S. Fish and Wildlife Service, and should be consistent with the goals, objectives, and conservation guidelines of the Yolo HCP/NCCP. Wherever possible, restoration and reclamation

projects should incorporate features to conserve existing populations and to encourage the establishment of new populations.

## **6.2 GOALS**

- 6.2-1 Provide for a diverse, native ecosystem within the OCMP area that is self-sustaining and capable of supporting native wildlife and invertebrate species.
- 6.2-2 Seek to enhance, expand, and connect existing patches of native woody and herbaceous vegetation to reduce habitat fragmentation and support similar efforts with the CCRMP area.
- 6.2-3 Integrate climate-smart adaptation strategies to increase resiliency and prepare for future uncertainty

## **6.3 OBJECTIVES**

- 6.3-1 Conserve and protect existing wildlife habitat within the OCMP area to the greatest extent possible.
- 6.3-2 Establish conditions to encourage the development of a variety of natural habitat types in the off-channel areas along the Cache Creek channel.
- 6.3-3 Adopt standards for planning, implementing, and monitoring habitat revegetation and restoration projects in order to ensure consistency, to maximize success and account for future uncertainty due to climate change.
- 6.3-4 Coordinate restoration programs with relevant planning efforts of both the County and other private and public agencies. Encourage regional mitigation to occur within the CCAP plan area, consistent with the program and the Parkway Plan. Require mitigation obligations resulting from mining applications to be implemented within the CCAP plan area, consistent with the Parkway Plan.

## **6.4 ACTIONS**

- 6.4-1 Coordinate with appropriate entities, such as the Cache Creek Conservancy, YCFCWCD, Yolo County Resource Conservation District, California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and the U.S. Army Corps of Engineers to ensure that proposed habitat restoration projects are consistent with or complement the Off-Channel Mining Plan and the Parkway Plan. Restoration plans shall complement the preservation and enhancement measures in the Yolo County Natural Communities Conservation Program (HCP/NCCP).

- 6.4-2 Provide for the development of shallow areas along reclaimed off-channel excavations that extend below the groundwater level, to create wetland and riparian habitat. *(See Section 10-5.529 of the Reclamation Ordinance.)*
- 6.4-3 Mitigate for short-term and long-term loss of agricultural land and habitat pursuant to applicable County requirements and CEQA. Comply with the Yolo HCP/NCCP for species covered by that Plan. For non-covered species for which impacts may occur, ensure compliance with appropriate measures in site-specific biological assessments required under the OCMP and CCRMP, in compliance with the State Fish and Wildlife Code, Migratory Bird Treaty Act, and other applicable regulations, plans and programs, as appropriate.
- 6.4-4 Implement strategic mapping, prioritization, treatment, and monitoring of invasive plant species including arundo, barbed goatgrass, Himalayan blackberry, Italian thistle, medusahead, milk thistle, Ravenna grass, tamarisk, perennial pepperweed, tree tobacco, yellow starthistle, especially in areas where they inhibit the growth and development of native riparian vegetation.
- 6.4-5 Include provisions to enhance habitat for special-status species in restoration components of reclamation plans, where feasible. *(See Section 10-5.523 of the Reclamation Ordinance.)*
- 6.4-6 Encourage cooperative agreements and voluntary conservation easements with private landowners to preserve, protect, and enhance the biological resources of Cache Creek, and to implement provisions of the OCMP.
- 6.4-7 Restore riparian habitat throughout the planning area, wherever appropriate. However, re-vegetative efforts should be primarily focused on implementing recommendations described in the Technical Studies and the subsequent Restoration Recommendations incorporated into the CCRMP. Integrate off-channel and in-channel revegetation plans with the goal of reducing fragmentation by expanding and connecting existing habitat patches, optimizing restoration planning in alignment with the Parkway Plan, and supporting future funding proposals. Ensure that elements such as soils, drainage, slopes, and habitat types complement one another in a coordinated effort.
- 6.4-8 Include native-planted hedgerows and other vegetated buffers between restored habitat areas and adjoining farmland, in order to minimize the potential for riparian areas to serve as harbors for predators and insect pests. These buffers will also reduce the noise, dust, and spraying generated by agricultural operations, in addition to providing valuable pollinator resources that in turn could enhance agricultural production.

## **CHAPTER 7.0 – OPEN SPACE AND RECREATION ELEMENT**

### **7.1 INTRODUCTION**

#### **Present Conditions**

As of 2016, the County has several open space properties along lower Cache Creek: Capay Open Space Park (41 acres), Millsap property (17 acres), Wild Wings Park (17 acres), Cache Creek Nature Preserve (123 acres), County Borrow Pit (7 acres), Rodgers Property (30 acres), and Correll Property (39 acres). In the upper reaches of Cache Creek, the County also owns parks near Rumsey and Guinda, and several campgrounds and whitewater rafting areas near Bear Creek. Due to the high proportion of land in private ownership, access to the creek is limited. Other recreational facilities within the immediate area include the Esparto Community Park, the Madison Community Park, and the Flier's Club (a private golf course and clubhouse). In addition, there are several private equestrian facilities on the north side of the creek, just west of County Road 94B.

Recently, trespass and illegal off-highway vehicle activity are significant management issues along lower Cache Creek as the vehicles use formerly mined pits and streambanks, creating erosion and damaging riparian vegetation. Trespassing is frequent, including poaching, camping, and loitering along the creek, resulting in graffiti, property damage, and trash. These areas of the creek are typically found in remote locations, away from nearby residences and areas frequented by authorized visitors. The County faces important decisions about how to manage, improve, and integrate the public properties it owns, and new properties that will be dedicated to the County in the future as a result of development agreements with mining operators and implementation of the CCAP program.

Pursuant to the vision and direction articulated below, the County in 2016 started the process of drafting the Cache Creek Parkway Plan which will provide a detailed vision and integrated management plan for: 1) properties currently under public ownership and managed by the County pursuant to the CCAP; 2) properties and trail easements that will be dedicated to the County in the future pursuant to the CCAP; and 3) additional properties accepted or purchased for management pursuant to the CCAP.

#### **OCMP Vision**

The OCMP and the CCRMP, which together comprise the CCAP, address with the "first phase" of creek management: re-stabilizing the creek channel and restoring the riparian habitat. The "second phase" involves a more detailed analysis of the recreational needs of Yolo County and the resulting environmental effects that recreation would have on surrounding properties. The OCMP anticipates that the County will pursue an integrated system of trails and recreational areas along Cache Creek, similar to facilities along the San Joaquin and American Rivers, although at a less intensive scale of development. The County has undertaken a more detailed analysis of the recreational needs of Yolo County, which will include consideration of resulting

environmental effects (including land use conflicts) of a regional parkway. Development of the Cache Creek Parkway Plan will allow for community involvement and provide specific proposals as well as projected costs for developing and maintaining a parkway system. It will also be valuable for addressing creek ownership and access issues.

The OCMP has designated six general areas for recreational use (see Figure 9). These areas are conceptual in nature. They are located at regular intervals of approximately two miles along Cache Creek, in order to function as trailheads or staging areas for a future system of bicycle, pedestrian, and/or horse paths. These recreational areas are located on lands included for mining, where proposed reclamation is to permanent ponds. This ensures that no additional farmland would be lost, while taking advantage of the amenities associated with the bodies of water to be reclaimed through mining. Frontage to County roads and State highways was an important consideration, to ensure that the public would have adequate access to the sites and the trail system. Also, a variety of sites were included in order to provide a range of potential recreational uses. The three easternmost areas are located near reaches proposed for habitat restoration, and may be suitable for passive activities, such as hiking, birdwatching, horseback riding, and educational exhibits. The three westernmost sites are located in areas of the creek that contain more open space and may be appropriate for intensive activities, including non-motorized boating, catch and release fishing, bicycle riding, and picnic grounds. Active recreational uses in the western sites, would directly benefit the nearby communities of Madison, Esparto, and Capay, and could serve as a future basis for expanded tourism opportunities and economic benefits.

## **7.2 GOALS**

- 7.2-1 Preserve scenic resources within the off-channel planning area.
- 7.2-2 Establish a variety of outdoor recreational and educational opportunities along Cache Creek for use by the public.
- 7.2-3 Ensure the compatibility of recreational facilities with surrounding land uses, in order to minimize adverse impacts.

## **7.3 OBJECTIVES**

- 7.3-1 Continue to use the "Open Space" zoning designation for the area located within the creek's existing banks and other areas where resource management and habitat protection is warranted.
- 7.3-2 Create a continuous corridor of natural open space along the Creek and provide for limited access, at specific locations, to recreational and educational uses.
- 7.3-3 Discourage the encroachment of incompatible uses into areas surrounding designated recreation sites.

# Cache Creek Area Plan Update - Baseline Parkway Properties

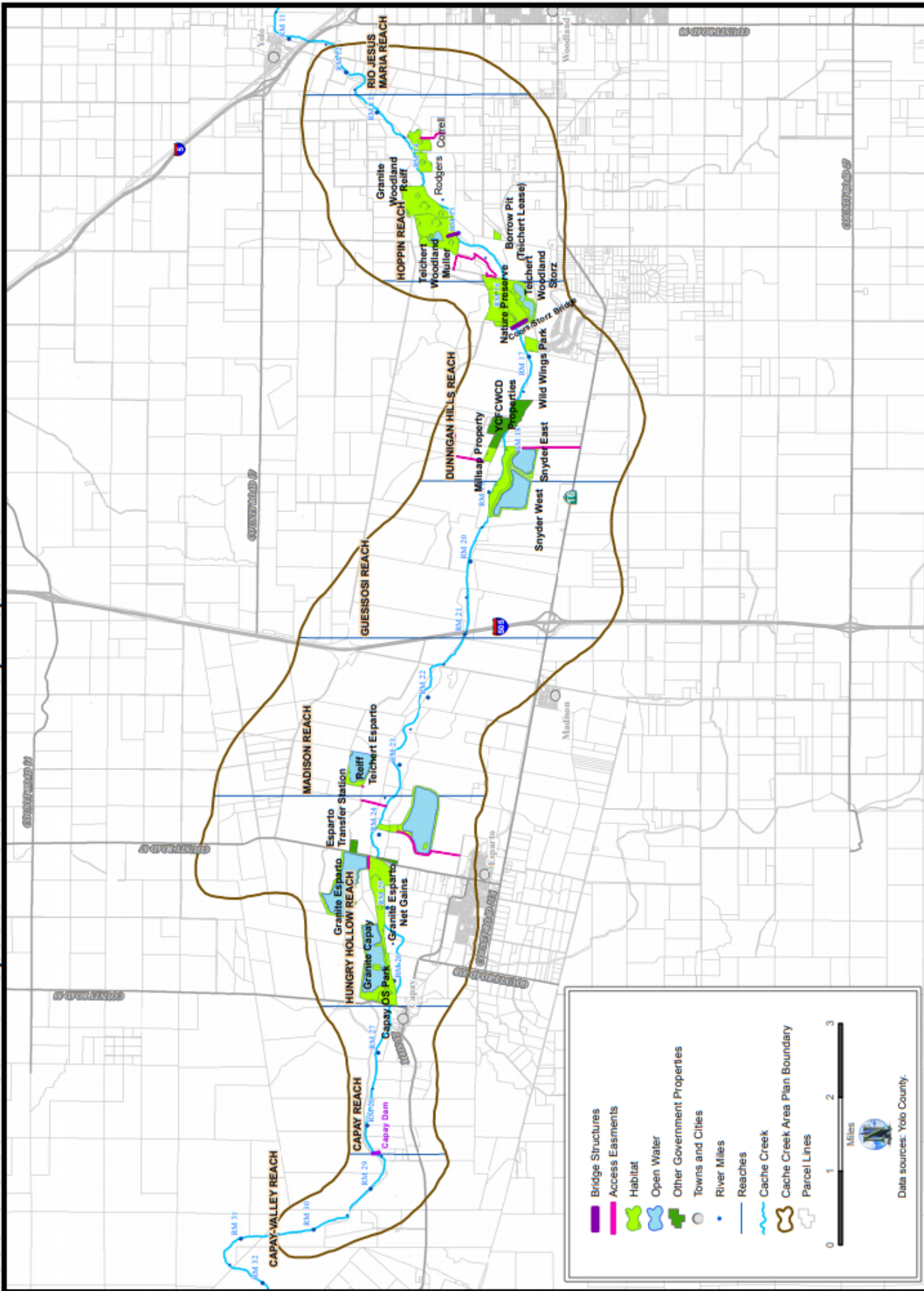


Figure 9

August 9, 2018

7.3-4 Design recreational facilities to maintain the privacy and security of surrounding property owners.

#### **7.4 ACTIONS**

7.4-1 Continue to solicit the dedication of restored habitat areas and/or recreational areas to the County or to an appropriate land trust such as the Cache Creek Conservancy, in order to provide continuous open space along the creek.

7.4-2 Develop a future Cache Creek Parkway Plan for Cache Creek, in consultation with the County Parks Administrator, to provide a range of public activities and uses. Suggested recreational uses may include, but are not limited to hiking, horseback riding, fishing, picnic grounds, boating, educational exhibits, and birdwatching.

7.4-3 Identify locations for future recreational and educational uses along Cache Creek. Sites shall be located at regular intervals throughout the planning area, with access to a County Road or State Highway. The location and operation of such facilities shall be compatible with surrounding residences, agriculture, mining, and wildlife habitat.

7.4-4 Designate dedicated recreational areas as "Open Space" in the OCMP.

7.4-5 Coordinate with the U.S. Bureau of Land Management to investigate the eventual linkage of recreational uses located along the upper watershed of Cache Creek to the designated recreational sites located within the planning area. *(The BLM Cache Creek Coordinated Resource Management Plan was adopted in December 2004.)*

7.4-6 Ensure that active surface mining operations are located away from public areas, such as County roads, residences, and sites reclaimed to recreational uses, unless adequate mitigation is provided. *(See Section 10-4.429 of the Mining Ordinance.)*

7.4-7 Design and manage recreational sites so that trespassing, vandalism, and other undesirable activities are discouraged. Suggested options include controlled and gated access, day-use fees, and volunteer docents to patrol the site.

## ACKNOWLEDGEMENTS

### 2019 Update

The Cache Creek Area Plan (CCAP) is a rivershed management plan that sets policy for and regulates off-channel surface mining along, as well as in-channel restoration and maintenance within, Lower Cache Creek. The program is based on the concept of adaptive management, and relies on on-going detailed monitoring, analysis, and re-evaluation. A comprehensive ten-year review is mandatory under the program. The 2019 CCAP Update constitutes the second mandatory ten-year program review since the program was put into effect in 1996. The purpose of the Update was to analyze trends and adjust the program to avoid unexpected effects on Cache Creek resources focusing on changing in creek conditions; analysis of collected data; and new regulatory requirements.

### 2019 Yolo County Board of Supervisors

Don Saylor	District 2 (Chair)
Gary Sandy	District 3 (Vice-Chair)
Oscar Villegas	District 1
Jim Provenza	District 4
Duane Chamberlain	District 5

### 2019 Yolo County Planning Commission

Patrick Reynolds	District 4 (Chair)
Darin Hall	District 1 (Vice-Chair)
Elisabeth Dubin	District 2
Chuck Dudley	District 3
Amon Muller	District 5
Trini Campbell	At Large
Marcia Gibbs	At Large

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Project management was provided by Heidi Tschudin of TSCHUDIN CONSULTING GROUP, under contract to the County as an extension of staff.

The primary technical basis for this Update was provided by the *2017 Technical Studies and 20-Year Retrospective for the Cache Creek Area Plan* (March 2017). Andrew Rayburn, CERP, Ph.D., Paul Frank, P.E., CED, and Mark Tompkins, P.E., Ph.D. were the primary authors of this report.



Funding for this project was provided by CEMEX, Granite Construction Company, Syar Industries, and Teichert Aggregates.

### **1996 Plan**

For the last twenty years countless hours have been spent by elected officials, citizens, landowners, aggregate operators, farmers, agency representatives, staff members, and consultants trying to agree on an appropriate balance between the use of natural resources and the sustainability of the riparian environment. From those efforts a mountain of studies have been produced, providing a ready source of technical data upon which policy and planning may be based. We will have foregone an opportunity and failed as stewards of the land if we do not translate this knowledge into a plan of action. The past debate concerning Cache Creek has been vital in assuring the investigation of a wide variety of alternatives, but there is a general feeling that the coordinated management and planning for the creek must begin now. Further delays would not appreciably improve our understanding of the creek. Continued inaction, however, will allow the existing degraded conditions to worsen. It is time to concentrate less upon our differences and to devote our energies towards achieving the goals that we have in common. Through these efforts, and the tremendous resiliency of our natural resources, Cache Creek will once again achieve the vitality that makes it one of the County's unique treasures.

### **1996 Yolo County Board of Supervisors**

Mike McGowan	District 1
Helen Thomson	District 2
Tom Stallard, Chair	District 3
Betsy Marchand	District 4
Frank Sieferman	District 5

### **1996 Yolo County Planning Commission**

Bob Heringer	District 1
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Project management was provided by Heidi Tschudin of TSCHUDIN CONSULTING GROUP, under contract to the County as an extension of staff.

The primary technical basis for this Plan was provided by the *Technical Studies and Recommendations for the Lower Cache Creek Resource Management Plan* (October, 1995). A special thanks to the authors of this comprehensive report.

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To find out more about this Plan, or the process through which it was developed and updated, please contact:

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### **Appendix A: Off-Channel Surface Mining Ordinance**

The current version of this ordinance can be accessed online via the following link:

<https://codelibrary.amlegal.com/codes/yolocounty/latest/yolo/0-0-0-17331>



### **Appendix B: Yolo County Surface Mining and Reclamation Ordinance**

The current version of this ordinance can be accessed online via the following link:

<https://codelibrary.amlegal.com/codes/yolocounty/latest/yolo/0-0-0-17871>



### **Appendix C: Surface Mining and Reclamation Act**

The current version of these regulations can be accessed online via the following link:

<https://www.conservation.ca.gov/dmr/lawsandregulations>



**UPDATED FINAL**  
**CACHE CREEK RESOURCES**  
**MANAGEMENT PLAN (CCRMP)**  
**for LOWER CACHE CREEK**

**Yolo County**

***Updated December 17, 2019***  
***Amended July 23, 2002***  
***Adopted August 20, 1996***

**UPDATED FINAL**  
**CACHE CREEK RESOURCES MANAGEMENT PLAN**  
**for LOWER CACHE CREEK**

**Yolo County**

***Updated December 17, 2019 (Board Resolution 19-176)***  
***Amended July 23, 2020 (Board Resolution 02-130)***  
***Adopted August 20, 1996 (Board Resolution 96-132)***

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## **CHAPTER 1.0 – INTRODUCTION**

Pursuant to local requirements, the Cache Creek Resources Management Plan (CCRMP) was comprehensively reviewed and updated in 2017. New hydraulic modeling was conducted along Cache Creek using HEC-RAS v.5.0 and topographic data collected in 2011. Biological resources within the program area were comprehensively assessed. Over twenty years of data collected as a part of the program were analyzed for patterns and trends. This information was reported in an update to the 1995 Technical Studies entitled 2017 Technical Studies, which provided information in support of proposed updates, clarifications, and modifications to the program documents.

### **1.1 HISTORY AND BACKGROUND**

Cache Creek has long served as the social and economic heartland of Yolo County. Long before exploration by the French trapper and Spanish soldiers, Cache Creek was one of the main settlement areas for the Patwin tribe, providing a rich environment for water, food, building materials, and recreation. In 1821, when the Spanish first entered the area, they noted a village of about 900 native people situated along the creek in an oak forest. The word Yolo comes from the Patwin "yoloy," which means a place abounding with rushes. These rushes were found in extensive wetlands along the Sacramento River, fed by the waters of Cache Creek.

By 1829, trappers from the Hudson Bay Company had discovered the bountiful nature of what the Spanish referred to as the "Rio de Jesus Maria." Since there was a convenient storage site near the creek for their beaver pelts, they dubbed it "Riviere la Cache," or Cache Creek. This area was one of the first in the Sacramento Valley to be settled by Americans, beginning in the 1840's. Several ranchos were granted to local residents by the Mexican government over the next decade. Soon, agriculture flourished along Cache Creek, especially the raising of livestock. The town of Cacheville (now Yolo) was established in 1857 and the water from Cache Creek was used to power mills and irrigate nearby fields.

Several ditches were constructed to divert water from Cache Creek in the 1850's and 1860's, diversifying the agricultural base of the area by expanding the production of wheat, barley, and alfalfa. In fact, irrigation diversions on Cache Creek are some of the earliest recorded in the state's history. Technological advances in water pumps during the 1880's led to widespread use of groundwater irrigation and the expansion of orchard crops, especially in the Capay Valley. As both surface irrigation and the groundwater pumping improved, agriculture intensified in areas previously dry farmed. The development of efficient land leveling equipment and continual improvements in water delivery systems after World War II created a shift from grain and orchard crops to irrigated field crops, such as sugar beets and tomatoes.

With the booming post-war economy came rapidly growing subdivisions in the urban areas, dam construction, and the building of the interstate highway system. Consequently, the 1950's saw a dramatic increase in the demand for high-quality sand and gravel for use in concrete and in road construction. Due to its unique hydraulic and geologic characteristics, Cache Creek soon proved

to be an important source of construction grade aggregate. In-stream mining expanded to meet the demand and several new gravel operators moved into the area. The amount of sand and gravel removed from the channel rose sharply over the next two decades, generating public interest in the environmental effects caused by mining. Concerned over the noticeable degradation of Cache Creek, Yolo County began to turn its attention towards taking better care of this long neglected and highly valued natural resource.

### **Aggregate Resources Advisory Committee**

Yolo County began working on a regulatory solution for concerns related to aggregate mining in Cache Creek in the mid-1970's. Although much of the debate has centered on the benefits and problems associated with aggregate mining, previous studies have often expanded into other areas of environmental interest. The discussion of managing Cache Creek first began with the formation of the Aggregate Resources Advisory Committee (ARAC) by the Board of Supervisors in 1975. The ARAC described its scope as follows:

*Concern that the high quality aggregate resources of Yolo County may be being depleted led to the need to understand the impact of gravel extraction on: sediment transportation, bank erosion, scour, stream channelization and meandering, groundwater recharge, agriculture, land values, air and noise pollution, environmental and aesthetic considerations as well as obtaining an estimate of needs for Yolo County to the year 2025 for aggregate. There is also concern that alternatives for management are recommended.*

The ARAC sought the assistance of Woodward Clyde Consultants to provide an objective technical investigation of the conditions on Cache Creek. The primary purpose of the study was to develop a sound basis for establishing a viable management policy. The report focused on two primary environmental impacts associated with the creek: (1) the causes and effects of streambed lowering; and (2) the causes and effects of stream widening. Woodward Clyde concluded that the streambed had been lowered significantly in many areas, largely as a result of gravel extraction, but that several other factors also contributed, including flood control structures (dams, levees, channelization, etc.), the construction of bridges with piers in the channel, and removal of riparian vegetation.

Several of the recommendations described in the Woodward Clyde report were incorporated into the CCRMP, including the construction of sills, check dams, and jetties within the channel to reduce the potential for erosion and the additional protection of bridge structures (although the CCRMP recommends bio-engineering methods, rather than traditional techniques depending on the extensive use of concrete and steel). While recommending that in-channel excavation be significantly reduced, this early report advised that aggregate mining should be encouraged in off-channel pits, as long as such concerns as hydraulics, water, and agricultural land were adequately addressed. Woodward Clyde also suggested that the County undertake further study and regular monitoring of the creek. These concepts have similarly been applied in the policy framework of the CCRMP.

One of the primary recommendations of the ARAC was to update the County surface mining and reclamation ordinances, and require that all in-stream mining operations existing at the time obtain new use permits and reclamation plans consistent with the new ordinances. This was accomplished in 1980. The permits were analyzed in a program-level Environmental Impact Report (EIR), prepared by Environ. In the EIR, Environ also analyzed the County's approach to resource management. They reiterated many of the recommendations made by Woodward Clyde and the ARAC, such as the need for additional study and future monitoring; revision of the recently adopted interim mining and reclamation ordinances; encouragement of off-channel mining; and maximization of net benefits from the aggregate industry (similar to the CCRMP's concept of "net gain"). In addition, Environ recommended that the County re-examine its policy with regard to agriculture lands, to allow for reclamation to other compatible uses, such as groundwater storage and recharge basins, recreation ponds, and fish farming. Most importantly, however, was the ARAC's emphasis on developing a coordinated approach to resolving interrelated resource problems.

### **Aggregate Technical Advisory Committee**

In order to implement the directions of the ARAC, the Board of Supervisors appointed an Aggregate Technical Advisory Committee (AgTAC) in 1979 to develop a Resource Management Plan (RMP) for Cache Creek. A new study was prepared by Wahler Associates in 1982, of sand and gravel deposits along Cache Creek, as well as the upper and lower groundwater basins within the plan area. The Draft Resource Management Plan for the Cache Creek area located between the towns of Yolo and Capay was released by the AgTAC in 1984. The draft plan looked at eleven separate management alternatives, as follows:

1. Eliminate in-channel mining and allow off-channel excavation;
2. Same as Item 1, except dedicate a corridor for the establishment of riparian vegetation;
3. Continue existing permits, as approved, and allow off-channel mining;
4. Repeal existing mining regulations and review in-stream mining on a case-by-case basis;
5. Create a channel of sufficient capacity to convey flood events, with in-channel mining restricted for maintenance and allow off-channel mining;
6. Same as Item 5, except sills would be installed downstream from local bridges to protect the structures against future scour;
7. Same as Item 5, except a low-flow channel would be designed within the floodway to convey smaller flood flows;
8. Same as Item 5, except channel banks would be armored with concrete or riprap;

9. Construct check dams within the channel and mine the materials that would be deposited behind them, as well as permit off-channel excavation;
10. Allow in-stream mining down to a predetermined elevation and prohibit off-channel mining; and
11. Prohibit all mining within the plan area.

After comparing the various benefits and problems of each method of creek management, the AgTAC decided that Alternative No. 5 was the one that would best accomplish the committee's goals, as well as being the most practical and the least expensive to implement. The recommended plan expanded upon this alternative, describing a number of specific actions needed to carry out the development of the flood channel concept. Among the actions to be taken were the design of a floodway using the 100-year storm event, as determined by the U.S. Army Corps of Engineers; the development of criteria to ensure that off-channel pits would not adversely impact groundwater flow or breach during a flood; adoption of new zoning designations to protect mined lands from encroachment by incompatible uses; and incorporation of the classification study of aggregate resources prepared by the State Department of Conservation. The AgTAC also reiterated earlier recommendations to review the compatibility of the County's agricultural zone categories with future mining reclamation, as well as a need to revise the County mining and reclamation ordinances.

A Draft EIR was authorized for the Draft Resource Management Plan by the firm of Dames and Moore in 1989. The document looked at seven different mining alternatives, as follows:

1. Continue existing permits, as proposed, and allow off-channel mining;
2. Rescind the County mining and reclamation ordinances, and allow both in-channel and off-channel mining depths and amounts to be set on an individual basis;
3. Implement the floodway channel concept described in the plan recommended by the AgTAC (Recommendation 5);
4. Implement off-channel wet pit mining, as long as it minimizes groundwater lowering and prevents levee breaches. (Note: This alternative and Item 3 together constituted the recommended AgTAC plan);
5. Allow off-channel mining, but restrict it to depths above the water table;
6. Allow in-stream mining below the maximum allowed depth (the theoretical thalweg); and
7. Prohibit all mining within the study area.

The environmental impacts of each alternative were examined in a general manner, since no specific applications had been submitted to the County for review. Before any further work could be completed; however, the Draft EIR was subjected to significant controversy regarding the adequacy of the project description and the accompanying analysis. As a result, the document was abandoned by the County in 1991.

Over the next two years, a series of public workshops were held by the Community Development Agency in order to develop a consensus project description to form the basis of a new Resource Management Plan. Although substantial progress was made, the effort was ultimately unsuccessful. This effort was later taken up by a subcommittee of the Board of Supervisors, who made their findings in March 1994. These findings formed the foundation for the goals and objectives of the CCRMP.

### **Cache Creek Area Plan**

The Cache Creek Area Plan (CCAP) is comprised of the OCMP and CCRMP. The OCMP is a scientifically based aggregate resource management plan that allowed for off-channel mining adjacent to Cache Creek. It facilitated the development of a sufficient supply of aggregate to meet current and future market needs, while greatly increasing the level of environmental protection and monitoring. It provided a planning area boundary, and restricted mining to certain areas within that boundary for a 50-year period. It identifies specific goals, objectives, and actions to guide mining activities that go well beyond the state-mandated requirements of the State Mining and Reclamation Act (SMARA). The OCMP was adopted on July 30, 1996 (Board Resolution 96-117), and underwent a comprehensive update in 2017.

The CCRMP is a scientifically based river management plan that eliminated in-channel commercial mining, established an "improvement program" for implementing on-going projects to improve channel stability, encouraged restoration along the creek banks pursuant to a carefully developed policy and regulatory framework, and established a framework for future recreation along the Creek. The CCRMP was adopted on August 20, 1996 (Board Resolution 96-132), underwent a focused update on July 23, 2002 (Board Resolution 02-130), and a comprehensive update in 2017. An historic overview of the development of the two plans is provided below.

In June 1994, the Board of Supervisors adopted a framework of goals and objectives for the CCRMP<sup>1</sup>. The document was based on the key premise that "the Creek must be viewed as a total system, as opposed to a singular focus on the issue of mining." As a result, the conceptual plan offered a far broader scope than previous efforts. It was composed of seven elements, covering agriculture, aggregate resources, riparian and wildlife resources, water resources, floodway and channel stability, open space and recreation, and the cultural landscape. Specific goals and

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<sup>1</sup> The Yolo County Cache Creek Resources Management Plan (CCRMP) was adopted August 20, 1996, with an update on July 23, 2002. In 2002, the BLM released a draft of their Cache Creek Coordinated Resource Management Plan (CCCRMP). The BLM CCCRMP was adopted December 14, 2004. Though similarly named these plans are completely independent.

objectives were adopted for each of the elements, with suggested policies for their implementation.

A work schedule was also approved by the Board in June 1994, outlining the interrelationships between four primary tasks: (1) adoption of a resource management plan to protect and restore the creek; (2) adoption of an off-channel mining plan and implementing ordinances; (3) processing of long-term off-channel mining and reclamation applications; and (4) processing of temporary off-channel mining and reclamation applications to allow operations to continue while the necessary plans are being developed. This schedule was further refined by staff in order to provide a clear guide for both decision-makers and the public throughout the overall planning process.

In addition to adopting the conceptual framework, the Board also directed the preparation of the "*Technical Studies and Recommendations for the Lower Cache Creek Resource Management Plan*" (1995 Technical Studies). The 1995 Technical Studies provided baseline and historical information about the streamway fluvial morphology, groundwater resources, and riparian habitat, so that an accurate assessment could be made of the creek's condition and appropriate management strategies. Constraints and opportunities for activities such as channel stabilization, habitat restoration, flood control, groundwater management, and mining were also identified in the report. The 1995 Technical Studies include an extensive list of recommendations on improving the natural resources of Cache Creek. On October 24, 1995, the Board of Supervisors accepted the 1995 Technical Studies and directed staff to utilize them as the basis for preparing both the CCRMP and OCMP.

Throughout 1995 and the first half of 1996, the CCRMP, Cache Creek Improvement Program (CCIP), OCMP, and various implementing ordinances were drafted. Program EIRs were prepared and certified for both plans and accompanying ordinances. The entire program was adopted the Board of Supervisors in 1996, and subsequently placed by the Board before the voters on the November 1996 ballot against an opposing citizen's initiative. Over 60 percent of the voters supported the CCAP and that same proportion voted against the citizen's initiative. Moreover, the CCAP carried in every supervisorial district. Implementation of the plan began in earnest in 1997.

The entire CCAP program (sometimes referred to as the "gravel program") is now administered through the following local regulations:

- CCRMP implemented by the CCIP (Appendix A) and In Channel Ordinance (Appendix B and County Code Title 10, Chapter 3)
- OCMP implemented by the Off-Channel Surface Mining Ordinance (County Code, Title 10, Chapter 4) and the Surface Mining Reclamation Ordinance (County Code, Title 10, Chapter 5)

- Other important ordinances include (but are not limited to):
  - Gravel Mining Fee Ordinance (County Code, Title 10, Chapter 11)
  - Sand and Gravel Combining Zone County Code, Title 8, Chapter 2, Article 23.1)
  - Sand and Gravel Reserve Combining Zone (County Code, Title 8, Chapter 2, Article 23.8)
  - Development Agreements Ordinance (County Code, Title 8, Chapter 5)
  - Flood Protection Ordinance (County Code Title 8, Chapter 4)

## **1.2 STUDY AREA**

The definition of a waterway is always subject to varied interpretation. Some agencies use the floodplain as the definition, although they may differ on what size event to use, covering everything from a 2-year flood to a 200-year flood. Other jurisdictions define a creek according to its navigability. Still, others look at the extent of riparian vegetation or its suitability for support fish species. The confusion regarding how a creek is defined extends to the literature of channel dynamics. References are made to ordinary high water, active channel, and bank full elevation, all of which may or may not mean the same thing. The CCRMP uses a definition, based on floodplain boundaries and streambank locations that is measurable and allows the plan to focus on the extent of the present creek and improvement of channel stability.

### **The CCRMP Channel Boundary**

The authors of the 1995 Technical Studies, as well as other consultants, recommended that the CCRMP use two measures for determining the extent of the channel. One was the existing channel bank, as shown in recent aerial photographs taken of Cache Creek. The other was the 100-year floodplain boundary. There were several flood boundaries for Cache Creek at the time, developed by the Federal Emergency Management Agency, the U.S. Army Corps of Engineers, and the State Reclamation Board, each of which varied slightly from the others. On the recommendation of the County's technical consultants, the floodplain used to determine the original channel boundary for the CCRMP was the one calculated by the Army Corps of Engineers in the "*Westside Tributaries to Yolo Bypass, California, Draft Reconnaissance Report*" released in June of 1994.

The area within the channel boundary originally encompassed 4,956 acres. As recommended in the Program EIR for the CCRMP, the boundary was modified to eliminate an off-channel mining pit operated by Solano Concrete at the time. In addition, the large floodplains located downstream of County Road 94B were deleted, because it was determined that these farmlands did not have a direct impact on the dynamics of the channel, except to serve as overflow areas during severe flood events. In this downstream reach, the boundary was defined by the channel bank line, as delineated in the 1995 Technical Studies. The revised channel boundary, comprising 2,324 acres, served as the plan area for the CCRMP.

In 2017, as part of the CCAP Update, the CCRMP channel boundary (also referred to as the in-channel area or the active creek channel) and the more narrow CCRMP plan area boundary, were updated to reflect the best available information including 2011 LIDAR topography and two-dimensional hydraulic modeling using this topography, 2015 aerial photography, and the 2012 FEMA regulatory 100-year floodplain (see Figures 1, 2, and 3). As redrawn, the in-channel area totals 5,109 acres and the CCRMP plan area totals 2,266 acres.

Although the CCRMP concentrates on those issues that most directly affect Cache Creek, management of the creek requires a comprehensive approach that recognizes the interrelationships between the creek and its regional setting. The Streamway Influence Zone (see Figure 4) described in the 1995 Technical Studies shows the approximate area subject to these interrelationships, based on the extent of the channel's historical meander migration zone. Because off-channel mining within the Streamway Influence Zone could be especially prone to the effects of erosion and groundwater lowering caused by the creek, appropriate engineering is required to account for potential pit capture and fluctuating water levels.

### **The Off-Channel Mining Plan**

SMARA includes provisions to encourage the production and conservation of minerals to ensure that a sufficient supply will be available for the state's future growth. In order to assist local jurisdictions in the identification of significant aggregate resources near urbanizing areas, the State Geologist is assigned the responsibility of classifying the extent and quality of mineral deposits within metropolitan regions around the state. As a part of this program, the State Department of Conservation (DOC) issued Special Report 156, *"Mineral Land Classification: Portland Cement Concrete-Grade Aggregate in the Sacramento-Fairfield Production Consumption Region"* in 1988. Included within this report is an analysis of the sand and gravel resources located along Cache Creek. An updated report was released in June 2019 (Special Report 245, *Mineral Land Classification: Concrete Aggregate in the Greater Sacramento Area Production Consumption Region, 2018*). SR 245 consolidates and redefines the regional consumption area. The report provides a revised estimate of remaining available aggregate along Cache Creek that does not appear to factor in the conclusions of the 2017 Technical Studies related to in-channel aggradation or aggregate extraction off-channel since the 1988 report. For these reasons, no changes to County estimates of available aggregate resources have been made in response to this report, as County estimates are believed to be more accurate.

The planning area for the Off-Channel Mining Plan (OCMP) is defined as those areas designated as potentially containing sand and gravel resources (i.e. Mineral Resource Zones), according to Special Report 156, minus the planning area for the CCRMP, as defined above (see Figure 2). The MRZ area includes approximately 28,130 acres in a broad band of varying width along Cache Creek, between the Capay Dam and the town of Yolo. As described in the OCMP, however, only 4,727 acres or less than 17 percent of the total plan area are identified for off-channel mining over the next fifty years.



# Cache Creek Area Plan Update - In-Channel Boundary

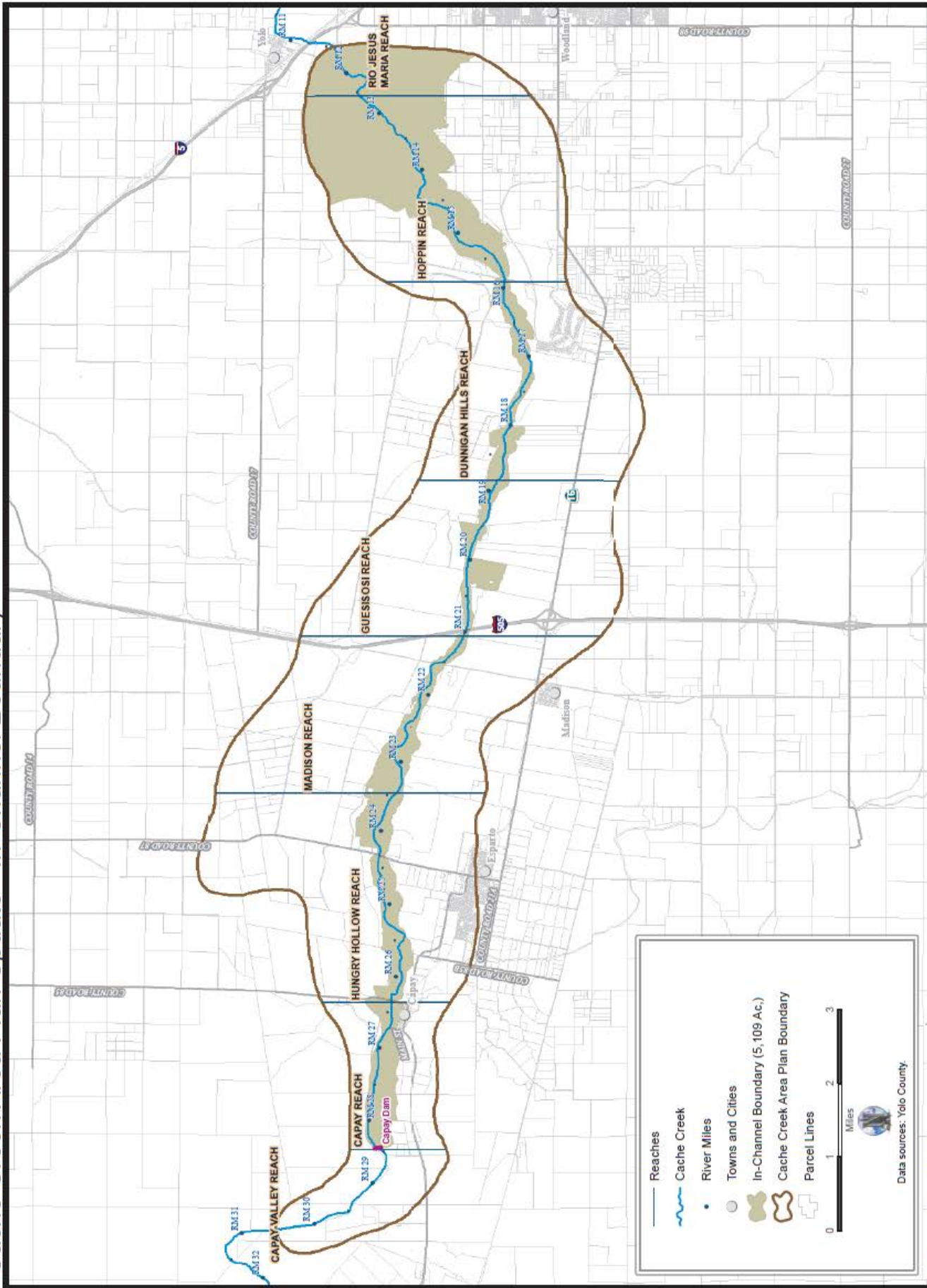


Figure 1

May 10, 2017

# Cache Creek Area Plan Update -Cache Creek Resource Management Plan Boundary

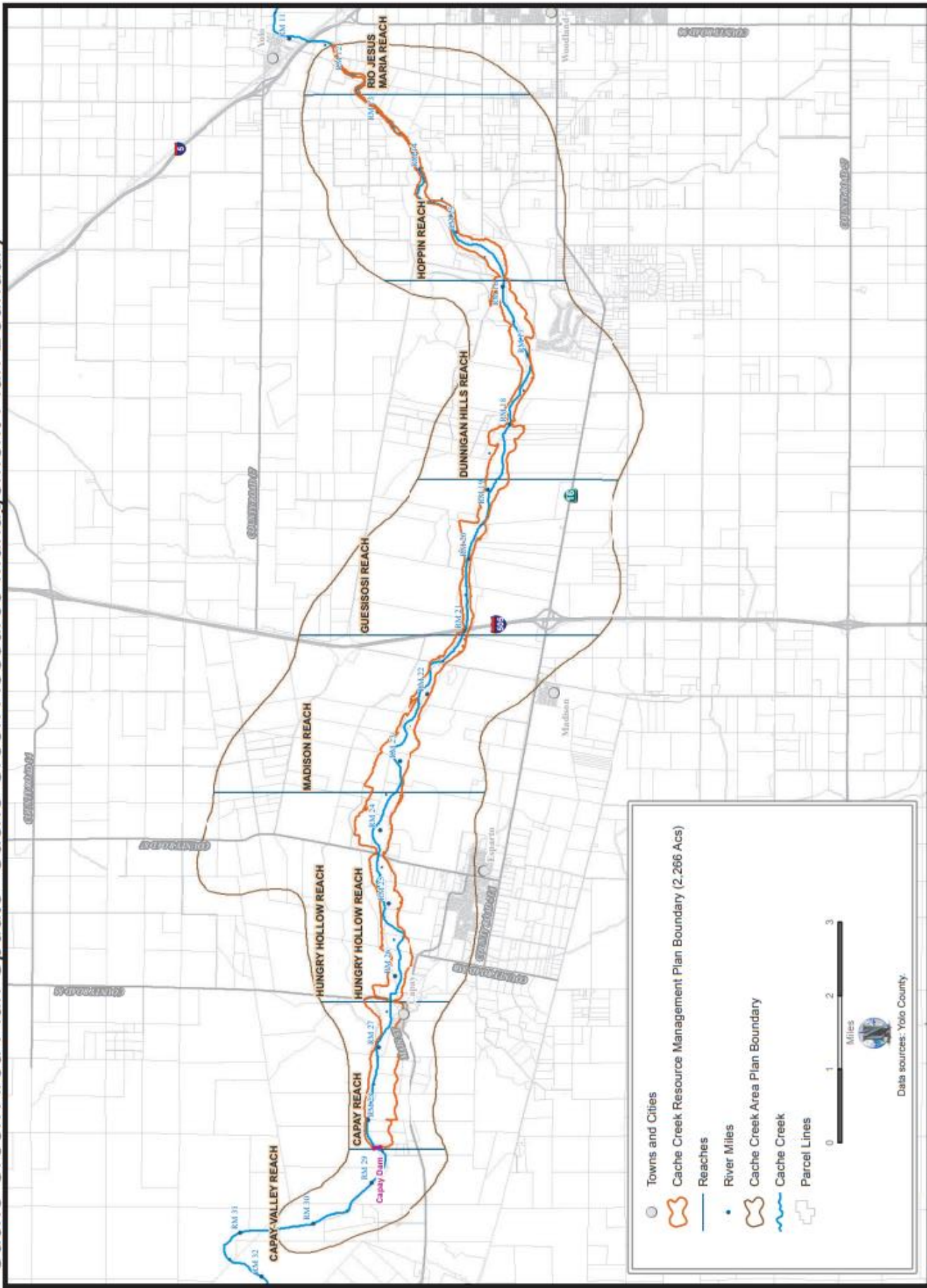


Figure 2

May 10, 2017



# Cache Creek Area Plan Update - FEMA 100 Year Flood Zones

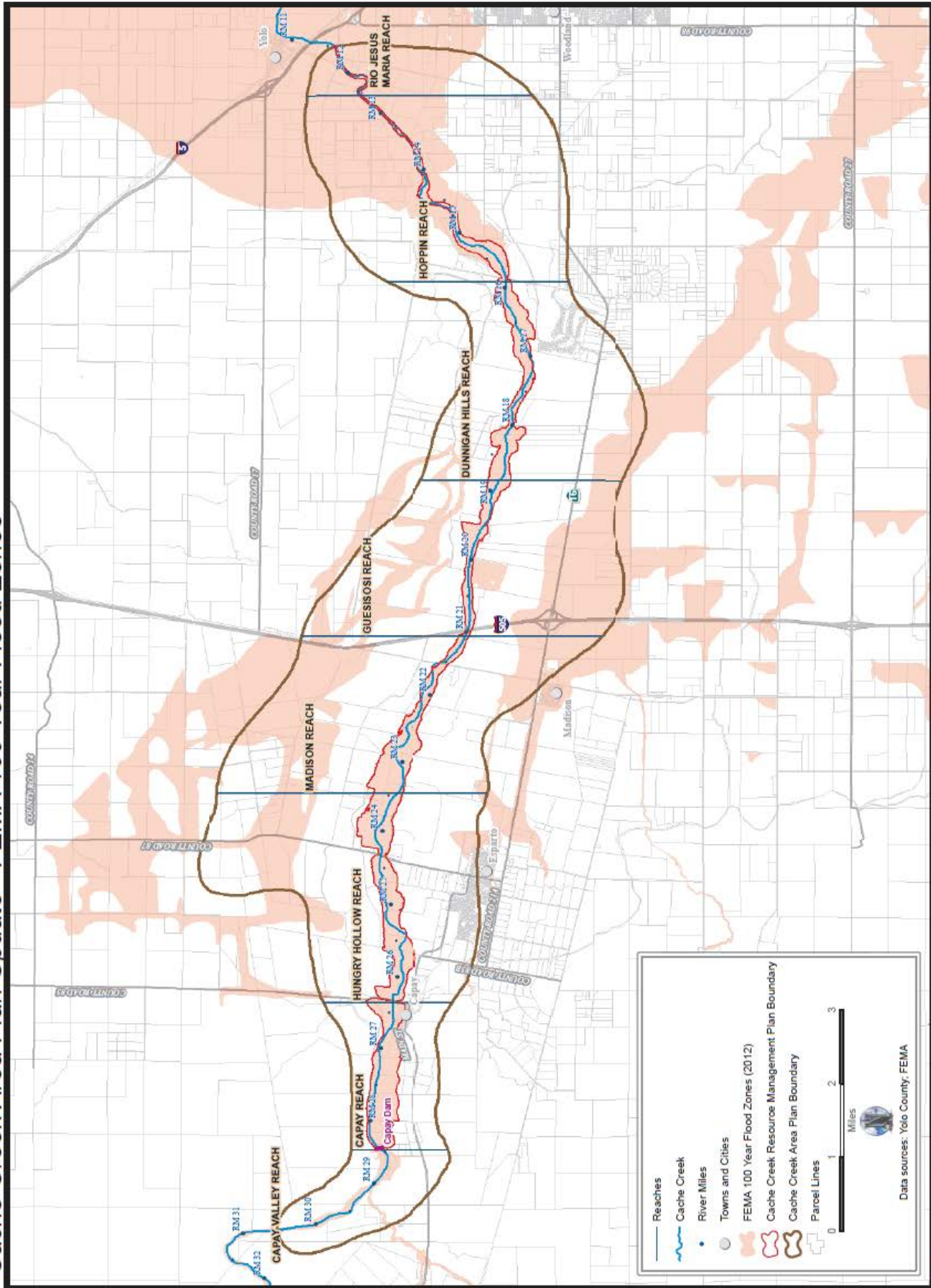


Figure 3

May 10, 2017

# Cache Creek Area Plan Update - Streamway Influence Zone

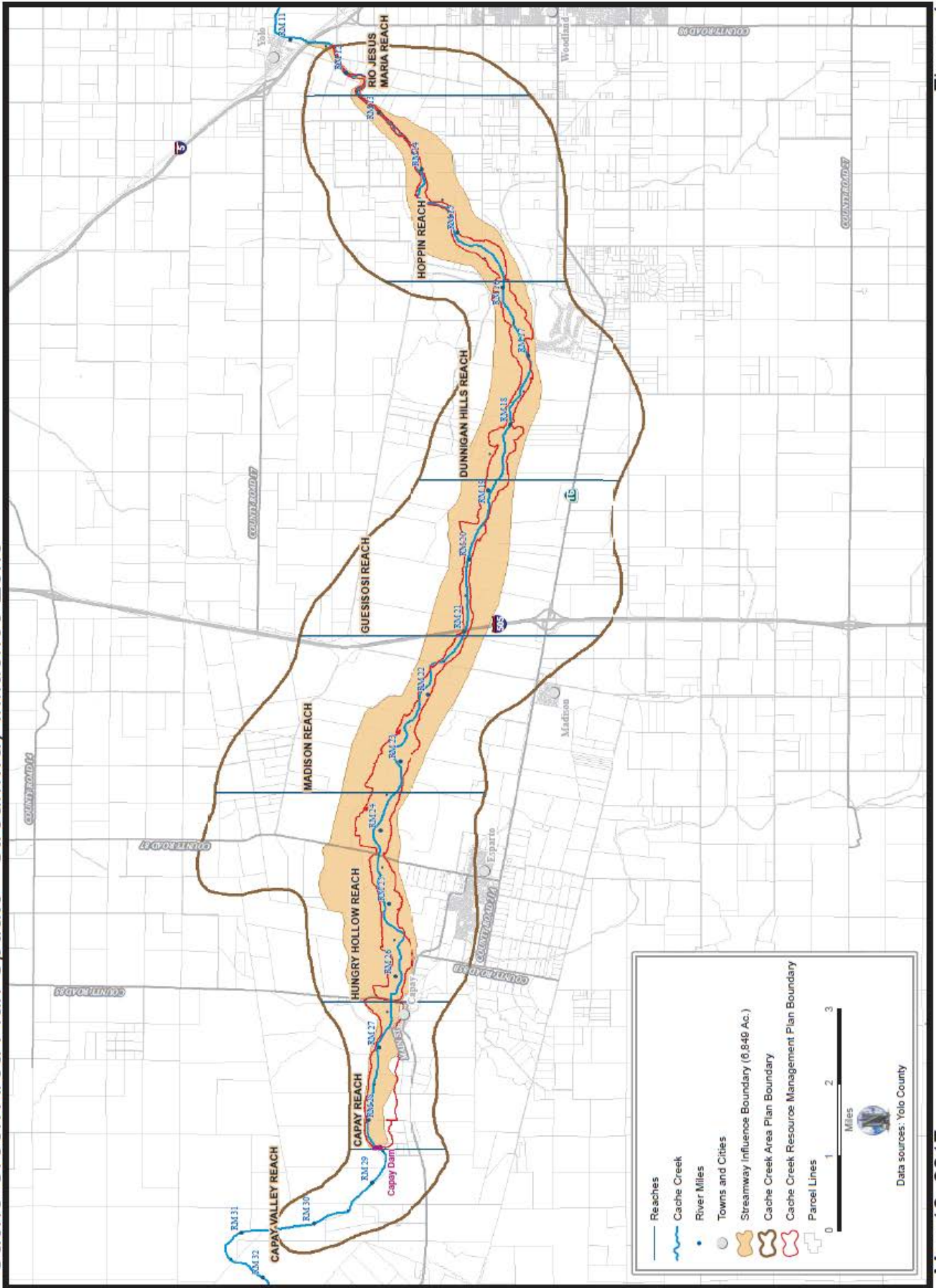


Figure 4

May 10, 2017

## **Horizon Year**

The horizon year for this plan is 2068. Similar to the use of this term in other long-range planning efforts, this reflects how far into the future the plan guidance extends. It also defines the period for consideration of cumulative effects for purposes of environmental impact analysis.

### **1.3 RELATIONSHIP TO OTHER REGULATIONS AND PLANS**

The CCRMP recognizes that management of the creek cannot occur within a vacuum. Implementation of the CCRMP must take into consideration other policies and plans of the County, as well as the applicable requirements of local, state, and federal agencies of jurisdiction. This section briefly describes compliance of the proposed plan with those regulations of primary relevance.

#### **The Surface Mining and Reclamation Act**

Two of the primary recommendations of the CCRMP were (1) that the amount of in-stream excavation be significantly reduced from present levels; and (2) that future excavation within the channel be restricted to those "channel smoothing and shaping" activities which reduce erosion and improve flow dynamics. Even though large-scale commercial mining was prohibited with adoption of the plan, it was recognized that sand and gravel would still need to be removed from the channel in order to enhance channel stability. It was envisioned that future channel improvement projects would be directed by the County based on the review of the independent Technical Advisory Committee (TAC).

The California Surface Mining and Reclamation Act (SMARA) establishes a regulatory framework, which requires all new excavations to obtain the following: a mining permit, a reclamation plan describing the methods to be employed in returning the site to a beneficial use once operations have been completed, and financial reassurances that provide funds for guaranteeing that the reclamation work is carried out as approved. Lead agencies are required to annually inspect each mine located within their jurisdiction to monitor permit compliance. In addition, the State Mining and Geology Board has adopted specific standards to ensure that reclamation is performed in a consistent manner.

However, because the activities anticipated under the CCRMP would be performed for the primary purpose of improving channel stability, the Plan originally envisioned that implementation of the CCRMP might not be subject to SMARA. Provisions in SMARA allow exceptions for those activities which would restore land following a flood, or which are a necessary part of a construction project approved by the lead agency for land improvements, or which involve minor surface disturbances of an infrequent nature. These exceptions were identified as consistent with the intent of the CCRMP. In-channel excavation would only be permitted for the purpose of improving channel stability, maintaining flood control, or preventing the erosion of adjoining lands. Aggradation would be encouraged, with the removal of sand and gravel not exceeding the previous year's deposition.

In the fall of 1998, the County requested a ruling from the State Mining and Geology Board regarding whether implementation of the CCRMP/CCIP would be subject to, or exempt from, SMARA. The Board determined that the CCRMP/CCIP did not qualify for an exemption from SMARA due to the amount of sand and gravel expected to be removed over the 30-year horizon of the plan. Subsequent to that action, special legislation was passed to amend SMARA to recognize the CCRMP/CCIP as the functional equivalent of a Reclamation Plan for purposes of SMARA compliance (Assembly Bill 297, H. Thomson, Statutes of 1999). This law had a five-year sunset date, but was subsequently reauthorized every five years. The history of this legislative exemption is as follows: 1) First authorization Chapter 869 of the Statutes of 1999 (AB 297, Thomson), sunset December 31, 2003; 2) Second authorization Chapter 173 of the Statutes of 2004 (AB 1984, Wolk), sunset December 31, 2008; 3) Third authorization Chapter 604 of the Statutes of 2007 (AB 646, Wolk), sunset December 31, 2012; 4) Fourth authorization Chapter 145 of the Statutes of 2011 (SB 133, Wolk), sunset December 31, 2017; 5) Fifth authorization Chapter 235 of Statutes of 2016 (SB 1133, Wolk), sunset removed. On August 29, 2016, Governor Brown signed Senate Bill 1133 (Wolk) which removed the sunset clause and made this statute permanent.

With the amendment of SMARA for the CCRMP, this opened a path for implementation of the CCIP. Individual projects could move forward based on County issuance of Flood Hazard Development Permit and consistency with the CCRMP. Those working in the channel are required to post financial assurances to ensure restoration is performed in accordance with the approved plan. They are also required to be compliant with the In-Channel Ordinance adopted in June 2008.

As discussed earlier, the State Department of Conservation released Special Report 156 in 1988. This report classified the sand and gravel deposits along Cache Creek (including the CCRMP plan area) as being regionally significant mineral resources. Section 2762(a) of SMARA requires that the lead agency (Yolo County) incorporate mineral resource management policies into its general plan within twelve months after receiving a mineral land classification report prepared by the State Geologist. These policies must accomplish the following:

1. Acknowledge the information provided by the State Geologist regarding the extent of mineral resources within the jurisdiction.
2. Coordinate the management of land uses within and surrounding areas of statewide and regional significance to restrict the encroachment of incompatible uses.
3. Emphasize the conservation and development of identified mineral deposits.

In addition, Section 3676 of the State Mining and Geology Board Reclamation Regulations requires that mineral resource management policies incorporate, but not be limited to, the following:

1. A summary of the information provided by the classification study, including, or incorporated by reference, maps of the identified mineral deposits as provided by the State Geologist; and a discussion of state policy as it pertains to mineral resources.
2. Statements of policy as required in Section 2762(a) of SMARA.
3. Implementation measures that:
  - a. Discuss the location of identified mineral deposits and distinguish within those areas between resources which are designated for conservation and those which may be permitted for future extraction.
  - b. Provide appropriate maps to clearly define the extent of identified mineral deposits, including those resources designated for conservation and those, which may be permitted for future extraction.
  - c. Include at least one of the following:
    - i. Adopt appropriate zoning that identifies the presence of identified mineral deposits and restricts the encroachment of incompatible land uses in those resource areas that are to be conserved.
    - ii. Require that a notice describing the presence of identified mineral deposits be recorded on property titles within the affected area.
    - iii. Impose conditions of approval upon incompatible land uses in and around areas, which contain identified mineral deposits, in order to mitigate any significant land use conflicts.

Policies regarding the conservation and development of classified mineral deposits, in accordance with the above requirements, are contained in the OCMP. The CCRMP restricts extraction of material within the Cache Creek channel to those activities, which maintain flood flow capacity; protect existing structures, infrastructure, and/or farmland; minimize bank erosion; implement the Channel Form Template (described further below); enhance creek stability; establish riparian vegetation; and/or result in recreation and open space uses consistent with the Parkway Plan. In addition, in-channel aggregate extraction is limited to the average annual amount deposited since the last prior year of removal. Those aggregate resources remaining within the channel will be conserved and maintained with Open Space zoning to restrict the encroachment of incompatible uses.

Prior to adoption of the CCRMP, review and comment by the State Mining and Geology Board was required, as stated in Section 2762(a) of SMARA. Future amendments to the CCRMP and its policies must also be sent to the State Mining and Geology Board for review and comment, prior to their adoption, to ensure that the above requirements are being met.

## **Yolo County General Plan**

The County of Yolo 2030 Countywide General Plan includes goals, policies and actions that guide Yolo County in ensuring continued productivity and conservation of the County's mineral reserves while balancing the preservation and enhancement of the Cache Creek channel and corridor.

Goal CO-3: Mineral Resources. Protect mineral and natural gas resources to allow for their continued use in the economy.

Policy CO-3.1: Encourage the production and conservation of mineral resources, balanced by the consideration of important social values, including recreation, water, wildlife, agriculture, aesthetics, flood control, and other environmental factors.

Policy CO-3.2: Ensure that mineral extraction and reclamation operations are compatible with land uses both on-site and within the surrounding area, and are performed in a manner that does not adversely affect the environment.

Action CO-A37: Designate and zone lands containing identified mineral deposits to protect them from the encroachment of incompatible land uses so that aggregate resources remain available for the future. (Policy CO-3.1)

Action CO-A39: Encourage the responsible development of aggregate deposits along Cache Creek as significant both to the economy of Yolo County and the region. (Policy CO-3.1)

Action CO-A40: Encourage recycling of aggregate materials and products. (Policy CO-3.1)

Action CO-A41: Regularly review regulations to ensure that they support an economically viable and competitive local aggregate industry. (Policy CO-3.1)

Action CO-A42: Implement the Cache Creek Area Plan to ensure the carefully managed use and conservation of sand and gravel resources, riparian habitat, ground and surface water, and recreational opportunities. (Policy CO-3.1)

Action CO-A43: Monitor updates to the State Mineral Resource classification map and incorporate any needed revisions to the County's zoning and land use map. (Policy CO-3.1)

Action CO-A44: Coordinate individual surface mining reclamation plans so that the development of an expanded riparian corridor along Cache Creek may be achieved. (Policy CO-3.1)

Action CO-A46: Maintain standards and procedures for regulating surface mining and reclamation operations so that potential hazards and adverse environmental effects are reduced or eliminated. (Policy CO-3.1, Policy CO-3.2)



Action CO-A47: Ensure that mined areas are reclaimed to a usable condition that is readily adaptable for alternative land uses, such as agriculture, wildlife habitat, recreation, and groundwater management facilities. (Policy CO-3.1)

Action CO-A48: Regularly update surface mining and reclamation standards to incorporate changes to State requirements, environment conditions, and County priorities. (Policy CO-3.1)

Action CO-A54: Implement the Cache Creek Area Plan. (Policy CO-3.2)

Goal CO-1: Natural Open Space. Provide a diverse, connected and accessible network of open space, to enhance natural resources and their appropriate use.

Policy CO-1.1: Expand and enhance an integrated network of open space to support recreation, natural resources, historic and tribal resources, habitat, water management, aesthetics, and other beneficial uses.

Policy CO-1.2: Develop a connected system of recreational trails to link communities and parks throughout the county.

Policy CO-1.3: Create a network of regional parks and open space corridors that highlight unique resources and recreational opportunities for a variety of users.

Policy CO-1.7: Support efforts by willing landowners and non-profit groups to provide new opportunities for outdoor recreation. (Policy CO-1.29)

Policy CO-1.8: Encourage responsible stewardship of private lands. Promote increased opportunities for public access to waterways and other natural areas.

Policy CO-1.9: Promote the conservation of environmental resources in new and existing park and open space facilities.

Policy CO-1.11: Coordinate the development of recreation areas and public open space with regional trail planning.

Policy CO-1.15: Support efforts to acquire either fee title or easements on additional open space areas adjoining existing protected natural resource areas to increase the size, connectivity, and buffering of existing habitat.

Policy CO-1.23: Increase public access and recreational uses along waterways wherever feasible, particularly Cache Creek, Lower Putah Creek, the Yolo Bypass, and the Sacramento River.

Action CO-A4: Pursuant to the Cache Creek Area Plan, develop a recreation plan for the Cache Creek Parkway including a range of public activities and uses. (Policy CO-1.24)

Action CO-A6: Connect the future Bay Delta Trail system, the future trail system in lower Yolo Bypass, and the future Cache Creek Parkway system, and link those trails to the American River Bikeway system in Sacramento County. (Policy CO-1.1, Policy CO-1.3, Policy CO-1.12, Policy CO-1.19, Policy CO-1.28)

Action CO-A11: Provide recreational uses that are river or creek dependent in locations directly on Cache Creek, Putah Creek, and the Sacramento River. Examples include fishing, canoeing, boating, and nature observation. With the exception of boat launches and docks, more active uses, such as parking, restrooms, and picnic areas, shall be located in areas away from the river and sensitive riparian habitat. (Policy CO-1.1, Policy CO-1.24, Policy CO-1.27, Policy CO-1.28)

Action CO-A12: Cluster recreational improvements at various locations along Cache Creek, Lower Putah Creek, and the Sacramento River, to reduce habitat disturbance and provide efficient and cost-effective management by the County. (Policy CO-1.10)

Action CO-A15: Combine parks and trails with open space and wildlife conservation areas where appropriate. (Policy CO-1.1, Policy CO-1.10)

The CCRMP has been evaluated and determined to be consistent with the various goals and policies of the County General Plan. The CCRMP, together with the OCMP, constitute the Cache Creek Area Plan (CCAP), which provides the policy framework for implementing this program to manage the wide variety of resources associated with the creek, including habitat, water resources, aggregate, agriculture, and recreation.

The County's off-channel surface mining ordinance, reclamation ordinance, and in-channel maintenance ordinance all implement the policy framework. These ordinances include specific performance standards that ensure that the goals and objectives spelled out in the OCMP and CCRMP are achieved. Although each plan was prepared as a stand-alone document, they were adopted as two co-equal parts of the CCAP and have been implemented in concert with one another since adoption.

### **Cache Creek Area Plan**

An "area plan" is a focused planning policy document that is part of a general plan. The CCRMP meets all the requirements of a State land use law to function as an area plan or the channel boundary area defined herein. It addresses all of the elements specified in Section 65302 of the California Code of Regulations, to the extent that the subject of the elements exists in the planning area. As allowed by State law, the degree of specificity and level of detail of the discussion of each such statement reflects local conditions and circumstances. A brief summary of how the General Plan requirements are satisfied is provided below.

### *Planning Area*

By taking in the entire channel area as determined by topographic features and flood flow calculations, and by recognizing the Streamway Influence Zone as defined in the 1995 Technical Studies, the CCRMP addresses all land and resources which bear a relationship to streamway planning along the creek.

### *Diagrams and Implementation Programs*

The Plan contains appropriate diagrams and specific discussion regarding implementation under the CCIP.

### *Consistency*

The Plan has been examined for consistency and found to be both internally consistent and consistent with appropriate federal and State policies and regulations.

### *Land Use Element Issues*

The Plan contains data, analysis, policies, and programs related to the intensity, location, and type of channel maintenance and riparian restoration activities within the planning area. The Plan clearly specifies where and under what circumstances in-stream extraction is allowed, species of plants to be used in habitat restoration, cross-section profiles and standards for reshaping the channel, and the authority and responsibilities of the TAC.

It examines the current distribution of habitat and agricultural land, specifies areas where channel widening/narrowing should occur, as well as average levels of sediment discharge and water levels expected from the creek. It also addresses potential recreational facilities and opportunities associated with creek restoration. A program has been provided to ensure that channel stabilization and maintenance activities do not adversely affect downstream flooding.

Other typical Land Use Element issues such as educational facilities, public buildings and grounds, as well as solid and liquid waste facilities are addressed only in the context of having relevance to the maintenance and stabilization of the creek.

Consistency with the California Surface Mining and Reclamation Act has been addressed in the environmental analysis and found not to be an issue.

### *Circulation Element Issues*

The Plan identifies the location and extent of major thoroughfares, transportation routes, and other local public utilities and facilities in the planning area. The proposed levels of aggregate production from creek maintenance activities would not generate any significant changes in traffic volumes.

### *Housing Element Issues*

The Plan identifies nearby housing for purposes of assessing the potential impact from channel maintenance and recreational activities. Regulations are provided, where appropriate.

### *Conservation Element Issues*

The Plan addresses programs for the conservation, management, and protection of natural resources within the Cache Creek channel, including surface water quality, biological resources, and the erosion of soil resources.

### *Open Space Element Issues*

The Plan includes identification of areas required for the preservation of plant and animal life, including sensitive habitat. The areas within the channel are identified as requiring ongoing monitoring and study. The Plan also contains a program for the protection and enhancement of riparian habitat and the use of biological elements to control erosion and flow velocities. Land within the CCRMP boundary has been designated as Open Space (OS) in the County General Plan.

Scenic resources and cultural resources have been identified in the Plan. The area located within the channel is designated as Open Space in the Plan, in order to preserve it for future habitat and recreational uses. This compliments the OCMP, which designates future recreation nodes that would provide access to areas targeted for future open space and passive recreation.

### *Noise Element Issues*

Noise identified with in-stream excavation and recreational uses has been identified and is regulated in the Plan.

### *Safety Element Issues*

The effects of dam failure, flooding, and channel instability are discussed. Policies and specific regulations to address these concerns are provided, when necessary.

### *Other*

Coastal issues and timber harvesting plans are not relevant to the CCRMP plan area and have not been addressed in the Plan.

## **Yolo County Mining and Reclamation Ordinances**

Commercial in-stream surface mining ended with the adoption of the OCMP and CCRMP in 1996 and the subsequent relinquishment of vested in-stream rights by all operators along Cache Creek. On June 24, 2008, the County Board of Supervisors adopted the CCAP In-Channel Ordinance (Yolo

County Code Title 10, Chapter 3) to regulate in-stream extraction activities that implement the bank stabilization, channel maintenance, and habitat restoration necessary to carry out the CCRMP and CCIP.

The in-stream mining regulations for Yolo County, prior to adoption of the CCRMP and CCIP, allowed excavation within the channel down to the "theoretical thalweg." This was a specific elevation, below which in-stream mining was prohibited. In addition, in-channel mining was prohibited within three hundred feet of any County bridge along Cache Creek and nine hundred feet from any State bridge. These measures were established to protect local bridge structures from being undermined and to minimize streambed lowering.

Conclusions reached in the 1995 Technical Studies recommended that these regulatory mechanisms be revised to take new information and research into account. In place of the theoretical thalweg, a series of reach-specific slopes and sinuosity ratios (comparing the channel width to its length) were adopted, which provide standards for maintenance excavation that would improve the channel flow. Commercial mining was prohibited and the prohibition against working near local bridges was removed to allow for restoration activities including the construction of transitions to improve flow efficiency through these portions of the creek. Additionally, the in-channel boundary was revised to more accurately reflect the active flow of Cache Creek, as defined by the existing channel banks and the 100-year floodplain (as determined by the U.S. Army Corps of Engineers).

The 1996 policy and regulatory changes changed the focus away from aggregate mining within Cache Creek to channel stabilization and flood conveyance capacity management. Restoration under the CCRMP focuses on reestablishing a riparian vegetation corridor along the length of Cache Creek, as well as ensuring a stable channel system that allows for flood flow conveyance and erosion protection. The plan provides guidance on habitat creation and ensures that in-stream restoration is sensitive to channel flow dynamics.

### **Yolo County Flood Protection Ordinance**

The County has no obligation or responsibility under either the CCRMP or CCIP to manage or maintain flood flow conveyance capacity in Cache Creek. However, both the CCRMP and CCIP include monitoring and reporting tasks to provide interested landowners and agencies information relevant to flood management that is derived from the program.

All projects located within the floodplain, as defined by the Federal Emergency Management Agency (FEMA), require review by the County's Floodplain Administrator, to ensure that development, such as grading, fill, construction, etc., does not significantly raise flood levels for surrounding property. This authority applies to all flood zones throughout the County, including those associated with Cache Creek. The Director of Community Services serves as the Floodplain Administrator; however, the Natural Resources Manager (NRM) may be the designee for the Floodplain Administrator, for consideration of Flood Hazard Development Permits within the boundaries of the CCRMP. The scope of the Floodplain Administrator's authority and the

approval process are contained within the County Flood Protection Ordinance (Chapter 4 of Title 8 of the Yolo County Code).

Implementation of the CCRMP is carried out through the CCIP (Appendix A), which establishes a regulatory framework for stabilizing the channel. Central to this approach is the TAC. The TAC is charged with identifying and establishing priorities for channel improvement projects, monitoring various issues related to the hydraulic characteristics of flow in the creek, and reviewing and commenting on proposed projects within the channel area. Channel improvements made pursuant to the CCRMP and CCIP require a Flood Hazard Development Permit. The TAC will review all permit applications for projects within the CCRMP boundary prior to their issuance by the Floodplain Administrator (or designee) and provide recommendations on design, and whether the permit is consistent with the Plan, the implementing ordinances, and other programmatic permits issued by jurisdictional agencies. Thus, the requirements of the CCRMP and CCIP will be implemented through the Flood Hazard Development Permit. Unlike the past, where individual property owners modified the creek independently, with sometimes adverse consequences, the CCIP provides a consistent means for coordinating activities along the channel.

### **The Cache Creek Improvement Program**

The CCIP was developed to implement the goals, objectives, actions, and performance standards of the CCRMP as it relates to the stabilization and maintenance of Cache Creek. It was adopted as a component part of the CCRMP, and generally, where the acronym CCRMP is used it is intended to include the CCIP. The CCIP has three primary components, including the identification of channel stabilization projects, a description of expected channel maintenance activities, and the establishment of a hydrologic monitoring program. Overall management of the CCIP is the responsibility of the County NRM. Scientific analysis of the creek and recommendations will be provided by the TAC, in coordination with the NRM. In addition, an optional Cache Creek Stakeholders Group (CCSG) may be established to provide input on how the creek should be managed. Funding for the CCIP will primarily be provided by the aggregate industry through a per ton surcharge on gravel produced within the County.

In-channel commercial mining is prohibited under the CCIP. Aggregate excavation within the channel may only occur to install or maintain habitat restoration, maintain flood control, protect existing structures, minimize bank erosion, or implement the Channel Form Template.

Under the CCIP, applicants proposing to modify the creek channel within the CCRMP boundary must submit applications to the Community Services Department for a Flood Hazard Development Permit. The permit is reviewed by the TAC, which will provide recommendations to the Floodplain Administrator (or designee) prior to permit approval. The program is supported by programmatic permits from agencies of jurisdiction (e.g., Regional Water Quality Control Board, Army Corps of Engineers, and Department of Fish and Wildlife) for channel shaping and maintenance activities. Flood Hazard Development Permits within the CCRMP boundary must be consistent with the CCIP and CCRMP, comply with appropriate programmatic permits, protect

sensitive biological resources, and ensure that flood risk for downstream communities, such as Woodland, are not worsened.

Channel improvement and maintenance projects must comply with design guidelines, target channel characteristics, and typical cross-section profiles, as described in the CCIP. These reach-specific guidelines incorporate baseline information from the 1995 Technical Studies, and the findings from the 2017 Technical Studies and CCAP Update. These guidelines will be periodically updated according to the information obtained through creek monitoring program. The results of the monitoring program are included in the annual report prepared by the TAC for review by the Board of Supervisors. The annual report also includes program costs, an evaluation of streambed and streambank stability in the CCRMP area, recommended changes in the prioritization of channel improvement projects, and proposed changes in the monitoring program for the following year.

### **The Off-Channel Mining Plan**

The CCRMP is a companion document to the OCMP, which primarily governs the mining of sand and gravel aggregate outside the present channel banks and 100-year floodplain. The two plans, which together comprise the CCAP, recognize that in-channel and off-channel environments are different and require unique approaches that address their varying needs. At the same time, however, the County also recognizes that Cache Creek and its surrounding areas form an integrated system, and that activities that occur in one environment affect the other. Thus, although the planning areas for the two plans are mutually exclusive, both plans include goals and policies that acknowledge the connections between in-channel and off-channel concerns where they occur.

## **1.4 REQUIRED APPROVALS**

The CCRMP is a complex plan and its emphasis on comprehensive and integrated resource management required consideration by the County of several additional actions (described below) for its implementation. These actions provided the County with a regulatory framework for carrying out the various policies described within the CCRMP. Ongoing implementation of the CCRMP requires continuing efforts by the County, including public outreach and education programs, monitoring and technical analysis, negotiation with other agencies of jurisdiction, and coordination with volunteer community groups.

### **Certification of the Program EIR**

Section 15168 of the California Environmental Quality Act (CEQA) provides for the preparation of a Program EIR. A Program EIR may serve as an environmental document for a series of individual projects that are located within the same geographical area, or are sequentially related, or have similar environmental effects. There are several advantages to a Program EIR. It provides a more thorough consideration of potential environmental impacts, especially cumulative effects, and encourages a broader discussion of project alternatives. Program EIRs also reduce redundancies

in the environmental review process, as well as allow for greater County flexibility in dealing with policy issues.

Subsequent projects approved pursuant to the Program EIR still require additional environmental documents. However, Program EIRs allow subsequent environmental documents to focus on issues unique to the site, that were not specifically addressed in the Program EIR. This allows decision-makers and interested parties to concentrate on the primary issues associated with a particular project, without revisiting other issues on which there is general agreement. Although they help to streamline the process, Program EIRs and any subsequent focused project-level EIRs do not restrict public participation. They still require circulation of the documents and a comment period, notification of interested parties, and public hearing.

A Program EIR was certified for the CCRMP in 1996. The Program EIR was written to fulfill the federal National Environmental Protection Act (NEPA) standards, so that the EIR could be used to support the 404 Permit required by the U.S. Army Corps of Engineers for work within the channel, as well as permits for jurisdictional State agencies (e.g., the Regional Water Quality Control Board, the Department of Conservation, and the Department of Fish and Wildlife).

The CCRMP EIR also served as a project-level EIR for the CCIP, in order to enable the subsequent implementation of the specific channel stabilization and maintenance actions required by the program.

### **Adoption of the Cache Creek Resources Management Plan**

The CCRMP and the CCIP, as well as the companion OCMP, are intended to be evolutionary documents that adjust and change in response to new creek conditions. Adoption of the CCRMP in 1996 allowed the County to begin taking the first steps towards managing the resources of Cache Creek in a more balanced and sustainable manner. However, the plan was not seen as a static vision of what the ultimate disposition of the creek will be in the future. Rather, it was expected that the CCRMP would undergo periodic review and updating as additional data is gathered through monitoring and the success of habitat restoration projects and channel stabilization are known. The CCRMP is required to be updated every ten years, at a minimum, in order to allow sufficient time for trends to become evident, yet still be early enough to change any policies that are having an unexpectedly adverse effect on resource management.

### **Adoption of the Surface Mining and Reclamation Ordinances**

In order to simplify the administration of managing the resources along Cache Creek, in-channel management requirements and off-channel mining regulations have been given separate chapters within Title 10 of the County Code: Chapter 3, In-Channel Ordinance; Chapter 4, Off-Channel Surface Mining Ordinance; Chapter 5, Surface Mining Reclamation Ordinance).

In the fall of 1998, the County requested a ruling from the State Mining and Geology Board regarding whether implementation of the CCRMP/CCIP would be subject to or exempt from



SMARA. The Board determined that the CCRMP/CCIP did not qualify for an exemption from SMARA due to the amount of sand and gravel expected to be removed over the 30-year horizon of the plan. Subsequent to that action, special legislation was passed to amend SMARA (PRC Section 2715.5) to recognize the CCRMP/CCIP as the functional equivalent of a Reclamation Plan for purposes of SMARA compliance (Assembly Bill 297, Statutes of 1999). This law had a five-year sunset date, but was subsequently been reauthorized every five years. On August 29, 2016, Governor Brown signed Senate Bill 1133 (Wolk) which removed the sunset clause and made this statute permanent.

In June of 2008 the County's In-Channel Ordinance was adopted to regulate in-stream extraction activities that implement the bank stabilization, channel maintenance, and habitat restoration necessary to carry out the CCRMP and CCIP.

### **Approval of Zone Changes**

In 1996, the area within the CCRMP plan boundary was rezoned to the Open Space (OS) designation. The OS Zone is specifically designed for resource management, including agriculture, groundwater recharge, habitat, recreation, flood control, sand and gravel extraction, and riparian areas. As such, it provides the flexibility needed to meet the various resource needs of Cache Creek.

### **2002 CCRMP Update and Supplemental EIR**

The CCRMP underwent a focused update on July 23, 2002 (Board Resolution 02-130). A Supplemental Program/Project-Level Environmental Impact Report (SEIR) was prepared and certified in 2002 to support proposed modifications and clarifications to the CCRMP and generally inform public agency decision-makers and the public of the environmental effects of the CCRMP and CCIP on Cache Creek since implementation. The SEIR was also determined to be necessary to support the County's request at the time to renew programmatic permits from the State and the US Army Corps of Engineers, pursuant to under Sections 401 and 404 of the federal Clean Water Act and Section 1602 of the State Fish and Wildlife Code.

## **1.5 ORGANIZATION OF PLAN**

The CCRMP contains seven chapters comprised of six elements, each dealing with a specific resource associated with the Cache Creek area. The elements contained within the CCRMP are as follows:

- Chapter 2.0 Floodway and Channel Stability
- Chapter 3.0 Water Resources
- Chapter 4.0 Biological Resources
- Chapter 5.0 Open Space and Recreation
- Chapter 6.0 Aggregate Resources
- Chapter 7.0 Agricultural Resources

Each element begins by briefly describing the past and current status of the resource under consideration. Next is a summary of the general direction proposed by the CCRMP to manage this resource in the future. Following these initial discussions are a series of goals, objectives, actions, and standards that explain how the general direction will be carried out and what measures will be used to ensure its success. Although each element has its own goals and objectives that address management of the specific resource, the plan was written so that these policy statements are mutually supportive and coordinated to minimize conflict.

The CCIP comprises Appendix A.

## **CHAPTER 2.0 – FLOODWAY AND CHANNEL STABILITY ELEMENT**

### **2.1 INTRODUCTION**

#### **Present Conditions**

The Cache Creek system is very dynamic. It is shaped by a complex relationship between four primary factors: the amount of water, the amount of sediment in the water (including sand and gravel), the average size of the sediment, and the slope of the channel. If any one of these factors is altered, either naturally or artificially, the other factors will adjust until a new equilibrium is established. If there is too much water and not enough sediment, the river will erode the streambed and adjoining banks in order to obtain more sediment. If the sediment is too large and the slope of the channel too flat, the river will aggrade. Although this relationship may appear simple, flow dynamics are very complex and difficult to analyze and predict. Adjustments are constantly being made in a river system, not only from one flood event to the next, but from smaller flows in between large flood events.

In perennial (year-round) creeks, these adjustments are often made in a slow and steady fashion. Cache Creek is ephemeral. It does not flow year-round naturally or under existing conditions. Further, Cache Creek is an episodic system characterized by brief, intense flows that can cause dramatic changes in creek conditions over relatively short periods of time. These changes may result in an imbalance between the factors described above. Historically, Cache Creek would have adjusted itself to correct for imbalances during the low flows of later spring and early fall, but a number of artificial constraints have been imposed on Cache Creek which prevent it from achieving a balanced condition.

The bridges over Cache Creek were originally designed to accommodate a relatively narrow channel width and often required bank protection measures to prevent excess erosion of channel banks. These bridge crossings confine Cache Creek, resulting in higher flow velocities and increased erosion and scour potential. Flood control improvements along Cache Creek have had an effect as well. Levees constructed throughout the plan area further increase channel confinement and the resulting elevated flow velocities increase erosion and scour potential.

Extensive in-stream mining prior to 1996 also contributed to the destabilization of Cache Creek. The average annual sediment supply to the plan area (measured at Capay) was estimated in the 1995 Technical Studies to be approximately 927,600 tons, of which about 210,000 was estimated to be sand and gravel that settled in Lower Cache Creek, with the remaining 717,600 tons assumed to be fines traveling through the system to the settling basin. The sand and gravel tonnage number was ultimately adopted as a cap on annual in-channel extraction for maintenance purposes, except where excavation was determined to be necessary to widen the channel as part of implementing the Test 3 Run Boundary.

Based on the analysis conducted for the 2017 Technical Studies, between 1996 and 2011, an average of approximately 690,800 tons per year of sediment was actually deposited in the

CCRMP area, of which 156,400 tons is estimated to be sand and gravel and 534,400 is estimated to be fines. This estimate of deposition was calculated by comparing topographic maps of Cache Creek in 1996 and 2011. It differs significantly from the original estimate in that it appears much more fine sediment is depositing in Lower Cache Creek than originally predicted. While it is unclear whether the current rate of deposition will continue into the future, it appears likely that at least some portions of Cache Creek are recovering faster than expected in 1996. Based on this information, the cap for in-channel extraction for maintenance purposes should be increased from 210,000 tons annually on average to 690,800 tons annually on average to reflect actual conditions. In addition, in recognition that the creek may in reality deposit no tonnage in a given year or double the tonnage in another (depending on flow conditions) the cap shall be based on the annual average deposition since the last prior year that extraction occurred, not to exceed 690,800 tons annually.

In addition to the constrictions described above, Cache Creek has periods of natural instability. The upper watershed is narrow and steep. As a result, flood events carry with them a great deal of force that impacts the channel over a short span of time. In addition, the coastal mountains in this area contain areas of highly erosive materials that can provide very large volumes of sediment to the creek. The combination of energetic flood flows and large sediment supplies create the potential for large, rapid changes in Cache Creek.

Continuous long-term simulations of Cache Creek conducted as part of the 1995 Technical Studies indicated that if all in-stream mining were prohibited for 100 years the channel would achieve a substantially more stable configuration but would remain sediment deficient at the bridges. With intervention, such as recommended in the CCIP, however, this repair can be hastened. In fact, since 1996, significant sediment deposition has occurred in the CCRMP area and the sinuosity of the active channel has increased in most of the creek reaches. This geomorphic change has been accompanied by a significant increase in riparian vegetation along the creek. It should be noted, however, that it is not possible to return the creek to the conditions of 100 years ago without making significant changes to other influencing factors, including the elimination and/or relocation of flood control levees, reductions in the amount of water diverted to irrigation, the reconstruction of County and State bridges, and re-establishment of the historical width of the channel, which approaches one mile in some areas. Such extreme requirements are not feasible and do not reflect the reality of multiple public and private land uses and interests in the CCRMP area.

Trying to assign proportional responsibility for the degradation of Cache Creek to each of these influences is difficult. As discussed earlier, creek systems are complex with many interrelated influences that are not easily separated and categorized. Similarly, anticipating how the channel may react to new changes is also uncertain. Nevertheless, as evidenced by the changes in Cache Creek observed since 1996, careful management can continue to help the creek repair itself and further improve its present condition.

## 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 were several actions 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 was to significantly reduce the amount of aggregate removed from within the channel. In-stream extractions allowed under the CCRMP 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. 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 has resulted in the reshaping of portions of Cache Creek according to the conceptual design provided in the Test 3 Run Boundary. The Test 3 Run Boundary envisioned re-grading the streambed to create a series of terraces and low-flow channel. These actions stabilize the channel and allow it to operate more like a natural system. In addition, selected banks and levees may be excavated to provide gentle transitions into and out of the channel bottlenecks created by the bridge structures. In some areas, jetties may 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 was 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 5). The Channel Form Template replaces the Test 3 Run Boundary, and provides similar guidance for smoothing abrupt channel width transitions.

The CCRMP also envisioned 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 plan update, this remains a goal of the plan to be achieved if feasible. This could create a more stable low-flow channel that would support the goals of the Channel Form Template. In addition, increased surface flows would accelerate recovery of native vegetation and benefit native species of wildlife, invertebrates, and fish. Continued engagement with the YCFWCWD will be undertaken to determine the options for increasing surface flows, especially in warmer times of the year.

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 takes a strong role in providing this management, based on the recommendations of the TAC.

Future in-channel modifications must consider the elevation and slope of the streambed, as well as 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-sections developed for 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 existing thalweg elevation, unless local channel stability, desired habitat creation, or flood flow capacity requires otherwise. In addition, off-channel mining must 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 or as a result of maintenance extraction of gravel.

Although flood flow conveyance capacity is important, management of the Creek has to consider other values as well. Conditions must be created to allow native riparian vegetation to reestablish, as long as it does not adversely affect streamflow. Growth along the banks is especially encouraged, both for erosion control and to direct the highest flow velocities 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 extremely important as compliance with the Sustainable Groundwater Management Act (SGMA) proceeds. The CCRMP encourages

# Cache Creek Area Plan Update - Channel Form Template

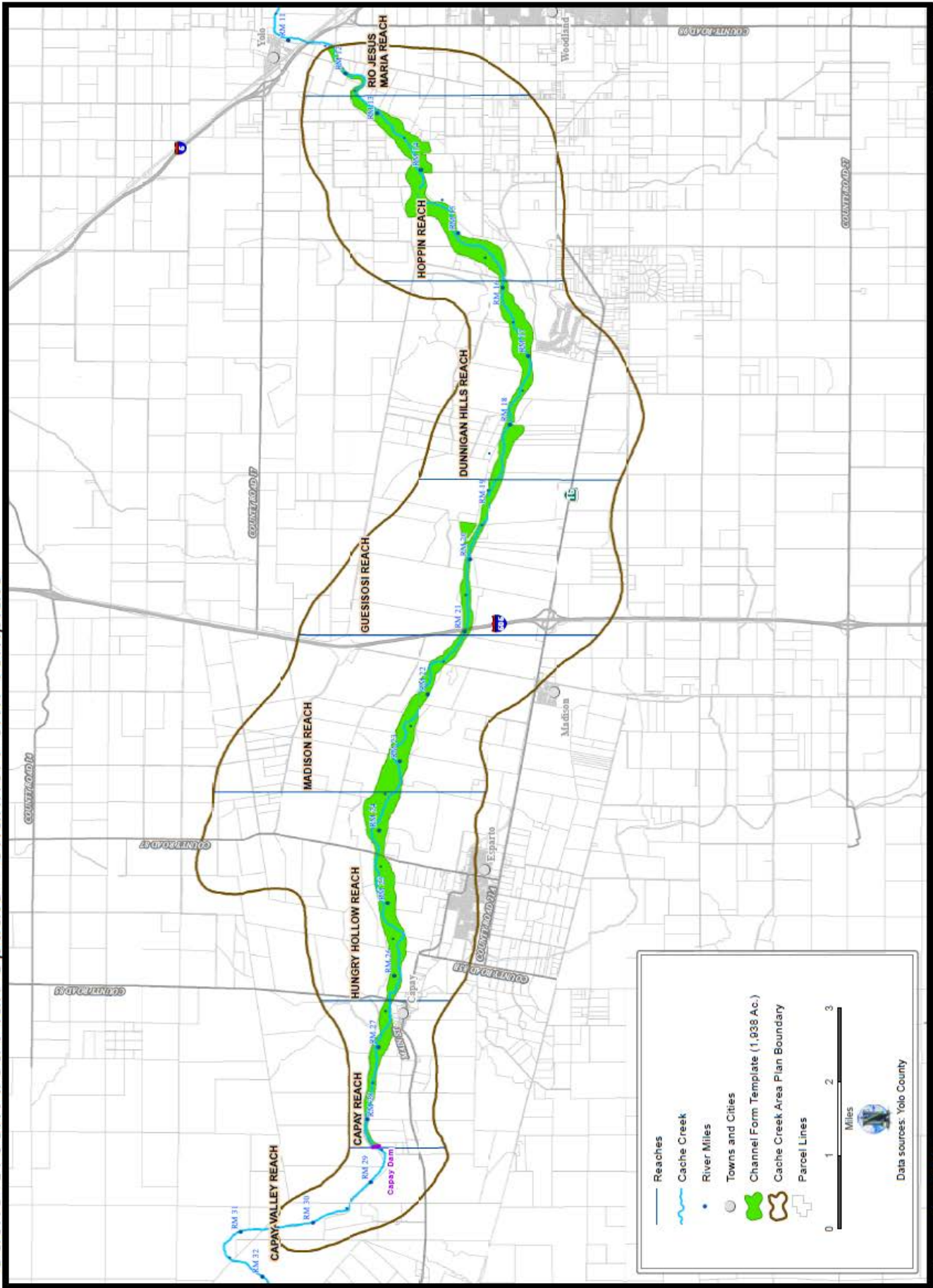


Figure 5

June 1, 2017

coordination with YFCWCD to enhance groundwater recharge, where possible, in order to increase water supply reliability for both urban and agricultural users in the County.

Implementing these programs will require extensive monitoring and analysis. The County will continue to leverage the data collected through annual creek inspections described in Chapter 6 of the CCIP, the on-going 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. The information in this database is reviewed by the TAC. 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. As a part of this monitoring, the CCRMP is required to be updated a minimum of every ten years. This 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 2017/2019.

## **2.2 GOALS**

- 2.2-1 Recognize that Cache Creek is a dynamic system that naturally undergoes gradual and sometimes sudden changes during high flow events.
- 2.2-2 Establish a more natural channel floodway capable of conveying floodwaters without damaging essential structures, causing excessive erosion or adversely affecting adjoining land uses.
- 2.2-3 Coordinate land uses and improvements along Cache Creek so that the adverse effects of flooding and erosion are minimized.
- 2.2-4 Ensure that the floodway is maintained to allow other beneficial uses of the channel, including groundwater recharge, recreation, and riparian habitat, without adversely affecting flood flow conveyance capacity.

## **2.3 OBJECTIVES**

- 2.3-1 Support flood management objectives as required to protect the public health and safety.
- 2.3-2 Integrate the CCRMP with other planning efforts to create a comprehensive, multi-agency management plan for the entire Cache Creek watershed.
- 2.3-3 Recommend actions to create a more stable channel configuration with flood flow conveyance capacity that is consistent with regional flood management programs.
- 2.3-4 Protect permanent in-channel improvements (e.g., pipelines, bridges, levees, and dams) from structural failure caused by erosion and scour.



- 2.3-5 In order to allow the creek to aggrade and create a more natural channel system, restrict the amount of aggregate removed from Cache Creek, except where necessary to: increase flood flow capacity; protect existing structures, infrastructure, and/or farmland; minimize bank erosion; implement the Channel Form Template; enhance creek stability; establish riparian vegetation; or for recreation and/or open space uses consistent with the Parkway Plan.
- 2.3-6 Establish monitoring programs for the continued collection of data and information to be used in managing the resources of Cache Creek.
- 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.

## **2.4 ACTIONS**

- 2.4-1 Revoke the 1979 In-Channel Mining Boundary, as defined in Section 10-3.303(a) of the Yolo County Mining Ordinance. In its place, adopt a new in-channel area based on present channel banks and the 100-year floodplain, as determined by the U.S. Army Corps of Engineers in the Westside Tributaries Study, whichever is wider. This is a more accurate measure of delineating the boundary between in-channel and off-channel uses. *(Completed in 1996)*
- 2.4-2 Limit the amount of aggregate removed from the channel to the average annual amount of sand and gravel (and associated fines) deposited since the last prior year of removal as estimated by the TAC based on channel topography and bathymetry (not to exceed approximately 690,800 tons annually on average), except where excavation is necessary to widen the channel as a part of implementing the Channel Form Template, or where potential erosion and flood flow conveyance capacity problems exist. The amount and location of in-channel aggregate removal shall be carried out according to the ongoing recommendations of the TAC, with the voluntary cooperation of the landowners involved.

In-channel projects are limited to projects 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. Landowners are responsible for applying for and financing in-channel projects unless other funding is available.

- 2.4-3 Implement the Channel Form Template described in the 2017 Technical Studies to re-shape the Cache Creek channel based on best available data and hydraulic modeling tools. Continue to collect and analyze channel topography (LiDAR) data, and update the CCRMP hydraulic model with those data. Based on outcomes of these analyses, the TAC can determine the need for streambed and channel alteration projects. Altering the channel

banks and profiles will assist in returning the creek to a form that is more similar to its historical condition. This will result in reduced erosion, increased in-channel recharge, and additional riparian habitat opportunities.

- 2.4-4 Replace the theoretical thalweg, as defined in 10.3-221 of the Yolo County Mining Ordinance, with channel slope, width, depth, and cross-section standards specific to each reach of the creek, based on annual monitoring and periodic engineering analysis of hydraulic and sediment transport conditions. *(Completed in 1996)*

Develop and maintain a hydraulic model of Cache Creek capable of simulating a range of discharges and flood hydrographs up to the 100-year flood and assessing sediment transport patterns. Update this model with new topography, vegetation cover, and other available data sources. *(Note: HEC-2 and HEC-6 were completed by Northwest Hydraulic Consultant in the 1995 Technical Studies; HEC-RAS and HEC-2 were completed by MBK Engineers for the area between CR 94B and I-5 in 2001; HEC-RAS was completed by MBK Engineers for the area between CR 94B and I-5 in 2006.)*

- 2.4-5 Acknowledge the Streamway Influence Zone as the general area of the creek which has historically been subject to meander migration. The Streamway Influence Zone also defines the area where in-stream and off-channel issues overlap and are addressed in both plans. *(This concept lead to Section 10-4.429(d) of the Mining Ordinance.)*
- 2.4-6 Work with other entities, including, but not limited to, the YFCWCD, the U.S. Army Corps of Engineers, the California Department of Water Resources, the Federal Emergency Management Agency, landowners, and regional groups in developing a coordinated solution for managing the watershed of Cache Creek. *(In December of 2010, the TAC identified a primary and alternate Flood Coordinator. The County Office of Emergency Services (OES) designated the position of TAC Flood Coordinator as a Technical Specialist to the County OA EOC during periods of activation.)*
- 2.4-7 Manage activities and development within the floodplain to avoid hazards and adverse impacts on surrounding properties. This shall be accomplished through enforcement of the County Flood Ordinance and ensuring that new development complies with the requirements of Flood Hazard Development Permits. *(This is addressed through the County's requirement for a Flood Hazard Development Permit (FHDP) for any work within the 100-year floodplain of the creek. In correspondence dated July 14, 2005, the Chief Engineer of the State Reclamation Board confirmed that the Reclamation Board's authority is from I-5 downstream and the County's authority extends from I-5 upstream. In 2008, the State Reclamation Board became the Central Valley Flood Protection Board.)*
- 2.4-8 The County shall work with the Yolo County Flood Control and Water Conservation District to explore opportunities for increasing surface flows during spring and summer. Enter into a Memorandum of Understanding with the YFCWCD to provide a regular source of surface water flow in Cache Creek throughout the year, when annual precipitation is

sufficient. The timing and volume of flows should be coordinated with the TAC in order to create a stable low-flow channel and allow for the natural revegetation of the streambed, where appropriate.

- 2.4-9 As part of updating the hydraulic model of the creek channel, obtain funding to install a gage at Capay and work with other jurisdictional agencies (e.g. YFCWCD, USACE, DWR) to establish a gage maintenance program. This will allow the TAC to monitor the amount of streamflow and sediment coming into the plan area and compare the results with data obtained from the gage at Yolo. This information is important in determining how much water is recharged within the plan area, and whether the sediment "budget" is in a net gain or deficit.
- 2.4-10 The County shall manage collection of the information necessary to make informed decisions about the management of Cache Creek, including: regular water and sediment discharge data at Rumsey and Yolo gage sites, water and sediment discharge data at other sites during high flow events, and topographic data showing the erosion, aggradation, and the alignment of the low-flow channel within the creek. A formal integrated data management program should be developed with appropriate user access and consistent management and control.

Monitoring may, at the discretion of the County, be conducted by either consultants or trained volunteers, including landowners, public interest groups, the aggregate industry, and students, as a part of future public education programs associated with Cache Creek. However, the County shall maintain responsibility for the collection of high-quality data.

- 2.4-11 Create a Technical Advisory Committee (TAC) to provide the County with specific expertise and knowledge in implementing the CCRMP and CCIP. The TAC will assist the County in carrying out its responsibilities under this plan, as well as recommending changes to the CCRMP, the CCIP, and implementing ordinances. *(Completed in 1996)*
- 2.4-12 When possible, reshape channel banks immediately upstream and downstream of both County and State bridges to minimize scour and erosion. Work on the creek banks could be accompanied by the construction of check dams or weirs within the channel, downstream of the bridges, to encourage aggradation. The length of smoothed bridge transitions should generally be five times longer than the width of the channel at the bridge site, and shall incorporate guide banks, grade control structures, dikes, berms, vegetation, and other similar measures. Such methods and practices shall incorporate riparian vegetation and increase wildlife habitat values to the extent that the objective of minimizing scour and erosion are not compromised. *(This was anticipated to be a significant effort in the first five years of the program. In 1997, approximately 40,000 tons were removed in-channel near the facilities now operated by CEMEX, and in 1998 approximately 332,423 tons were removed near the Syar facilities, although a portion of this may have come from existing stockpiles.)*

- 2.4-13 Update the CCRMP every ten years. This will allow the plan to be amended on a regular basis so that the results of monitoring programs and reclamation efforts can be taken into account.
- 2.4-14 Rezone those lands within the CCRMP plan boundary to add the Open Space (OS) designation as an integrated zone. This will allow for those excavations necessary to carry out the channel widening envisioned in the 1995 Technical Studies, as well as any regular and/or emergency flood control and bank protection activities, riparian restoration, and other resource management efforts. *(Completed 1996)*
- 2.4-15 Present a request to the State Mining and Geology Board to grant an exemption from the requirements of SMARA for all channel improvement projects approved under the CCIP. If the CCRMP is found to be subject to SMARA, the County shall submit the plan, including the CCIP, to the Department of Conservation for review and comment as the mining and reclamation plan for the study area of the creek. *(The request was rejected by the State Mining and Geology Board in the fall of 1998. The Board determined that the CCRMP did not qualify for an exemption due to the amount of sand and gravel expected to be removed over the 30-year life of the plan. Special legislation was passed to amend SMARA to recognize the CCRMP as the functional equivalent of a Reclamation Plan for purposes of SMARA compliance (PRC Section 2715.5). On August 29, 2016, Governor Brown signed Senate Bill 1133 (Wolk) which made this statute permanent.)*
- 2.4-16 Adopt a County In-Channel Ordinance to prohibit commercial mining within the CCRMP planning area and specify that aggregate extraction within the area shall be limited to activities necessary to complete channel improvement projects. *(Completed in June 2008. See Cache Creek Area Plan In-Channel Ordinance, Section 10-3.101 et seq.)*

## CHAPTER 3.0 – WATER RESOURCES ELEMENT

### 3.1 INTRODUCTION

#### Present Conditions

Groundwater studies have shown a consistent pattern of interaction between Cache Creek and the local aquifer. Based on the underlying geology of Cache Creek, some reaches are hydrologically considered to be “losing” (i.e., prone to percolation of surface water through the streambed), while others are considered “gaining” (i.e., elevated groundwater seeps upwards into the streambed). The portion of Cache Creek located between the Capay and Esparto Bridges tends to be a losing reach. The reach between the Esparto Bridge and the Dunnigan Hills may either be losing or gaining, depending on the amount of rain. The more rain there is, the higher the groundwater table raises, seeping water into the creek. In a prolonged drought, however, the level of the aquifer drops and the reach loses water. The portion of Cache Creek downstream of the Dunnigan Hills to the town of Yolo is generally a losing reach.

Surface water hydrology in Cache Creek is dependent on winter rainfall; although in some cases, releases from upstream dams can influence base flow in the creek, particularly during the summer irrigation season. Rainfall generally begins in December and peaks in January and February. Depending on number and timing of storms, surface water flows begin to recede in late spring, although gaining reaches and pools will retain water into the summer. By fall, the creek has gone completely dry.

Cache Creek is known to be impaired by mercury originating from historic mining practices upstream. Boron, nitrogen, orthophosphate, and fecal coliforms are also elevated in Cache Creek and likely originate from agricultural sources in the watershed. The CCRMP water quality monitoring program has involved sampling in the creek since 1999, and few spatial or temporal trends are evident. The CCRMP water quality sampling program has identified Gordon Slough as a major contributor of many of the agriculturally originating pollutants detected, most notably fecal coliforms and orthophosphate.

Groundwater elevations in the Cache Creek area have been consistent over the two decades since the start of the CCRMP, exhibiting seasonal trends of depression in the summer/fall due to pumping and recharge in the winter/spring due to rains. Overall, the winter recharge has kept spring groundwater elevations near Cache Creek constant. Two exceptions are during 2009-2010, when groundwater levels were depressed due to dry conditions in 2007-2009, and from 2012 to 2016 due to the effects of the 2012-2014 California drought. Wet conditions in 2011 restored groundwater elevations after the 2009-2010 depression, but the severity of the 2012-2014 drought has meant that rains in the winter of 2015-2016 have not yet recovered pre-drought groundwater elevations.

In 2007, the Water Resources Association of Yolo County, comprised of the jurisdictions and water agencies of Yolo County, adopted an Integrated Regional Water Management Plan

(IRWMP) to look area wide at water supply, water quality, and water resources management. In 2014, significant new legislation known as the Sustainable Groundwater Management Act or SGMA was enacted relevant to groundwater management in California. This legislation established requirements for sustainable management of groundwater at the local level to protect against overdraft, subsidence, and other adverse effects of unsustainable groundwater use. This resulted in the formation of the Yolo Subbasin Groundwater Agency and on-going efforts to develop a Groundwater Sustainability Plan by January 2022.

### **CCRMP Vision**

Studies that preceded adoption of the CCRMP in 1996 demonstrated that lowering of the streambed from prior commercial in-channel mining in Cache Creek did not result in a permanent loss of groundwater storage throughout the aquifer; however, it did result in a decline of groundwater levels of about 10 feet near the channel. This is one of the reasons the CCRMP limits in-stream activities to those that enhance channel stability, establishment of riparian vegetation, and recreation and open space activities as prescribed in the Parkway Plan. Such activities are restricted to no more than the average annual amount of aggregate deposited since the last prior year of removal (not to exceed approximately 690,800 tons on average), excluding the reshaping of the channel bank to comply with the Channel Form Template. Removal of aggregate from the channel may only occur under the direction of the County based on the recommendations of the TAC. It is intended that the streambed will aggrade over time in some areas. In most reaches of Cache Creek within the plan area, the channel can accommodate far more than the necessary flood flow conveyance capacity and can aggrade without adversely affecting this capacity. In areas where the rising streambed does reduce channel capacity sufficiently to encroach on necessary flow conveyance capacity, periodic maintenance may be advisable to restore desired flow conveyance capacity.

The CCRMP also recognizes opportunities to develop a groundwater recharge program as a component of mining reclamation. Recharge can be accomplished by converting some of the formerly mined pits along Cache Creek into groundwater recharge basins. Excavations where the pit floor is above the groundwater table are especially suitable for recharge. Where appropriate, the County will coordinate with the Yolo County Flood Control and Water Conservation District in their efforts to develop a groundwater management program.

Cache Creek is a major conveyance of stormwater and irrigation water. Landowners along the creek should be encouraged to divert upland stormwater runoff flows into sediment basins before the water enters the creek. This action would reduce the peak flows in Cache Creek during storm events because sediment basins would also act as stormwater detention basins. As discussed in the Biological Resources Element, some of the formerly mined pits could be used for this purpose to deposit sediment carried by stormwater runoff into areas that need topsoil (provided it can be demonstrated that soil quality is acceptable), as well as to provide a seasonal source of water for riparian vegetation. At the same time, the stormwater detention/sediment basins would settle out much of the suspended sediment carried by upland stormwater runoff.

## **3.2 GOALS**

- 3.2-1 Improve the gathering and coordination of information about water resources so that effective policy decisions can be made.
- 3.2-2 Promote the conjunctive use of surface and groundwater to maximize the availability of water for a range of uses, including habitat, recreation, agriculture, water storage, flood control, and urban development.
- 3.2-3 Maintain the quality of surface and groundwater so that nearby agricultural productivity and available drinking water supplies are not diminished.
- 3.2-4 Enhance the quality of water resources by stressing prevention and stewardship rather than costly remediation.
- 3.2-5 Provide habitat restoration without increasing the generation of mosquitoes.

## **3.3 OBJECTIVES**

- 3.3-1 Encourage the development of a groundwater recharge program, where appropriate, within the Cache Creek basin. The program may specify use of reclaimed mining pits and open lakes to the greatest extent feasible, while maintaining consistency with the other goals, objectives, actions, and standards of both the CCRMP and OCMP.
- 3.3-2 Use the CCRMP as a basis for developing a comprehensive watershed plan for Cache Creek that eventually integrates the area above Clear Lake to the Yolo Bypass, relying on coordinated interagency management.
- 3.3-3 Eliminate water quality impacts from the use of pesticides, fertilizers, and other soil amendments in the channel. Promote public education programs that encourage the use of innovative methods and practices for enhancing the water quality of Cache Creek through the voluntary cooperation of local landowners.
- 3.3-4 Establish monitoring programs for the continued collection of data and information to be used in managing surface and groundwater resources.
- 3.3-5 Promote the safe use and handling procedures of hazardous materials during creek management activities.
- 3.3-6 Minimize mosquito generating potential in habitat restoration areas.

### **3.4 ACTIONS**

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

Pesticides (including herbicides, insecticides, rodenticides, and fungicides) shall be used within the channel boundary only under the direction of a certified pesticide/herbicide applicator. These chemicals shall not be applied prior to forecasted rainfall. Evaluate the potential for herbicides to cause aquatic life toxicity. Use herbicides with low toxicity to aquatic life (fish, zooplankton, algae).

Public access to County-owned land shall be allowed only at limited points within the CCRMP planning area to facilitate the control of potential releases of deleterious materials (including fuel, motor oil, household waste, and debris) that could affect water quality within the Cache Creek channel. Access to private property along the creek should be discouraged through the posting of "No Trespassing" signs.

- 3.4-2 Negotiate cooperative agreements with the YCFCWCD, U.S. Army Corps of Engineers, Regional Water Quality Control Board, Yolo County Resource Conservation District, and U.S. Bureau of Land Management, among others, to extend the provisions of the CCRMP outside of the plan area and incorporate the requirements of other agencies of jurisdiction into the County's planning efforts. Interagency contact shall be initiated by the County NRM at least once per year.
- 3.4-3 Provide for annual (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 include, but not be limited to, pH, temperature, turbidity, total and fecal coliform, mercury, dissolved oxygen, nitrogen, and orthophosphate. This information will assist in habitat restoration efforts and allow the County to monitor water quality trends within the planning area. The County NRM 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.

- 3.4-4 Encourage landowners adjoining Cache Creek to participate in a groundwater monitoring program, so that ongoing groundwater information can be integrated into the Water Resources Information Database (WRID) created since the CCAP was originally adopted in 1996.
- 3.4-5 Deleted.
- 3.4-6 Work with agricultural land owners within the CCRMP boundary to develop agricultural drainage ponds or wetlands to reduce loads of contaminants present in these discharges before they enter Cache Creek.
- 3.4-7 Coordinate all habitat restoration efforts with the Sacramento-Yolo Mosquito and Vector Control District.

## CHAPTER 4.0 – BIOLOGICAL RESOURCES ELEMENT

### 4.1 INTRODUCTION

#### Present Conditions

In California's Central Valley, intact riparian ecosystems are critically important habitat for numerous native wildlife, fish, and invertebrate species. Riparian forests are particularly valuable for both common and special-status species of birds, mammals, insects, and other species seeking food, shelter, dens, or nesting sites. Riparian areas also provide many important ecosystem services for people including hiking, bird watching, hunting, fishing, education, and carbon sequestration that reduces the effects of climate change.

Prior to the 1850's, Cache Creek was likely bordered by extensive riparian forests composed of cottonwoods, willows, and oaks, spanning a broad vegetated floodplain. Much of the forest was eliminated in the early to mid-1900's, largely as the result of cattle grazing, timber harvesting, clearing of fields for agriculture and homesteads, and water diversion. In-stream mining that began with small operations in the early 1900's, and which grew to industrial-scale operations in subsequent decades, further decreased riparian forests and native vegetation in general.

Based on hand-drawn maps at the scale of the entire CCAP, the 1995 Technical Studies estimated that approximately 125 acres of riparian forest remained along lower Cache Creek within the present-day CCRMP area. A more refined re-analysis of the 1995 vegetation data as part of the 2017 Technical Studies revealed that riparian forest area was substantially underestimated in 1995. The 2017 Technical Studies provided refined estimates that in 1995 there was an estimated 263 acres of riparian forest, 36 acres of oak woodland, 331 acres of willow scrub, and 218 acres of herbaceous vegetation, with significantly more oak woodland present within the OCMP area, outside the CCRMP boundary.

As of 2015, there was an estimated 252 acres of riparian forest, 3 acres of oak woodland, 213 acres of willow scrub, and 475 acres of herbaceous vegetation within the CCRMP area. Changes in these values from 1995 to 2015 represent actual changes in vegetation, in addition to significant differences in methodology used to classify vegetation and estimate acreage between the two time periods. The acreage of riparian forest could have potentially been higher; however, recent brush fires and forest die-back from drought resulted in some degradation and loss of forest habitat from 2010 to 2015.

Herbaceous vegetation has increased significantly to 475 acres in 2015 balanced by a decline in willow scrub to 213 acres. Assuming the area of oak woodland was approximately 2.5 acres in 1995, a slight increase to just under 3 acres has also occurred. The most extensive riparian forests are found in the Dunnigan Hills reach, in which large patches of gallery forests comprised of cottonwoods, willows, oaks, black walnuts, buckeyes, and other species of trees and shrubs. Bands of dense willow/mulefat scrub line the channel, interspersed with patches of wetland herbaceous vegetation. Large patches of riparian forest are also found in the Capay, Guesisosi,

and Hoppin reaches. Herbaceous vegetation has increased significantly along the channel banks in the Dunnigan Hills and Hoppin reaches, primary in the form of dense stands of cattails and tules. Within the Hungry Hollow, Madison and western portion of the Guesisosi reaches, riparian vegetation has begun to recover from previous mining activities, albeit slowly due to gravelly soils, relatively deep groundwater, and lack of surface water. While a slight increase in native vegetation has been observed from 1995 to 2015, most of these areas remain exposed and largely unvegetated, providing only minimal habitat for wildlife and other species.

Numerous threats to remaining native vegetation were identified in the 1995 Technical Studies, including the narrow stream channel, lack of surface water, invasive plant species (tamarisk and giant reed), and lowered groundwater levels. These factors are still present in 2016. The narrow width of the channel increases the velocity of the streamflow, making it more likely that native plant seedlings are scoured away during high flows. The diversion of surface water often occurs during the growing season for riparian vegetation and removes the primary source of water in losing reaches of the creek. Lowered groundwater levels leave tap roots withered and reduces colonization by new native seedlings, especially in riparian forest patches on upper terraces. In addition, the invasion of aggressive non-native species inhibits the recovery of diverse native habitat.

However, additional threats to native vegetation have arisen since 1996, including off-highway vehicle (OHV) use, brush fires, numerous new invasive species, and the lack of active revegetation after fires and invasive species treatment. Rampant OHV use along lower Cache Creek damages or removes native vegetation, potentially promotes invasive species, and likely has negative impacts on wildlife such as nesting birds, reptiles, and amphibians. Fires set by landowners to clear brush in forested areas have spread to encompass entire forest stands, resulting in large-scale damage to riparian forests. Numerous new invasive, non-native species have established along lower Cache Creek since 1996, including Ravenna grass, perennial pepperweed, tree of heaven, non-native thistles, tree tobacco, Himalayan blackberry, edible fig, poison hemlock, barbed goatgrass, and medusahead. These species compete directly with native plants and generally have little value for native wildlife. Finally, the lack of active revegetation with native species after fires and invasive species treatment has allowed many of these invasive species to rapidly increase and spread across the area. It is estimated that over 95 percent of the understory vegetation within the CCRMP is non-native, consisting of naturalized annual grasses and forbs in addition to invasive species noted above. Some patches of arundo, Ravenna grass, and tamarisk (formerly widespread in large, continuous patches) have either persisted along backwater channels or under dense forest canopy or have re-sprouted after being treated in previous years. More recent invasive species, such as perennial pepperweed and Himalayan blackberry, are widespread and often occur in large, homogeneous patches that exclude native vegetation. These species provide only minimal value to native wildlife and invertebrates, while using vast amounts of water and growing dense enough to inhibit channel flows.

Wildlife and invertebrate species are also important components of the biological resources present within the area. The 1995 Technical Studies presented an overview of native species that are known to be present within the CCAP area, as well as those species that could be present

given suitable habitat. Notable species that were present, or potentially present, within the CCRMP area at the time of the 1995 Technical Studies included Swainson's hawk (*Buteo swainsoni*; present), bank swallow (*Riparia riparia*; present), tricolored blackbird (*Aegelaius tricolor*; present), Cooper's hawk (*Accipiter cooperi*; potentially present), yellow warbler (*Stenophaga petechia*; potentially present), Western pond turtle (*Actinemys marmorata*; present), ring-tailed cat (*Bassariscus astutus*; potentially present), Valley elderberry longhorn beetle (*Desmocerus californicus dimorphus*; present), Sacramento anthicid beetle (*Anthicus sacramento*; potentially present), as well as numerous common species such as black-tailed deer (*Odocoileus hemionus columbianus*) and common predators, such as bobcats, badgers, coyotes, foxes, and raptors.

As of 2015, notable species observed within the CCRMP area included Swainson's hawk, tricolored blackbird, yellow warbler, golden eagle (*Aquila chrysaetos*), loggerhead shrike (*Lanius ludovicianus*), Northern harrier (*Circus cyaneus*), white-tailed kite (*Elanus leucurus*), yellow-headed blackbird (*Xanthocephalus xanthocephalus*), bobcat (*Lynx rufus*), mountain lion (*Puma concolor*), nonnative wild pig (*Sus scrofa*), Valley elderberry longhorn beetle, Sacramento hitch (*Lavinia exilicauda*), and Sacramento pikeminnow (*Ptychocheilus grandis*). More than 150 additional common species of snakes, lizards, birds, mammals, invertebrates, and fish also occur across the CCRMP area.

Threats to native wildlife and invertebrates include non-native competitors and predators, such as brown-headed cowbird (*Molothrus ater*), European starling (*Sturnus vulgaris*), bullfrog (*Rana catesbeiana*), and small-mouthed bass (*Micropterus dolomieu*); poaching; rodenticides that can poison native mammalian and avian predators; damage to or loss of habitat due to development, drought, or disturbances including fires and OHV use; establishment and spread of invasive plant species that reduce habitat value; and in some cases noise that can impair ability of nocturnal predators to locate prey.

### **CCRMP Vision**

Although the CCRMP cannot re-establish the diversity and extent of riparian habitat that existed 150 years ago, there is substantial opportunity for improving the degraded situation that occurs today. One long-term goal of the CCRMP is to establish a continuous corridor of native vegetation along lower Cache Creek composed of a mosaic of riparian forests, oak woodland, scrub, and herbaceous habitat, including ephemeral species. Both passive and active restoration efforts will be required to achieve this goal. Passive restoration involves removing barriers to habitat recovery without actually planting native species back on a site. On lower Cache Creek, such barriers include invasive plants that displace native plants, disturbances such as fires and OHV use, lack of summer flows coupled with deep groundwater, and lack of floodplain connection. Active restoration includes elements of passive restoration (e.g., invasive plant removal), but also the deliberate planting of native trees, shrubs, and herbaceous species in order to accelerate habitat recovery. Both passive and active restoration projects within the CCRMP area should have one or more habitat targets (the type of habitat to be restored). Based on existing habitat within the CCAP area, these targets will include riparian forest, oak woodlands, scrub, herbaceous

grasslands and wetlands (Figures 6 through 8 below). It is critical that, for habitat types associated with woody vegetation (riparian forest, oak woodland, and scrub), native understory species (grasses, forbs, sedges, and rushes) are included in the planting palette in order to exclude invasive species, prevent soil erosion, and provide resources for pollinators and other species.

Figure 6 provides representative photographs of riparian forest patches from the CCAP area taken in 2015–2016. Figure 7 provides representative photographs of scrub (left) and oak woodland (right) habitat taken within the CCRMP area from 2015–2016. Figure 8 provides representative photographs of herbaceous habitat taken within the CCAP area from 2015–2016. Upper left to lower right: upland restored grassland dominated by purple needlegrass (*Stipa pulchra*), grassland on lower terrace near channel dominated by creeping wildrye (*Elymus triticoides*), wetland sedge (*Carex* sp.), and a large patch of native sky lupine (*Lupinus nanus*).

This plan identifies a number of recommended sites along Cache Creek for habitat restoration (see Figure 9). Figure 9 identifies priority sites for restoration of riparian forest, oak woodlands, grasslands, and wetlands within the CCAP area. Understory enhancement refers to areas with high-quality woody vegetation but with understory communities dominated by priority invasive species (e.g., perennial pepperweed, Himalayan blackberry). Due to the changing hydrological and geological conditions that exist throughout the plan area, the type and extent of habitat vary from one reach to another. In general, the recommendations may be summarized as follows:

Capay Reach: Due to the high flow velocities and widespread exposure of bedrock within the channel, there is currently little opportunity for in-stream restoration in this reach. However, there are substantial opportunities to restore oak woodlands with native understory communities on upland sites on both the north and south sides of the channel. These areas are largely open sites dominated by nonnative and invasive understory species, although some remnant native oaks, elderberry, and other species are still present. Soils appear to be of sufficient depth and quality to support these habitat types, and the sites are reasonably accessible. Riparian forest restoration should also be undertaken within the formerly large forest patch near the downstream end of the reach on the south side of the channel. This patch burned extensively in 2015, supposedly due to a brush fire spreading out of control, and much of the forest was lost and replaced by dense invasive thistles and other undesirable species. To a lesser extent, some opportunities also exist for riparian forest restoration to expand and connect existing forest patches on upper terraces along the north side of the channel. Efforts should also focus on continuing to treat priority invasive species including arundo, Himalayan blackberry, Ravenna grass, perennial pepperweed, and tamarisk within this reach.



Cache Creek Area Plan Update - Riparian Forest Patches



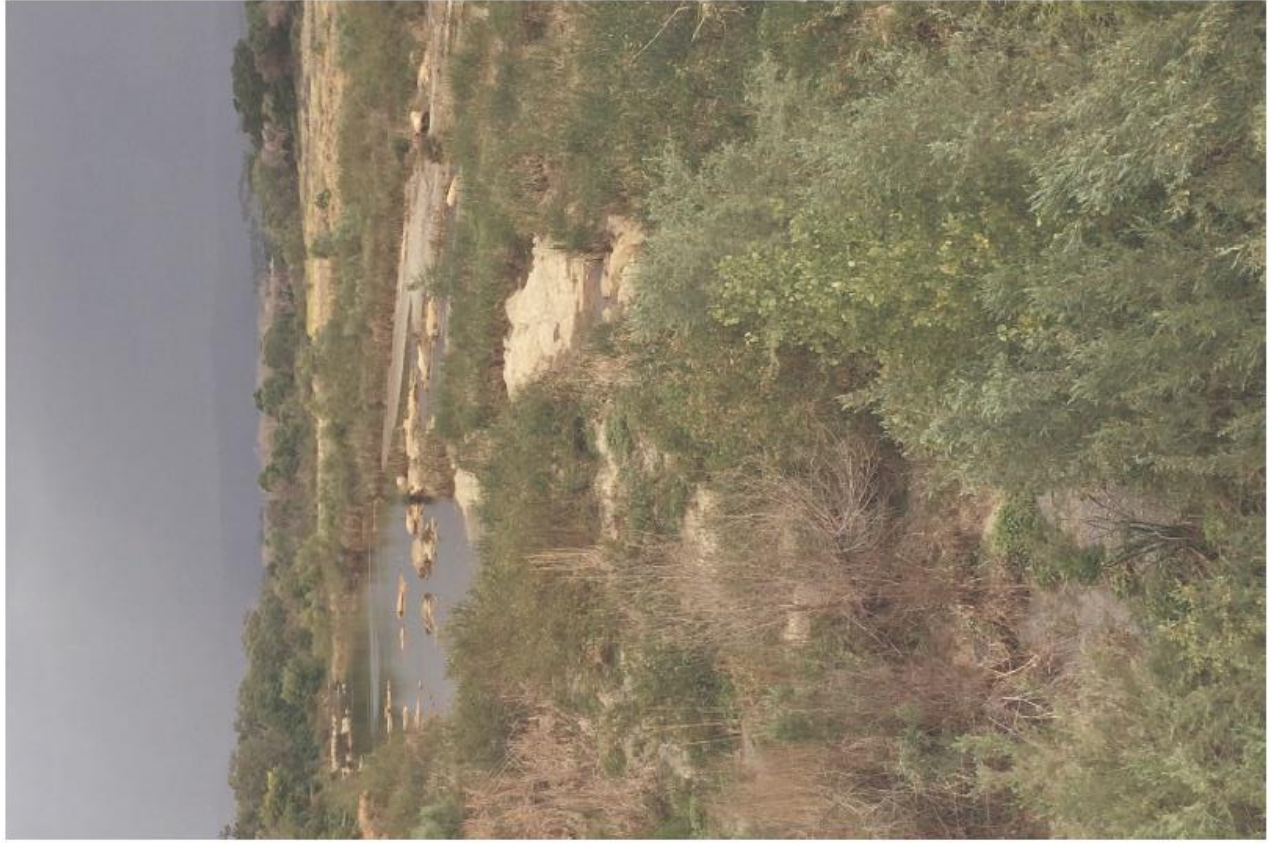
May 10, 2017

Data sources: Yolo County. Photo credit Dr. Andrew Rayburn

Figure 6



Cache Creek Area Plan Update - Scrub and Oak Woodland Habitat



May 10, 2017

Data sources: Yolo County, Photo credit Dr. Andrew Rayburn

Figure 7



*Cache Creek Area Plan Update - Herbaceous Habitat*



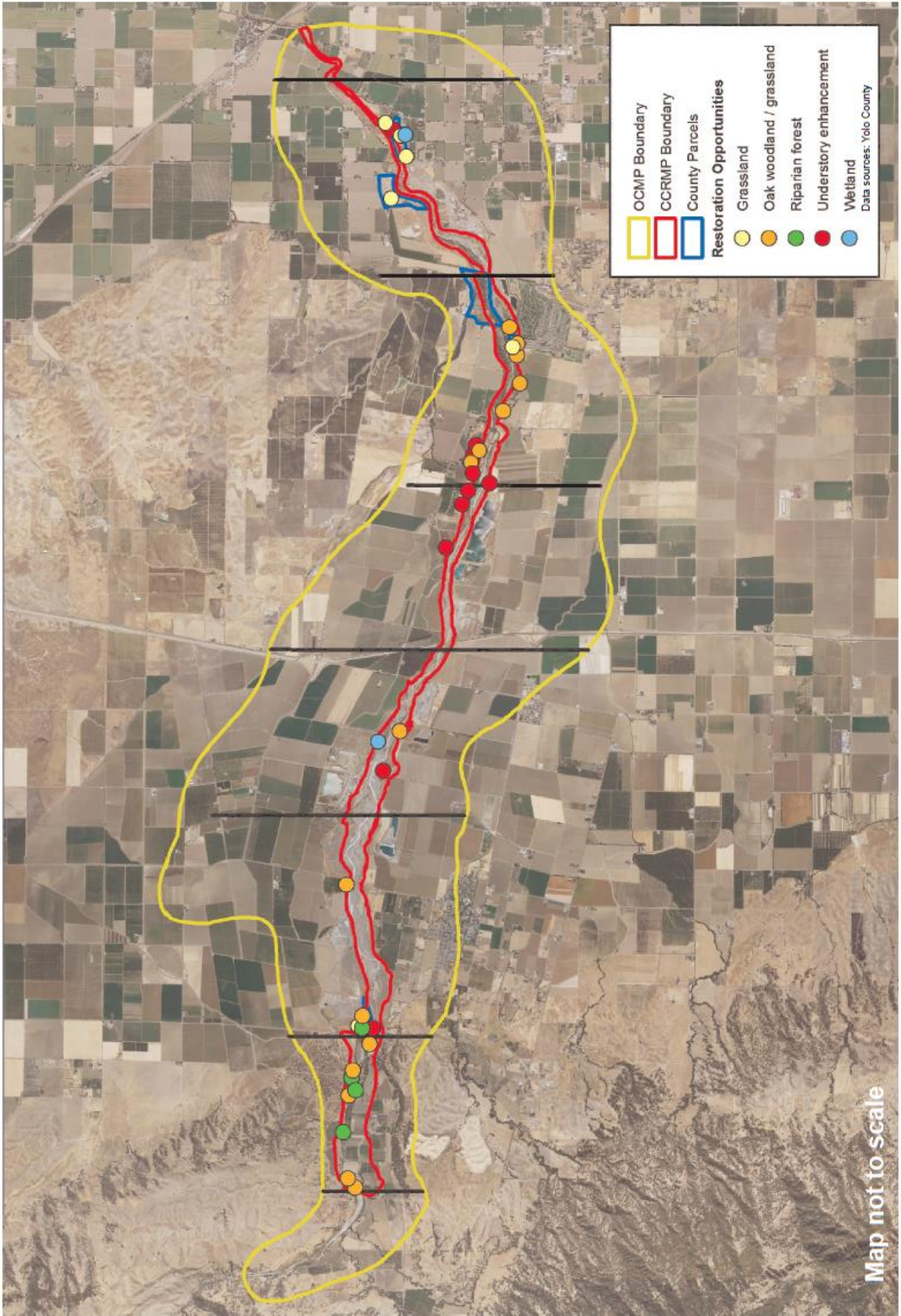
May 10, 2017

Data sources: Yolo County; Photo credit Dr. Andrew Rayburn

Figure 8



Cache Creek Area Plan Update - Priority Restoration Opportunities



May 10, 2017

Figure 9

Hungry Hollow Reach: This reach of the creek is the main area of natural sediment deposition that results in a braided channel. Groundwater levels are lower here than in other portions of the plan area. These two factors tend to discourage extensive restoration unless irrigation is used on an on-going basis. However, this area also forms a significant gap in the desired continuous corridor of native habitat that is the long-term goal of the plan. The exception is the upstream end of this reach, where the Capay Open Space Park is located. On the northern portion of the park, there are opportunities to enhance the existing habitat within the park through grassland, riparian forest, and oak woodland enhancement and restoration. On the portion of the park on the south bank, understory enhancement in the form of invasive species treatment and replanting of native grasses and forbs is recommended. Any restoration work at the Capay Open Space Park will directly support the implementation of the Parkway Plan. Along the meandering low-flow channel, where more water is available, some natural recovery of native woody vegetation has occurred from 1995 to 2015. Although a slow process, this recovery is expected to continue in the future, especially if more surface water becomes available in late spring and throughout the summer. Just upstream of the County Road 87 bridge on the north side of the channel, there are large open areas that would be suitable for oak woodland or native grassland restoration. Although there are relatively fewer priority invasive plants along this reach, monitoring and treatment efforts should continue to prevent spread within this reach and also downstream.

Madison Reach: Within a large patch of woody vegetation on the south bank in the upper third of this reach, removal of invasive species and debris could be paired with planting of native shrubs and understory species to improve habitat. Also, on the south bank but further downstream, oak woodland restoration would be appropriate for a large open area on an upper terrace. In addition, a former mining pit at the midpoint of the reach on the north bank could be restored to a native wetland (e.g., a sedge meadow). Some opportunities may exist to lower, breach, or remove levees to connect formerly mined pits on the north side of the channel. Areas on low terraces with good access to groundwater along this reach could potentially be restored to riparian forest habitat. Woody riparian species could also be planted along the low-flow channel itself, focusing on relatively stable areas in terms of scour and deposition. As in the Hungry Hollow reach, some native revegetation is naturally recovering along the low-flow channel and in other locations. Although not as abundant as in other reaches, continued monitoring and treatment of priority invasive species should also occur in this reach.

Guesisosi Reach: This portion of the creek serves as a transition zone between the sparsely vegetated, braided channel upstream, and the well-vegetated, relatively narrow channel downstream. Substantial natural recovery of native woody vegetation has occurred within this reach, especially on the downstream end. In this portion of the reach, the primary opportunities are to enhance the understory within the existing patches of woody vegetation (e.g., the Hayes “Bow-Tie” property) as well as to monitor and treat priority invasive species.

Dunnigan Hills Reach: This reach already contains several sites that have naturally revegetated, and is generally characterized by well-developed and diverse habitat including substantial patches of high-quality riparian forest and a wetland-forest complex at the Cache Creek Nature

Preserve. Two high-priority restoration opportunities exist within this reach, both of which have the potential to directly support the implementation of the Parkway Plan. First, the Millsap property on the northern side of the channel at the upstream end of the reach is ideal for restoration of a mosaic of oak woodlands interspersed with native grasslands and shrub communities, especially given the substantial effort put into controlling tamarisk and arundo on the site in recent years. The northwest portion of the property is currently a walnut savanna with a non-native understory; this site is unique since it retains the natural microtopography that is presumably the result of not having been plowed in the past. Oak woodland restoration and the establishment of a diverse natural understory on this site could be integrated with the creation of a nature trail and interpretive signage, resulting in a high-value Parkway site that would be open to the public. Other portions of the Millsap property require invasive species treatment and understory enhancement, such as the dense forest patch on the southeast portion of the property that is known to harbor migratory flocks of long-eared owls in some years.

The second priority restoration site is the Wild Wings property on the south side of the channel near the downstream end. The upper portion of the property would greatly benefit from repair and expansion of the existing trail network in addition to interpretive signage, while additional oaks, native shrubs, and native herbaceous species would augment those that survived after past planting efforts. The lower portion of this site is highly compacted with rocky soils, and would likely be suitable for native grassland restoration using species adapted to such harsh conditions (e.g., purple needlegrass, native buckwheat species). In addition, understory enhancement is needed within existing forest patches on both the northern and southern sides of the channel at the upstream end of this reach.

Oak woodland restoration would be appropriate both upstream and downstream of the former Patterson pit, which itself should be retained as a wetland especially given the historical occurrences of tricolored blackbirds on the site. Opportunities for creating further hydrological connections between the creek and both riparian forests and wetlands that have developed on former mining sites should also be explored. Overall, this reach is characterized by abundant priority invasive species, and both monitoring and treatment should continue to be emphasized.

Hoppin Reach: Two priority restoration opportunities are found within this reach. First, most of the Granite Woodland Reiff site adjacent to the CCRMP boundary is suitable for native grassland restoration and potentially some scattered oaks. Large patches of previously planted native grasses are thriving in the northern portion of the site. Second, the Correll and Rodgers properties are composed of a mosaic of different habitat types and have sites appropriate for grassland and wetland restoration in addition to understory enhancement within the large forest patch on the northern edge of the property. Oaks may also establish well in the more open areas targeted for grassland restoration, as may some riparian forest species especially if the lower areas were hydrologically connected to the creek. Otherwise, irrigation might be required to ensure woody species establishment. In general, opportunities should be explored to remove embankments and implement other measures to broaden the active floodplain to accelerate vegetation recovery on former mining sites. Elsewhere within this reach, the primary emphasis should be on monitoring and treating priority invasive species that are widespread across this area.

Rio Jesus Maria Reach: The channel is relatively narrow through this reach, with generally well-developed riparian forest on the upper banks. As noted for other reaches, priority invasive species should be monitored and treated within this reach, and some open areas would benefit from grassland restoration efforts. A portion of the mature forest on the northern side of the channel on the downstream end burned sometime from between 2015 and 2016, and re-planting of oaks and other woody species should be investigated.

One of the foremost considerations in accelerating and maintaining recovery of native vegetation and other biological resources within the CCRMP area is a more available supply of surface water (i.e., maintaining surface flows along the length of lower Cache Creek in the late spring and throughout summer). This may be accomplished by either coordinating revegetation efforts with agricultural drainage, or involving the Yolo County Flood Control and Water Conservation District.

Restoration recommendations for several of the reaches have included proposals to remove levees and connect formerly mined pits to the channel. In locations where this is still feasible as of 2015, this could be accomplished in a series of steps. The first would be to backfill the pit, if necessary, with four to six feet of overburden and topsoil. A number of sources could be used for this material, including sediment runoff from adjoining agricultural fields, waste fines from off-channel aggregate processing, surplus soil from grading projects, and/or backwash from Cache Creek (if a small breach is constructed on the downstream portion of the levee). Once sufficient material had been accumulated, the area should be planted with riparian vegetation and allowed to mature for two or three years. At that time, most of the levee would be removed, leaving a gently sloping transition from the newly revegetated terrace to the more active area of the channel.

Alternatively, a breach could be constructed in the downstream portion of the levee. The revegetated terrace would still be connected to the creek, while the remaining portion of the levee would increase the variety of natural landforms to diversify habitat opportunities. The remaining portion of the levee would be strengthened through riprap and other means to protect it from erosion. By implementing these recommendations incrementally, the vegetation is given enough time to become well established so that it can withstand the forces of large flood events. Providing a dense planting of vegetation along the toe of the streambanks will also stabilize the new banks and reduce erosion, as well as encourage higher flow velocities to remain in the center of the creek.

The continued recovery of riparian habitat along lower Cache Creek will require careful consideration. In some areas, the ability of vegetation to provide erosion control will be encouraged to protect nearby property or structures, while in other areas vegetation will have to be removed when it adversely affects channel flow. Similarly, the elimination of all priority invasive species across the CCRMP is likely an infeasible goal. Strategic investment of limited resources will be required in order to optimize invasive species treatment efforts into the future.

It is anticipated that much of the revegetation efforts along Cache Creek will be undertaken by the Cache Creek Conservancy and other organizations. As such, the County will work closely with

these groups in order to ensure that the various habitat development projects are carried out in a consistent manner and do not conflict with one another, that the projects contribute to the overall functioning of the riparian corridor, and that there is appropriate follow-up, maintenance, and monitoring to ensure success. Standards for developing habitat have been provided to guide revegetation projects and provide a measure of consistency in their implementation. The County will also coordinate with other government agencies, such as the YCFCWCD and the U.S. Army Corps of Engineers, so that a mutually agreed upon and coordinated approach can be implemented. Assistance will be sought to help in monitoring the results of these diverse efforts. Public service organizations and university students with ecological expertise will be approached to perform pro bono plant and wildlife surveys to supplement existing monitoring efforts.

## **4.2 GOALS**

- 4.2-1 Provide for a diverse, native riparian ecosystem within the CCRMP area that is self-sustaining and capable of supporting native wildlife.
- 4.2-2 Create a continuous corridor of riparian, upland, and herbaceous vegetation spanning the CCRMP area
- 4.2-3 Develop high-quality natural habitat that is dominated by native plants.
- 4.2-4 Manage riparian habitat so that it contributes to channel stability.
- 4.2-5 Establish monitoring programs for the continued collection of data and information to be used in measuring the success of revegetation efforts.
- 4.2-6 Integrate climate-smart adaptation strategies to increase resiliency and prepare for future uncertainty.

## **4.3 OBJECTIVES**

- 4.3-1 Conserve and protect existing riparian habitat within the CCRMP area to the greatest extent possible. Where channel maintenance or improvement activities result in the removal of riparian habitat, require disturbed areas to be restored. Where vegetation has been removed within the channel to maintain or improve flood flow conveyance capacity and/or erosion control purposes, restoration shall be done in nearby areas that do not adversely affect flood flow conveyance capacity.
- 4.3-2 Establish conditions to encourage the development of a variety of natural riparian habitat types within the CCRMP area in order to support biological resources associated with Cache Creek .

- 4.3-3 Adopt standards for planning, implementing, and monitoring habitat revegetation and restoration projects in order to ensure consistency, maximize success, and account for future uncertainty due to climate change.
- 4.3-4 Ensure that the establishment of habitat does not significantly divert streamflow or cause excessive erosion or damage to nearby structures and/or property.
- 4.3-5 Encourage the use of alternative methods and practices for erosion control that incorporate riparian vegetation in the design.
- 4.3-6 Coordinate restoration programs with relevant planning efforts of both the County and other private and public agencies. Encourage regional mitigation to occur within the CCAP plan area, consistent with the program and the Parkway Plan. Require mitigation obligations resulting from mining applications to be implemented within the CCAP plan area, consistent with the Parkway Plan.

#### **4.4 ACTIONS**

- 4.4-1 Encourage the use of riparian vegetation and other "soft-engineering" methods in bank or channel protection. Methods may include willow spiling (retaining walls constructed of woven willow stems from which trees will sprout); spur dikes to deflect the current away from the bank and create areas for vegetation; and cabling dead trees along the bank to provide both bank stabilization and additional habitat. *(This was incorporated into the CCIP; see various references to bio-technical techniques.)*
- 4.4-2 Remove vegetation when it threatens channel stability. In particular, the growth of invasive species, willow scrub, and other native and nonnative vegetation on mid-channel gravel bars shall be controlled to prevent streamflows from being diverted towards nearby banks. *(This was incorporated into the CCIP under Typical Channel Maintenance Activities.)*
- 4.4-3 Promote the eradication of priority invasive species within the planning area. A list of priority invasive species has been developed by the Cache Creek Conservancy and should be updated as needed. Current priority woody invasive species include edible fig, tamarisk, tree of heaven, and tree tobacco. Current priority herbaceous (non-woody) invasive species include arundo, barbed goatgrass, common teasel, fennel, Himalayan blackberry, medusahead, perennial pepperweed, poison hemlock, purple loosestrife, stinkwort, Italian thistle, milk thistle, yellow flag iris, and yellow starthistle. The annual CCRMP-wide invasive species treatment program (including but not limited to the annual Creek Spray) should continue and expand to include additional priority species and treatment areas within the planning area. Spatial data from baseline invasive species mapping in 2016 and from subsequent monitoring efforts should be used to inform and prioritize invasive species treatment efforts. All treatments should be implemented in accordance with the Migratory Bird Treaty Act, the Yolo HCP/NCCP, and other regulations



as appropriate. Treated areas should be marked using GPS technology and revisited the following growing season to determine if treatments were successful. Dead biomass should be removed from the planning area or burned on site. Comprehensive monitoring should be conducted at least every five years to inform adaptive management and invasive species treatment efforts. *(This was incorporated into the CCIP under Typical Channel Maintenance Activities.)*

- 4.4-4 Coordinate with the Cache Creek Conservancy, the YFCWCDC, Yolo Resource Conservation District, the California Department of Fish and Wildlife, the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, the U.S. Bureau of Land Management, and other appropriate agencies and organizations to ensure that habitat restoration projects within the CCAP plan area, proposed by these and other entities are consistent with the CCRMP and the Parkway Plan. Restoration plans shall complement the preservation and enhancement measures in the Yolo County HCP/NCCP.
- 4.4-5 Establish a series of wildlife reserves (see Figure 9) to provide core areas for maximizing wildlife and fish habitat, to help protect areas of high-quality habitat from future degradation, and to provide source areas and wildlife nurseries from which native plants and wildlife can colonize other reaches of the creek. Wildlife reserves should emphasize the preservation of high-quality existing habitat, areas with high species diversity, areas supporting unique species or biotic communities, and habitat for rare, threatened, and endangered species. *(This is being implemented in partnership between the County and the Yolo Habitat Conservancy pursuant to Resolution 14-126 approved December 2, 2014, and through the development of the Cache Creek Parkway Plan).*
- 4.4-6 Favor projects that establish native woody vegetation over emergent wetlands in appropriate areas within the planning area. Riparian forest and scrub habitats have largely disappeared regionally and are much more difficult to reestablish than are emergent wetland habitats. Emergent wetlands can also be established in a greater range of environmental conditions, whereas riparian woodlands require specific considerations in order to thrive.
- 4.4-7 Solicit the assistance of community groups in carrying out ongoing monitoring programs. Examples may include enlisting the local Audubon Society to perform annual bird counts at specific points along lower Cache Creek; coordinating with UC Davis to create a program whereby students could obtain class credits for performing surveying, vegetation mapping, or bed material counts; and collecting well levels from landowners in the plan area. *(See also CCRMP Action 2.4-10.)*
- 4.4-8 Restore riparian habitat throughout the plan area in order to create a continuous habitat corridor along lower Cache Creek. The CCRMP includes a series of recommended restoration sites located throughout the plan area.

- 4.4-9 Revise the In-Channel Ordinance to provide specific guidelines for design, implementation, and maintenance of riparian habitat. *(Complete)*
- 4.4-10 Through development agreements with mining operations, require integration of in-channel revegetation plans in order to reduce fragmentation by expanding and connecting existing habitat patches, optimize restoration planning, and support future funding proposals. Ensure that elements such as soils, drainage, slopes, and habitat types complement one another in a coordinated effort. Coordinate in-channel habitat areas with proposed wildlife mitigation and "net gain" established as a part of the off-channel mining operations in order to create a larger riparian habitat area. Require consistency with the Parkway Plan.
- 4.4-11 Work with the aggregate industry to achieve multiple benefits, whereby habitat developed as a part of a reclamation plan may be dedicated for preservation to offset development projects elsewhere. Coordinate this effort with implementation of the Parkway Plan and the Habitat Conservation Plan/Natural Community Conservation Plan (HCP/NCCP).
- 4.4-12 Recommended planting procedures and materials, soil amendments and stabilizers, and appropriate species and planting densities for marshland, oak woodland, and riparian woodland restoration efforts should be performance based. Variations from these guidelines shall be acceptable if alternative restoration plans have been prepared by a qualified biologist and reviewed by the TAC, consistent with the policies of the CCRMP.
- 4.4-13 Avoid disturbance to important wildlife habitat features such as nest trees, colonial breeding locations, elderberry shrubs, and essential cover associated with riparian forest and oak woodland habitat. This should include sensitive siting of maintenance access and recreational facilities away from these features in accordance with the Migratory Bird Treaty Act and other applicable regulations. *(This is a required finding of the In-Channel Ordinance in Section 10-3.505(c).)*
- 4.4-14 A biological database search (e.g., California Natural Diversity Data Base) shall be completed prior to implementation of priority projects. The database search shall compile existing information on occurrences of special-status species and areas supporting sensitive natural communities that should be considered for preservation. In addition, the database search shall be supplemented by reconnaissance-level field surveys to confirm the presence or absence of populations of special-status species, location of elderberry shrubs, active bird nests and colonies, and extent of sensitive natural communities along the creek segment. Essential habitat for special-status species and sensitive natural communities shall be protected and enhanced as part of restoration efforts or replaced as part of mitigation plans prepared by a qualified biologist and reviewed by the TAC. Compliance with the Yolo HCP/NCCP will ensure mitigation for activities and species covered under that Plan. *(Clarification regarding compliance with this action has been proposed in Section 10-3.501(c) of the In-Channel Ordinance.)*



- 4.4-15 Coordinate with jurisdictional agencies to establish programmatic permits and agreements to ensure a consistent multi-agency approach to managing the creek. (These permits were first secured in the late 1990's and subsequently renewed.)
- 4.4-16 Modifications to the plan area shall be reviewed and approved by the TAC to ensure that sensitive biological resources are protected and enhanced, that restoration plans are consistent with the policies of the CCRMP, and that various habitat restoration projects are compatible. Actions shall include compliance with the Yolo HCP/NCCP, State Fish and Game Code and the Migratory Bird Treaty Act, and other applicable regulations, plans and programs, as appropriate. *(This was incorporated into the CCIP and In-Channel Ordinance.)*
- 4.4-17 The NRM shall coordinate the Yolo Habitat Conservancy to explore opportunities for broadening the program and its benefits in conjunction with the HCP/NCCP. *(On December 2, 2014, the County Board of Supervisors approved Resolution 14-126 in support of a partnership with the Yolo Habitat Conservancy.)*

## **CHAPTER 5.0 – OPEN SPACE AND RECREATION ELEMENT**

### **5.1 INTRODUCTION**

#### **Present Conditions**

As of 2016, the County has several open space properties along lower Cache Creek: Capay Open Space Park (41 acres), Millsap property (17 acres), Wild Wings Park (17 acres), Cache Creek Nature Preserve (123 acres), County Borrow Pit (7 acres), Rodgers Property (30 acres), and Correll Property (39 acres). In the upper reaches of Cache Creek, the County also owns parks near Rumsey and Guinda, and several campgrounds and whitewater rafting areas near Bear Creek. Due to the high proportion of land in private ownership, access to the creek is limited. Present recreational uses are generally limited to canoeing, rafting, hunting, and fishing.

Other recreational facilities within the immediate area include the Esparto Community Park, the Madison Community Park, and the Flier's Club (a private golf course and clubhouse). In addition, there are several private equestrian facilities on the north side of the creek, just west of County Road 94B.

Recently trespass and illegal off-highway vehicle (OHV) activity are significant management issues along lower Cache Creek. OHVs use formerly mined pits and streambanks, creating erosion and damaging riparian vegetation. Trespassing is frequent, including poaching, camping, and loitering along the creek, resulting in graffiti, property damage, noise, and trash. These areas of the creek are typically found in remote locations, away from nearby residences and areas frequented by authorized visitors. The County faces important decisions about how to manage, improve, and integrate the public properties it owns, and new properties that will be dedicated to the County in the future as a result of development agreements with mining operators and implementation of the CCAP program.

Pursuant to the vision and direction articulated below, the County in 2016 started the process of drafting the Cache Creek Parkway Plan which will provide a detailed vision and integrated management plan for: 1) properties currently under public ownership and managed by the County pursuant to the CCAP; 2) properties and trail easements that will be dedicated to the County (or possibly other entities) in the future pursuant to the CCAP; and 3) additional properties accepted or purchased for management pursuant to the CCAP.

#### **CCRMP Vision**

The recreation and open space uses discussed in the CCRMP are conceptual in nature, providing some guidelines for implementation and suggesting general areas for access and future projects. The plan recommends that the County pursue an integrated system of trails and recreational areas along Cache Creek, similar to efforts occurring along the San Joaquin and American Rivers, although at a less intensive scale of development. The County has undertaken a more detailed analysis of the recreational needs of Yolo County which will include consideration of any resulting

environmental effects (including land use conflicts) of a regional parkway. Development of the Cache Creek Parkway Plan will allow for community involvement and provide specific proposals as well as projected costs for developing and maintaining a parkway system. It will also be valuable for addressing creek ownership and access issues. In the long run, planning efforts for this portion of Cache Creek should be coordinated with recreational plans developed by the U.S. Bureau of Land Management for the upper watershed.

The CCRMP has resulted in several areas that will provide future recreational use (see Figure 10). They are located at regular intervals of approximately two miles along Cache Creek, in order to function as trailheads or staging areas for a system of bicycle, pedestrian, and/or horse paths. These recreational areas are located on lands included for off-channel mining, where proposed reclamation is to permanent ponds. This ensures that no additional farmland would be lost, while taking advantage of the amenities associated with the bodies of water to be reclaimed through mining. Frontage to County roads and State highways is an important consideration to provide the public with adequate access to the sites and the trail system. The entire CCRMP area was designated as Open Space in the County's General Plan and zoning code in 1996. As specific Parkway sites are dedicated to the County (or brought into the system through other means), the CCRMP recommends that they also be designated as open space, so that subsequent surrounding land uses may account for future park development.

Future recreational sites should be acquired by the County, or other non-profit entity, so that facilities may be appropriately managed for public use. The area supports a variety of resources, including riparian habitat, off-channel mining, flood control and groundwater management facilities, agriculture, and private homes, many of which may not be compatible with intensive recreational uses. Trespassing is already a management issue for existing landowners; therefore, one of the primary goals of the County is to manage future public access, to minimize if not preclude undesirable activities such as vandalism, public disturbance, and unlawful conduct.

In 2016, the County adopted regulations related to Off-Highway Vehicle Use and Operation (codified in Chapter 12 of Title 10 of the County Code) which prohibits the operation of OHVs on the banks or bed of Cache Creek between the hours of 7:00 p.m. and 6:00 a.m.

## **5.2 GOALS**

- 5.2-1 Improve scenic resources within the Cache Creek channel.
- 5.2-2 Establish a variety of outdoor recreational and educational opportunities along Cache Creek for use by the public.
- 5.2-3 Ensure the compatibility of recreational facilities with surrounding land uses and sensitive wildlife habitat, in order to minimize adverse impacts.

# Cache Creek Area Plan Update - Baseline Parkway Properties

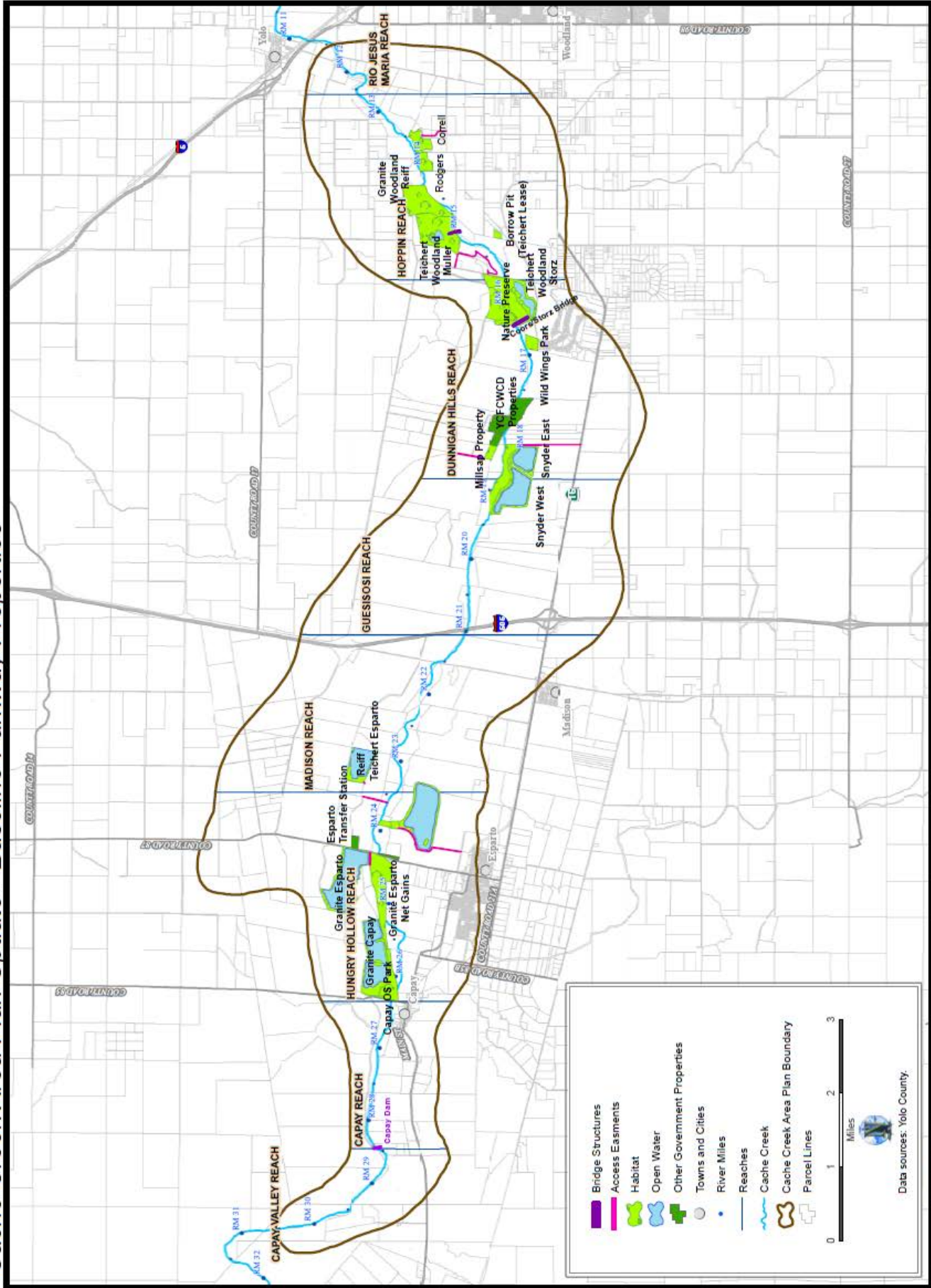


Figure 10

August 9, 2018

### **5.3 OBJECTIVES**

- 5.3-1 Create a continuous corridor of natural open space along the creek and provide for limited access, at specific locations, to recreational and educational uses.
- 5.3-2 Continue to use the "Open Space" designation for areas where resource management and habitat protection is warranted.

### **5.4 ACTIONS**

- 5.4-1 Continue to solicit the dedication of restored habitat areas and/or recreational areas to the County or an appropriate land trust, in order to provide continuous open space along the creek. See also Action 4.4-10. This shall be a consideration in all requests for new or modified mining permits.
- 5.4-2 Develop a future Cache Creek Parkway Plan in consultation with the County Parks Administrator, to provide a range of public activities and uses. Suggested recreational uses may include, but are not limited to hiking, horseback riding, fishing, picnic grounds, boating, educational exhibits, and birdwatching.
- 5.4-3 Identify appropriate locations for future recreational, habitat, and educational uses along Cache Creek, such as those shown in Figure 10. Sites shall be located at regular intervals throughout the plan area. Intensive recreational uses, such as horseback riding, picnicking, and boating shall be located away from designated habitat areas.
- 5.4-4 Designate identified recreational areas as "Open Space" in the CCRMP.
- 5.4-5 Coordinate with the Bureau of Land Management to investigate the eventual linkage of recreational uses located along the upper watershed of Cache Creek to the designated recreational sites located within the plan area. *(The BLM Cache Creek Coordinated Resource Management Plan was adopted in December 2004.)*
- 5.4-6 Design and manage recreational sites so that trespassing, vandalism, and other undesirable activities are discouraged. The County, in consultation with the TAC, and stakeholders, shall develop measures to control human access to sensitive wildlife habitat or other sensitive communities (i.e., wetlands) in the planning area to minimize impacts on these resources. See also Action 4.4-13.
- 5.4-7 Acquire future sites, through purchase or voluntary donation, so that the County can maintain and develop the areas according to the Cache Creek Parkway Plan.

## **CHAPTER 6.0 – AGGREGATE RESOURCES ELEMENT**

### **6.1 INTRODUCTION**

#### **Present Conditions**

In-stream surface mining ended with the adoption of the OCMP and CCRMP in 1996 and the subsequent relinquishment of vested in-stream rights by all operators along Cache Creek. Following adoption of the CCAP in 1996, commercial mining in Cache Creek was prohibited. In 1997, approximately 40,000 tons were removed from the facilities now operated by CEMEX and in 1998, approximately 332,423 tons were removed near the Syar facilities, although a portion may have come from existing stockpiles. There has been no in-channel commercial mining since that time. The CCRMP envisioned significant channel shaping in the first five years of the program, especially at bridge transitions, guided by the Test 3 Run Boundary. Annual in-channel maintenance was to occur thereafter, pursuant to the CCRMP and CCIP. On June 24, 2008, the County Board of Supervisors adopted the CCAP In-Channel Ordinance (Yolo County Code Title 10, Chapter 3) to regulate in-stream extraction activities that implement the bank stabilization, channel maintenance, and habitat restoration necessary to carry out the CCRMP and CCIP.

As reported in the 2017 Technical Studies, during the period from 1996 to 2015, Cache Creek has had four significant flow events (annual peak flow of 20,000 cubic feet per second (cfs) or greater): 1997, 1998, 2003, and 2006. Since 2006, conditions have been relatively dry. Sediment deposition in Cache Creek between 1996 and 2011, calculated based on a comparison of topography, has averaged approximately 690,800 tons annually. Compared to predictions made in the 1995 Technical Studies this suggests that the creek is aggrading more quickly than anticipated. While this is good news for the program, it also underscores the importance of maintaining flood flow conveyance capacity in the channel. The ability to undertake maintenance excavation in-channel has been stymied by delays securing reauthorization of regional permits by the U.S. Army Corps and Engineers and U.S. Fish and Wildlife Service since 2009.

#### **CCRMP Vision**

The key to future management of Cache Creek lies in the channel maintenance and improvement activities carried out under the CCIP. Implementation of the Channel Form Template, established in the 2017 Technical Studies and incorporated into the CCRMP, will guide the creek to a more stable shape through selected aggregate material removal and grading. The 1995 Technical Studies identified general cross-section templates to guide in-channel excavation so that terraces and a low-flow channel are provided to enhance the stability of the creek. The 2017 Technical Studies confirmed and updated the guidance provided through the CCRMP and CCIP. These activities will help ensure the creek maintains capacity to adequately convey high flows, and will slow flow velocities, which will create more beneficial conditions for the establishment of riparian vegetation. More vegetation will provide more habitat for wildlife, as well as assist in slowing surface water flows which will improve in-channel groundwater recharge. Increased groundwater supplies will lower pumping costs, thereby helping local agriculture. The resulting

improvements overall, will create a more attractive and enjoyable environment for all stakeholders.

It is important that these activities be managed in a way that carries out the stated objectives. To do so requires a cooperative and mutually beneficial partnership between local landowners, aggregate companies, the County, and various other regulating government agencies.

In an effort to streamline the permitting process, the County may file as the applicant for permits to remove in-channel material, pursuant to the CCIP and SMARA Section 2715.5, for the area covered by the CCRMP plan boundary. No mining within the channel would occur without the express consent of the affected landowner. Royalties would be paid to owners of land that was mined, which creates an incentive to pursue the desired in-channel work. This would save individual property owners the time and expense of acquiring all of the various permits necessary to work in the channel, while assuring the County a role in determining how to best manage the above relationships, as well as establishing prearranged procedures for performing repairs and maintenance during an emergency. Gravel operators will enter into these agreements for maintenance of their own properties.

As a part of managing Cache Creek, the County must work with other permitting agencies to ensure that necessary approvals are in place. In order for the CCRMP and CCIP to be implemented the following regional permits are needed: Clean Water Act Section 404 Discharge Permit from the U.S. Army Corps of Engineers; Biological Opinion for federally endangered species from the U.S. Fish and Wildlife Service; Clean Water Act Section 401 Water Quality Certification from the California Water Quality Control Board; Section 1601/1603 Streambed Alteration Agreement from the California Department of Fish and Wildlife; and California Department of Conservation compliance with the Surface Mining and Reclamation Act (SMARA). The County has successfully maintained these approvals since the late 1990's, with the exception of the Section 404 approval. The previously issued regional general permit expired in 2009 and the County has been working with the federal government on reauthorization since that time.

It is important to recognize the cost of doing the actual aggregate removal and channel shaping. The County does not have the funds or the equipment and labor to implement the required tasks, nor do most private landowners. It is the intention of the County to require the aggregate companies to perform this work on their mining properties, and to provide incentives for them to perform this work in cooperation with other property owners. All work would have to comply with applicable regulatory requirements, as well as recommendations made by the TAC. In return, material removed would not be counted against the company's maximum annual production limits. This arrangement would be beneficial for all parties involved and would allow the County to provide close monitoring of in-channel mining, without incurring significant new costs.

## **6.2 GOALS**

- 6.2-1 Use the removal of in-channel aggregate deposits as an opportunity to reclaim, restore, and/or enhance the channel stability and habitat of Cache Creek.
- 6.2-2 Provide for effective and systematic monitoring and reclamation of aggregate removal activities within Cache Creek.

## **6.3 OBJECTIVES**

- 6.3-1 Reduce duplication of effort and conflicting regulatory authorities in order to encourage implementation of appropriate management measures and practices within and adjacent to Cache Creek.
- 6.3-2 Revise existing regulatory measures to more accurately reflect the environmental processes of Cache Creek.
- 6.3-3 Enlist the cooperation of private and public interests to assist in maintenance and channel reshaping efforts.

## **6.4 ACTIONS**

- 6.4-1 Revise the existing ordinances contained in the Yolo County Code to incorporate performance standards to prevent hazards and reduce potential environmental impacts; programs to carry out the policies included within the CCRMP and CCIP; and recent amendments to SMARA, if appropriate. *(Completed in 1996.)*
- 6.4-2 Provide for the relinquishment of existing permits for mining within the active channel before off-channel operations may commence. The reclamation of former in-channel mining areas shall be consistent with and fully implement the CCRMP and CCIP. *(Completed in 1996 through the execution of development agreements with mining operators.)*
- 6.4-3 Pursue joint regulatory efforts with other agencies of jurisdiction in order to streamline and standardize conditions for performing work within the creek. The County shall coordinate with other government agencies that have permit authority over Cache Creek to obtain programmatic permits for the entire length of the creek located within the plan area. This will give the County more local control over management of the creek, while providing certainty for the TAC as to what activities may or may not occur. See also Action 4.4-15.
- 6.4-4 Draft the County In-Channel Ordinance to require that, upon revocation of existing in-channel mining permits, the tonnage of aggregate removed by an aggregate mining operator in the completion of approved channel improvement projects is excluded from



the operator's permitted maximum annual production. These market incentives would ensure that the necessary work would be accomplished at little cost to the County, while generating royalties for the owner of any property where excavation takes place. *(Complete. See Section 10-3.406(d) of the In-Channel Ordinance.)*

- 6.4-5 Provide technical support through the TAC to mining operators, property owners, and government agencies involved with Cache Creek to provide a professional and scientific basis for making decisions regarding the removal of channel deposits that affect property and structures, the construction of flood protection and erosion control measures, and the provision of emergency labor, equipment, and materials during and/or after flood events. *(This was accomplished in 1997 with the formation of the TAC. This support is on-going through the work of the TAC and implementation of the CCIP.)*
  
- 6.4-6 If the CCRMP and CCIP are determined to come under the provisions of SMARA, the County shall apply for a mining permit that would encompass the area within the CCRMP plan boundary, along the entire 14.5-mile reach of Cache Creek contained within the plan area. This will allow the CCIP to be implemented, without going through lengthy individual permit analyses and incremental environmental reviews. It should be emphasized, however, that the County would not be exercising eminent domain in applying for this permit. *(Complete. See discussion under Action 2.4-15.)*

## **CHAPTER 7.0 – AGRICULTURAL RESOURCES ELEMENT**

### **7.1 INTRODUCTION**

#### **Present Conditions**

Although there are no agricultural operations located within the Cache Creek channel, the surrounding region is largely characterized by farmland and related uses. The functioning of both Cache Creek and the adjoining agricultural land are closely intertwined. The rich agricultural soils found throughout the area are deposited by the creek when it was part of a meandering floodplain. Cache Creek has provided surface irrigation water for over 100 years, while the channel serves as a drainage conveyance for tailwater and nearby sloughs. Farmers have also constructed extensive bank improvement measures, building riprap, spur dikes, and levees to protect agricultural land and nearby homes from flooding and erosion.

#### **CCRMP Vision**

The Channel Form Template is the conceptual model for reshaping the Cache Creek channel in order to improve streamflow characteristics and reduce erosion and scour. One of the primary purposes of this reshaping effort is to smooth and shape the channel to improve stability and reduce erosion. In some areas, jetties or groins will be constructed to encourage sediment deposition and extend the banks further into the creek. Other areas may require excavation to eliminate peninsulas that interrupt the even flow of the creek. As a result of implementing the Channel Form Template over time, farmland within the template boundaries will be removed for channel widening activities. However, farmland may be expanded in those areas where the bank is extended, reducing or offsetting expected losses. The erosion of streambanks has resulted in substantial loss of crop land in the past. The channel stabilization program proposed under the CCIP will offset the loss of adjoining agricultural land in the future.

The restoration of Cache Creek and agricultural production are not only compatible; there are several instances where each may prove beneficial to the other. As described in earlier elements, implementation of the CCRMP involves careful management of the creek by the County. Two of the primary goals in carrying out this management are to minimize erosion and to allow for aggradation (as long as flood flow conveyance capacity is not substantially affected). A stable channel will result in reduction in the loss of farmland, while a higher streambed will provide more opportunity for groundwater recharge, which should help to offset or lower pumping costs for nearby land owners. In addition, enhancement of habitat for pollinating insects could enhance agricultural production in adjacent fields.

Conversely, there are also a number of things that agriculture can do to help out in the revegetation of Cache Creek. Groups seeking to restore habitat along Cache Creek are encouraged to form partnerships with local farmers to include existing agricultural operations in their revegetation plans. Irrigation tailwater may provide a valuable means of sustaining newly established riparian vegetation during the summer months when in-stream flows are low. These

partnerships should also take into consideration the potential impacts of habitat formation on agricultural production and design projects accordingly so that features such as buffers and weed control measures are incorporated.

## **7.2 GOALS**

- 7.2-1 Protect farmland along Cache Creek from land uses that may conflict with agricultural operations.
- 7.2-2 Develop opportunities where restoration efforts and agriculture can provide mutual benefits.

## **7.3 OBJECTIVES**

- 7.3-1 Ensure the compatibility of planned habitat and the channel floodplain with adjoining agricultural land, so that productivity is not adversely affected.
- 7.3-2 Coordinate with local farmers to employ existing agricultural practices in improving the quality of riparian habitat.
- 7.3-3 Manage Cache Creek to reduce the loss of farmland from erosion and increase the recharge potential of the channel.

## **7.4 ACTIONS**

- 7.4-1 Work with the Yolo Habitat Conservancy to ensure that agricultural operations are not adversely impacted by the development of riparian habitat along Cache Creek.
- 7.4-2 Design and develop habitat restoration projects so that they do not adversely impact the agricultural productivity of nearby farmland.
- 7.4-3 Incorporate agriculturally related features, such as agricultural forage areas and drainage systems, into the design of habitat planning.

## ACKNOWLEDGEMENTS

### 2019 Update

The Cache Creek Area Plan (CCAP) is a rivershed management plan that sets policy for and regulates off-channel surface mining along, as well as in-channel restoration and maintenance within, Lower Cache Creek. The program is based on the concept of adaptive management, and relies on on-going detailed monitoring, analysis, and re-evaluation. A comprehensive ten-year review is mandatory under the program. The 2019 CCAP Update constitutes the second mandatory ten-year program review since the program was put into effect in 1996. The purpose of the Update was to analyze trends and adjust the program to avoid unexpected effects on Cache Creek resources focusing on changing in creek conditions; analysis of collected data; and new regulatory requirements.

### 2019 Yolo County Board of Supervisors

Don Saylor	District 2 (Chair)
Gary Sandy	District 3 (Vice-Chair)
Oscar Villegas	District 1
Jim Provenza	District 4
Duane Chamberlain	District 5

### 2019 Yolo County Planning Commission

Patrick Reynolds	District 4 (Chair)
Darin Hall	District 1 (Vice-Chair)
Elisabeth Dubin	District 2
Chuck Dudley	District 3
Amon Muller	District 5
Trini Campbell	At Large
Marcia Gibbs	At Large

### 2019 Key Members of Staff

Patrick Blacklock	County Administrative Officer
Elisa Sabatini	Manager of Natural Resources
Casey Liebler	Natural Resources Program Coordinator
Stephanie Cormier	Principal Planner
Jeff Anderson	Senior Parks Planner
Ronald Miller	Senior Mining Planner

Project management was provided by Heidi Tschudin of TSCHUDIN CONSULTING GROUP, under contract to the County as an extension of staff.

The primary technical basis for this Update was provided by the *2017 Technical Studies and 20-Year Retrospective for the Cache Creek Area Plan* (March 2017). Andrew Rayburn, CERP, Ph.D., Paul Frank, P.E., CED, and Mark Tompkins, P.E., Ph.D. were the primary authors of this report.

Funding for this project was provided by CEMEX, Granite Construction Company, Syar Industries, and Teichert Aggregates.

### **1996 Plan**

The improvement of nearly fifteen miles of creekway is a tremendous undertaking that will require the participation and cooperation of landowners, aggregate companies, government agencies, public interest groups, consultants, and private citizens. The County must act as a catalyst to mobilize the resources necessary to accomplish the goals outlined in this plan. Programs, policies, and technical assistance should focus on local planning, local implementation, and volunteer monitoring for both individual parcels and the entire watershed. As such, opportunities for encouraging the participation by landowners and residents in planning and carrying out the restoration of Cache Creek are essential to the plan's success. Cache Creek has the capacity to be of enormous benefit to the people of Yolo County, but it will require the combined efforts of the community to realize its full potential. Long years of work have already been expended to produce this plan, and long years of labor lay ahead before we see its completion. Our efforts will be well rewarded, however, by the legacy of a natural streamway and healthy riparian habitat that we leave to future generations.

### **2002 Yolo County Board of Supervisors**

Mike McGowan	District 1
Helen Thompson	District 2
Frank Siefertman	District 3
Mariko Yamada	District 4
Lynnel Pollack	District 5

### **2002 Yolo County Planning Commission**

Amy Cameron	District 1
Jay Gerber	District 2
Aurora Cornejo	District 3
Betty Woo	District 4
Donald Peart	District 5
Merrideth Stephens	At Large
Jeff Mervin	At Large

### **2002 Key Members of Staff**

Vic Singh	County Administrative Officer
David Morrison	Resource Management Coordinator
Linda Fiack	Parks and Resources Manager

Project management was provided by Heidi Tschudin of TSCHUDIN CONSULTING GROUP, under contract to the County as an extension to staff.

The primary technical basis for this Plan was provided by the *Technical Studies and Recommendations for the Lower Cache Creek Resource Management Plan* (October 1995). A special thanks to the authors of this comprehensive report.

Funding for this project was provided by R.C. Collet, Solano Concrete Company, Syar Industries, and Teichert Aggregates.



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**UPDATED FINAL**  
**CACHE CREEK**  
**IMPROVEMENT PROGRAM (CCIP)**  
**for LOWER CACHE CREEK**

**Yolo County**

***Updated December 17, 2019***  
***Amended July 23, 2002***  
***Adopted August 20, 1996***

**UPDATED FINAL**  
**CACHE CREEK IMPROVEMENT PROGRAM**  
**for LOWER CACHE CREEK**

**Yolo County**

***Updated December 17, 2019 (Board Resolution 19-176)***  
***Amended July 23, 2002 (Board Resolution 02-130)***  
***Adopted August 20, 1996 (Board Resolution 96-132)***



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## CHAPTER 1.0 – INTRODUCTION

### 1.1 PURPOSE

The Cache Creek Improvement Program (CCIP) was developed by Yolo County to implement the goals, objectives, actions, and performance standards of the Cache Creek Resource Management Plan (CCRMP) related to the stabilization and maintenance of the Cache Creek channel. It implements the CCRMP, and may be amended as needed, without a general plan amendment. The CCIP provides the structure and authority for a Technical Advisory Committee (TAC), and defines the procedures and methodologies for creek monitoring, maintenance, and stabilization activities.

### 1.2 REGULATORY FRAMEWORK

One of the primary actions of the CCRMP initially was the elimination of commercial mining within the Cache Creek channel. Mining activities permitted in the past contributed to streambed lowering and the loss of riparian vegetation. Since creek instability is only partially addressed by the elimination of in-channel commercial aggregate mining, the CCRMP recognized the need for channel maintenance and improvement projects to promote stabilization of the creek channel and the protection of infrastructure elements along the creek. The CCRMP also acknowledged that the elimination of in-channel mining could result in sediment accumulation in the channel which could cause a reduction of channel capacity and increase in flood hazard. Modifications and maintenance of the Cache Creek channel are the obligation solely of individual landowners, through an application process overseen by the County and the TAC, subject to the review and guidance procedures described in the CCIP. The improvements and maintenance projects recommended as a result of the CCIP process could require excavation and filling of areas under the jurisdiction of the following local, State, and Federal authorities:

#### *Yolo County*

Any proposed improvements resulting in channel modifications within the 100-year flood hazard zone as defined by the National Flood Insurance Program shall require a Flood Hazard Development Permit from the Yolo County Floodplain Administrator.

#### *U.S. Army Corps of Engineers (USACE)*

Any proposed channel improvement project resulting in filling or excavation within "waters of the United States" shall require a Section 404 permit from the USACE.

#### *California Department of Fish and Wildlife (CDFW)*

Any proposed channel improvement project resulting in disturbance of areas below the high-water level of the creek shall require the applicant to secure a Streambed Alteration Agreement with CDFW (Section 1601).

*California Regional Water Quality Control Board (RWQCB)*

Construction activities associated with channel improvement projects performed under the CCIP may require compliance with the requirements of the statewide General Permit for Storm Water Discharges Associated with Construction Activities. For projects meeting the criteria for permitting under the General Permit, the project sponsors would be required to file a Notice of Intent (NOI) with the State Water Resources Control Board (SWRCB) to comply with the requirements of the General Permit.

Since 1996, the County has worked with the State and Federal agencies noted above to secure and implement regional or "general" permits for the CCRMP program. These permits have been administered by the County as part of the Flood Hazard Development Permit process. A history of these permits through the date of this plan update is provided below.

**USACE RGP #58 Section 404 Discharge Permit** – Authorized July 1997 to July 2002; reauthorized May 2004 to May 2009; reauthorization requested June 2011; receiving electronic mail notification on January 31, 2020, from Chandra Jenkins (Senior Project Manager, USACE), that within specific circumstances, in-channel maintenance activities will likely not require USACE approval.

**USFWS Biological Opinion (VELB)** – Authorized September 1996; tied to 404 permit; reauthorization requested June 2011; action pending. A Biological Assessment and wetlands delineation for the CCRMP was completed for Yolo County in July 25, 2012, by BSK and submitted to the USFWS in support of the June 2011 application to reauthorize RGP #58. With adoption and permitting of the Yolo HCP/NCCP in January 2019, further work on this matter was determined to be unnecessary.

**CVRWQCB Section 401 Water Quality Certification** – Authorized July 1999 to July 2002; reauthorized August 2002 to May 2009; reauthorized April 2016 to April 2021 (WDID# 5A57CR00093).

**CDFW Streambed Alteration Agreement Section 1601/1603** – Authorized July 1997 to June 2002; reauthorized August 2002 to August 2007; extended to December 2007; replaced August 2008 with Section 1602 MOU implemented through individual project permits; replaced November 2015 with Routine Maintenance Agreement (Notification No. 1600-2014-0054-R2) which expires after 12 years (November 2027); received Streambed Alteration Agreement (Notification No. 1600-2016-0273-R2) for sand and gravel extraction on July 17, 2018, which expires after 12 years (July 2030).

**CDOC SMARA Compliance (PRC Section 2715.5)** – Pursuant to CCRMP Action 2.4-15, the County submitted a request in the fall of 1998 to the State Mining and Geology Board to grant an exemption from the requirements of SMARA for all channel improvement projects approved under the CCIP. The request was declined, and the state determined the CCRMP was subject to SMARA, so a legislative solution was sought. In 1999, special legislation was passed to amend

SMARA to recognize the CCRMP as the functional equivalent of a Reclamation Plan for purposes of SMARA compliance. The history of this legislative exemption is as follows: 1) first authorization Chapter 869 of the Statutes of 1999 (AB 297, Thomson), sunset December 31, 2003; 2) second authorization Chapter 173 of the Statutes of 2004 (AB 1984, Wolk), sunset December 31, 2008; 3) third authorization Chapter 604 of the Statutes of 2007 (AB 646, Wolk), sunset December 31, 2012; 4) fourth authorization Chapter 145 of the Statutes of 2011 (SB 133, Wolk), sunset December 31, 2017; and 5) fifth authorization Chapter 235 of Statutes of 2016 (SB 1133, Wolk), sunset removed.

### **1.3 PROGRAM IMPLEMENTATION HISTORY**

#### *1999 Mercury Lawsuit*

On August 20, 1995, the Board of Supervisors approved the Cache Creek Resources Management Plan. Action 6.4-3 of the CCRMP stated as follows: "...County shall coordinate with other government agencies that have authority over Cache Creek to obtain "blanket" permits for the entire length of the creek located within the plan area."

As a part of the implementation of this Action, on July 1, 1997, staff submitted an application to the Central Valley Regional Water Quality Control Board for a 401 certification for the CCRMP area. On December 16, 1998, the RWQCB recommended approval of the Certification to the State Water Resources Control Board. Certification for the CCRMP area was formally approved by the SWRCB on June 11, 1999. The approved Certification included a requirement (Condition 2 of the Cache Creek Erosion and Sediment Control Demonstration Project) for the County to implement a water quality monitoring program approved by the RWQCB at the Cache Creek Nature Preserve wetlands site. The monitoring program was to include the collection and analysis of water column and bioaccumulation (tissue) data for the presence of mercury.

On July 12, 1999, the Citizens For Responsible Mining ("CFRM") filed a lawsuit in Sacramento Superior Court (Case No. 99CS01395) against the SWRCB for approving the Certification. A Settlement Agreement regarding the Lawsuit was subsequently executed between CFRM, SWRCB, and the County on February 11, 2000. One of the provisions of the Settlement Agreement required the County to develop a Mercury and Water Quality Monitoring Protocol to be applied to projects implemented in channel under the approved Section 401 Water Quality Certification, in a joint effort with the RWQCB, as provided for in Exhibit A of the Settlement Agreement. Exhibit A also required that the Protocol be developed by a specified technical team. Under the Settlement Agreement, the County was required to cover the reasonable costs of developing the Protocol. The contract for that work was approved by the County Board of Supervisors in late August 2000 approving a three-year scope of work to test and analyze fish, invertebrate, and water samples along lower Cache Creek.

The purpose of the work was to provide information about the possible presence and biological interaction of mercury in shallow wetland habitats. The testing and analysis was intended also to provide the information necessary to ensure that the wetlands at the Cache Creek Nature

Preserve were properly managed to eliminate any potential bioaccumulation, should sufficient mercury levels be determined to be present. The results of this analysis were published as Appendix F (Recommended Changes to Yolo County's Water Quality Monitoring Program for Lower Cache Creek) of the April 2002 Draft volume of the CCRMP Update EIR.

The settlement agreement and all requirements associated with it, including interim participation on the TAC by a representative of the CVRWQCB expired in July 2002; however, in the intervening time understanding, analysis, and regulation of mercury have continued.

### 2002 CCRMP Amendment

In 2002, in order to support requests for reauthorization of the various state and federal general permits necessary for implementation of the CCRMP/CCIP, the County undertook an assessment of the effectiveness of the program. The County opted to demonstrate the effectiveness of the program through a Supplemental Environmental Impact Report (SEIR) in order to secure the necessary permit renewals. The project was defined in the CEQA document as "continued implementation of the CCRMP/CCIP."

The SEIR demonstrated that the 1996 program was working well. Amendments to the CCRMP were undertaken at the time to clarify components of the program, document the wetlands delineation, acknowledge recent changes in mercury regulation, and provide an overview on the status of implementation including where improvements could be made.

## CHAPTER 2.0 – CACHE CREEK IMPROVEMENT PROGRAM DESCRIPTION

### 2.1 PROGRAM ELEMENTS

The 1995 Technical Studies for the Cache Creek Resource Management Plan included an extensive evaluation of existing and current hydrologic and hydraulic conditions along Cache Creek from the Capay Dam to just upstream of the I-5 bridge at Yolo, California. The results of the evaluation indicated that the Cache Creek channel had been and was at the time in a state of hydraulic disequilibrium throughout much of this reach of the creek. The instability of the channel had been caused by a combination of complex influences which contributed to channel bed degradation and adverse lateral erosion. These influences included the reduction in channel width caused by the reclamation of floodplain areas to agriculture, construction of localized constrictions at bridge locations, prior in-channel aggregate mining of the channel bed, the diversion of streamflow for irrigation, and sediment deposition at dam sites. Updated technical evaluations completed in 2017 indicated that significant deposition of sediment has occurred in the CCRMP area and resulted in recovery of more natural channel sinuosity and slope in certain locations. While this recovery appears to be occurring faster than originally anticipated in 1996, Cache Creek still exhibits unstable hydraulic and sediment transport conditions in the CCRMP area. Recommendations to improve channel stability along Cache Creek were identified in the 1995 Technical Studies and subsequently refined by the 2017 Technical Studies conducted in support of the CCAP Update.

The major recommendation from the 1995 Technical Studies was a proposed “reshaping” of the channel to develop more uniform hydraulic conditions and reduce the potential for adverse erosion. The 1995 Technical Studies proposed a conceptual channel configuration, referred to as the Test 3 Run Boundary, which reflected more uniform channel conditions and included armoring of the channel bed underneath bridges to prevent scour. The Test 3 Run Boundary served as a general goal for developing a more stable channel for Cache Creek. Projects implemented under the CCIP were required to be designed to support the development of this more stable condition.

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 has 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. For in-channel projects, which by definition are preventative or restorative rather than undertaken for commercial gain, implementation of the



Test 3 Run Boundary should be considered but is not always feasible. Language has been added to the In-Channel Ordinance to reflect this.

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, 2015 aerial photography, new HEC-RAS modeling, and over 20 years of monitoring data. The new HEC-RAS model is a two-dimensional model that reflects changes in topography and monitoring data collected as part of the program to allow for more precise simulation over the entire lower creek study area rather than in singular locations within individual reaches. The sophisticated mapping capabilities associated with the new HEC-RAS model did not exist in 1996. Evaluation of the Test 3 Run Boundary also recognized that the assumed channel bed hardening under the bridges was not implemented. The result was an update to the Test 3 Run Boundary called the Channel Form Template. The Channel Form Template replaces the Test 3 Run Boundary, but provides similar guidance for smoothing abrupt channel width transitions.

The three key elements of the CCIP intended to promote a more stable Cache Creek channel are as follows:

#### *Identification of Channel Stabilization Projects*

The CCIP shall prioritize projects that provide more room for the river wherever possible, and smooth channel transitions in areas with hydraulic conditions that could cause excessive and damaging bank erosion or bed scour. Implementation of the projects is intended to guide development of a more stable channel form and reduce the adverse effects of channel migration, while providing protection for existing infrastructure components.

#### *Identification of Channel Maintenance Activities*

Maintenance of the Cache Creek channel shall promote improvements related to channel stabilization and reduce the potential for development of unstable channel conditions. The CCIP shall identify expected short-term and long-term channel maintenance activities.

#### *Establishment of a Hydrologic Monitoring Program*

Understanding flow and sediment transport in the Cache Creek channel is critical to designing and maintaining channel improvements. The CCIP shall provide a practical program for the evaluation of water flow in the creek and trends of sediment transport and deposition. This may include monitoring and/or modeling as feasible and appropriate. The program shall also address changes in vegetation that could impact channel capacity and stability.

The hydrologic monitoring program shall also include those flooding events on Cache Creek which can result in major channel adjustments. The CCIP shall develop a program to mobilize technical personnel from the TAC during flood periods for inspection of channel conditions to monitor development of potential channel instabilities and flooding problems, and to survey water surface elevations to improve the calibration of the hydraulic model of the CCRMP area. Results from the flood watch program will also provide necessary information regarding project performance during floods and possible improved methods for maintaining and stabilizing the channel.

## **2.2 PROGRAM MANAGEMENT**

Effective implementation of CCRMP requires coordinated management by an informed, experienced interdisciplinary group of professionals who are familiar with the processes and conditions within the Cache Creek system. Appropriate management structure and procedures are required to ensure continued collection of necessary information on channel conditions and prioritization of improvement and maintenance projects. The CCRMP establishes the Technical Advisory Committee (TAC) for management of the CCIP. The following sections describe the management structure and responsibilities for the CCIP.

### *Natural Resources Manager*

The Natural Resources Manager (NRM) is responsible for management of all activities conducted by the TAC. The NRM has the responsibility for overall management and coordination of the CCIP. The duties of the NRM include coordination of the TAC with the regulatory agencies having jurisdiction over activities performed under the CCIP and with members of the Cache Creek Stakeholder Group (described below) if one is established. The NRM also has the responsibility to coordinate any necessary permit applications and maintenance of required permits for the CCIP. The NRM will oversee the review and issuance of permits for channel improvement and maintenance projects.

### *Technical Advisory Committee*

The Technical Advisory Committee will provide scientific and technical review and oversight for all projects conducted under the CCIP. The TAC will collect and evaluate scientific data on hydrologic, hydraulic, sediment transport, and biological conditions within the CCRMP area. These data and analyses will provide the basis for identification of annual maintenance needs and priority projects and critical review of the design and construction of improvement projects.

The following tasks will be the responsibility of the TAC under the direction and supervision of the NRM:

1. Implementation of a creek monitoring program;
2. Review of annual monitoring data;

3. Annual recommendations for channel maintenance activities that promote channel stability and environmental restoration;
4. Annual establishment of priorities for major channel stabilization projects;
5. Review of the design of projects requiring Flood Hazard Development Permits within the CCRMP channel boundary;
6. Recommendations for periodic updates and refinements of existing hydraulic and sediment transport models, and annual update of online program data (CCAP Dashboard);
7. Review of riparian habitat restoration proposals and designs for consistency with the CCRMP and CCIP (see for example CCRMP Action 4.4-6);
8. Review of channel stabilization and annual maintenance activity performance;
9. Preparation of an annual report for submittal to the Board of Supervisors; and
10. Attendance at selected public meetings to describe channel management activities and the success of the improvement projects.

The science of creek management is not so well advanced as to allow rigid formula-driven decision-making to dominate the planning and monitoring process in a dramatically changing system such as Cache Creek. The members of the TAC must have a blend of specialized knowledge and experience that will enable them to develop environmentally sound and flexible strategies for balancing a wide range of resource needs. They must also have the skills to work effectively with a variety of stakeholders and the develop a shared vision of the creek's future. The TAC shall consist of a three-person interdisciplinary group comprised of the following:

1. A qualified river engineering specialist with expertise in environmental water quality analysis (hydraulic engineer);
2. A qualified fluvial geomorphologist; and
3. A qualified biologist or ecologist with experience in riparian restoration.

Appointments to the TAC shall be made by the County Administrator, or his/her designee. The term of the TAC member contracts will be two years with the opportunity for unlimited extensions subject to approval by the County Administrator. The TAC will be required to submit a yearly budget to the NRM for review and submittal for approval by the Board.

The TAC will be responsible for making recommendations related to the supervision of all three elements of the CCIP, based on the activities conducted by the TAC. However, Yolo County will be responsible for implementation of the NRM recommendations.

#### *Cache Creek Stakeholders Group*

The NRM and TAC have broad responsibilities for decisions related to creek management. These decisions may benefit from organized input from interested agencies, citizens groups, and industry. Therefore, the CCIP includes the optional establishment of a Cache Creek Stakeholders Group (CCSG). The CCSG, if convened, will consist of representatives from various agencies and organizations and will provide a forum for the discussion of site-specific and general concerns regarding the resource management of Cache Creek. A list of potential participants, to be determined in the County's sole discretion, includes:

1. California Department of Fish and Wildlife;
2. Central Valley Regional Water Quality Control Board;
3. Yolo County Flood Control and Water Conservation District;
4. Yolo County Public Works Department;
5. Yolo County Office of Agricultural Commissioner;
6. Yolo County Resource Conservation District;
7. Yolo County Farm Bureau;
8. City of Woodland;
9. California Department of Water Resources;
10. Cache Creek Conservancy;
11. California Department of Transportation;
12. California Resources Agency;
13. California Department of Conservation;
14. Yolo County Aggregate Producers;
15. U.S. Army Corps of Engineers;
16. Property Owners along Cache Creek;
17. Communities of Capay, Esparto, Madison, and Wild Wings;
18. U.S. Bureau of Land Management; and
19. Other interested stakeholders.

This list is advisory and may be modified by the County during implementation as appropriate.

### **2.3 PROGRAM IMPLEMENTATION**

Implementation of the CCIP will require several important programmatic and procedural steps. The following sections describe the implementation process and procedures:

### *Implementation of Monitoring Program*

The TAC will initiate and perform the monitoring program described in Chapter 6. The monitoring program will consist of annual collection of stream discharge and available sediment transport data, annual analysis of changes in channel morphology, and annual analysis of changes in riparian vegetation and other biological resource elements (e.g., wildlife) as appropriate. All data and analysis will be summarized in an annual report submitted to the Board of Supervisors.

### *Notification of Recommended Channel Improvement Projects*

On an annual basis, the TAC will identify priority channel improvement projects (separate from annual maintenance) on the basis of the results of the Cache Creek monitoring program. In an annual report to the Board of Supervisors, the TAC will describe the need for and purpose of identified priority projects. The report will describe the specific location of the projects and the general aspects of proposed improvements. The NRM will annually send notification regarding the availability of the report to landowners along the creek, encouraging them to consider implementation of identified channel improvement projects for/on the property they control.

### *Permitting*

All landowners proposing channel modification projects within the CCRMP in-channel boundary will be required to submit applications to the County for a Flood Hazard Development Permit. The permit applications will be reviewed by the County Floodplain Administrator and the TAC. The review will include consideration of potential effects of the proposed project on hydraulic conditions upstream and downstream of the proposed project site, as well as consistency with the CCRMP, CCIP, and requirements of jurisdictional agencies that have issued "general permits" for the area. Following their review, the TAC will provide recommended changes in project design, if necessary. Prior to issuance of any FHDP for proposed in-channel activities the County shall consider whether these recommendations should be integrated into project design. Conditions of the permit shall require that completed projects be surveyed to provide a record of as-built conditions.

### *Regulatory Coordination*

Successful implementation of the program requires the ongoing maintenance and renewal of general permits, described earlier, issued by various state and federal agencies including Section 404 (discharge) from the USACE, Section 401 (water quality) from the CVRWQCB, and Section 1600 (streambed alteration) from the CDFW. These permits are critical for implementation of the CCRMP and CCIP.

### *Funding*

Implementation of the CCIP shall be funded in part through fees generated by a surcharge on the weight of aggregate resources sold (not mined) within the County. As established in the Gravel

Fee Ordinance a surcharge would be placed on each ton of processed aggregate in order to fund the CCRMP/CCIP. In addition, the County shall aggressively pursue other potential sources of funding, including user fees, benefit assessments, and state and federal grants for watershed management. The fees and other funding would be collected by the County Administrative Office (CAO) and placed in an interest-bearing account held by Yolo County, separate from the General Fund. The funds would be administered by the CAO with approval by the Board of Supervisors.

*Implementation Schedule*

The following sample schedule will guide program implementation:

15 January	Submittal of TAC annual progress report on previous year's monitoring results and completed channel improvement projects to Board of Supervisors.
15 February	Submittal of annual progress report to the Office of the Chief Clerk, California State Assembly, pursuant to AB 1585, Chapter 7, Statutes of 2010 and Government Code Section 9795.
15 March	County to coordinate implementation of priority projects as identified in annual report.
April/May	Annual creek walk
31 May	Deadline for submittal of applications to County for Flood Hazard Development Permits (FDP) related to channel modifications within the CCRMP planning area during the summer and fall.
30 June	Completion of TAC and County review of FHDP applications for proposed in-channel projects.
30 August	Completion of aerial photography and LiDAR (every five years or in water years with peak flows exceeding 20,000 cfs).
1 Jul to 31 Oct	Construction/Implementation of channel improvement projects <sup>1</sup> .
30 November	Completion of Digital Terrain Model analysis by TAC (every five years or in water years with peak flows exceeding 20,000 cfs).
1 Oct to 30 Sep	Ongoing TAC monitoring of stream discharge, sediment transport, flood conditions, and channel morphology during each water year.
1 November	Termination of in-channel improvement projects (may not apply to all projects depending on conditions of approval).

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<sup>1</sup> Formal construction season determined by applicable state/federal permits.

## **CHAPTER 3.0 – CHANNEL STABILIZATION PROJECTS**

### **3.1 INTRODUCTION**

The following discussions outline a plan for improving the overall stability and ability to maintain Cache Creek. The Cache Creek Improvement Program will be achieved through a series of steps orchestrated by the TAC. Steps include: 1) implementation of a channel management corridor that promotes "self-improvement and increased stability" of the creek's morphology; 2) implementation of a comprehensive annual monitoring program (described in Chapter 6), and 3) implementation of channel maintenance activities (Chapter 4).

The Technical Advisory Committee (TAC) will be responsible for collecting the required monitoring data and prescribing when and how further in-depth hydraulic engineering analyses and design activities will be carried out. As discussed in Chapters 2, 4, and 6 in this document, the TAC will identify and prioritize stabilization and maintenance projects along the creek. Engineering design of stabilization projects can be performed by the private land owners or public agencies. Through the processes of monitoring, and implementation of creek stabilization and maintenance projects developed by the TAC, the CCIP shall be used to promote adjustments in the creek which meet the stated objectives of the CCRMP while allowing flexibility for the creek to recover and restore itself through natural processes acting in the absence of commercial in-channel mining over time.

The creek is a dynamic system that was substantially impacted by a variety of influences, including in-channel mining prior to 1996 (Northwest Hydraulic Consultant, 1995). While significant sediment deposition has occurred, and channel sinuosity has increased in the CCRMP area since 1996, the system is still in a state of dis-equilibrium. Implementation of the CCRMP and CCIP will continue to improve channel stability over the long term, but significant channel adjustments can be expected under present and future conditions, especially during periods of high flow. It is anticipated that channel maintenance requirements under the CCIP will decrease as the channel becomes more stable over time. However, some degree of channel maintenance will be required for the foreseeable future to ensure that existing flood flow capacity is preserved, and to reduce the risk of bank erosion, lateral channel migration, and significant degradation or aggradation of the creek bed in specific locations.

### **3.2 SUMMARY OF EXISTING CONDITIONS BY REACH**

From its origin near Clear Lake to its terminus in the settling basin, Cache Creek exhibits great diversity in geologic and physiographic characteristics, with extreme swings in hydrologic and geomorphic processes from year to year. As described in the 1995 Technical Studies and reaffirmed in the 2017 Technical Studies, the historical geomorphic characteristics of Cache Creek from Capay Dam downstream to the settling basin were considerably different from today. The 1995 Technical Studies identified nine geomorphically distinct reaches in the 35 miles from upstream of the Capay Dam to the Settling Basin, as shown in Figure 1. The 2017 Technical Studies

reaffirmed these as relevant geomorphic designations. From upstream to downstream the nine geomorphic reaches are referred to as follows:

1. Capay Valley (Reach 9), upstream from the Capay Dam (Upstream RM 28.3)
2. Capay (Reach 8), from the Capay Dam to County Road 85 (RM 28.3 to 26.3);
3. Hungry Hollow (Reach 7), from County Road 85 to County Road 87B (RM 26.3 to 23.5);
4. Madison (Reach 6), from County Road 87B to Interstate 505 (RM 23.5 to 21.1);
5. Guesisosi (Reach 5), from Interstate 505 to a point upstream of Moore Crossing (RM 21.1 to 18.9);
6. Dunnigan Hills (Reach 4), from a point upstream of Moore Crossing to County Road 94B (RM 18.9 to 16.1);
7. Hoppin (Reach 3), from County Road 94B to County Road 97 (RM 16.1 to 12.9);
8. Rio Jesus Maria (Reach 2), from County Road 97 to County Road 102 (RM 12.9 to 5.4); and
9. Settling Basin (Reach 1), from County Road 102 to the Bypass (RM 5.4 to 0).

The channel boundary, as defined in the CCRMP, extends from the Capay Dam downstream to a point near the I-5 bridge and the town of Yolo, a distance of approximately 14.5 miles (16.8 river miles). The CCRMP channel boundary falls within Reaches 2 through 8 (see Figure 1).

### **3.3 BACKGROUND**

While significant sediment deposition and channel adjustment has occurred in the CCRMP area since 1996, the current Cache Creek channel system remains out of balance with respect to flow, sediment load, and channel conditions. Bridges and levees continue to pose significant hydraulic controls (constrictions) in the system and flow velocities can be significantly greater through constrictions than in the wider portions of the creek upstream and downstream of bridges. These differences in hydraulic conditions at bridges create local high energy zones that contribute to channel bed scour and bank erosion. The current channel configuration continues to confine flow energy during large flood events to a narrower channel than existed historically. Reduction of floodplain storage area and disconnection of the channel from its historical floodplain continues to alter local and reach-scale hydrology (including flood peak volumes and travel time) from historical conditions. Since 1996, the active channel has migrated into levees and channel banks in many reaches, indicating that the channel is adjusting by increasing in width.

The increased hydraulic stresses within the creek system relative to historical conditions may limit the type and survival rate of some vegetation species formerly found in CCRMP area and associated floodplain. Since the elimination of in-channel commercial mining in 1996, monitoring of channel configuration and topography has shown that the creek is developing a more stable configuration with sinuosity and slope conditions evolving towards more natural conditions. However, the creek is still adjusting and it will still take decades to establish a new equilibrium. As in-channel maintenance projects and on-going off-channel mining operations continue, opportunities to reconfigure the channel to smooth out abrupt changes in capacity and to reduce constrictions should be undertaken.



# Cache Creek Area Plan Update - Cache Creek Geomorphic Reaches

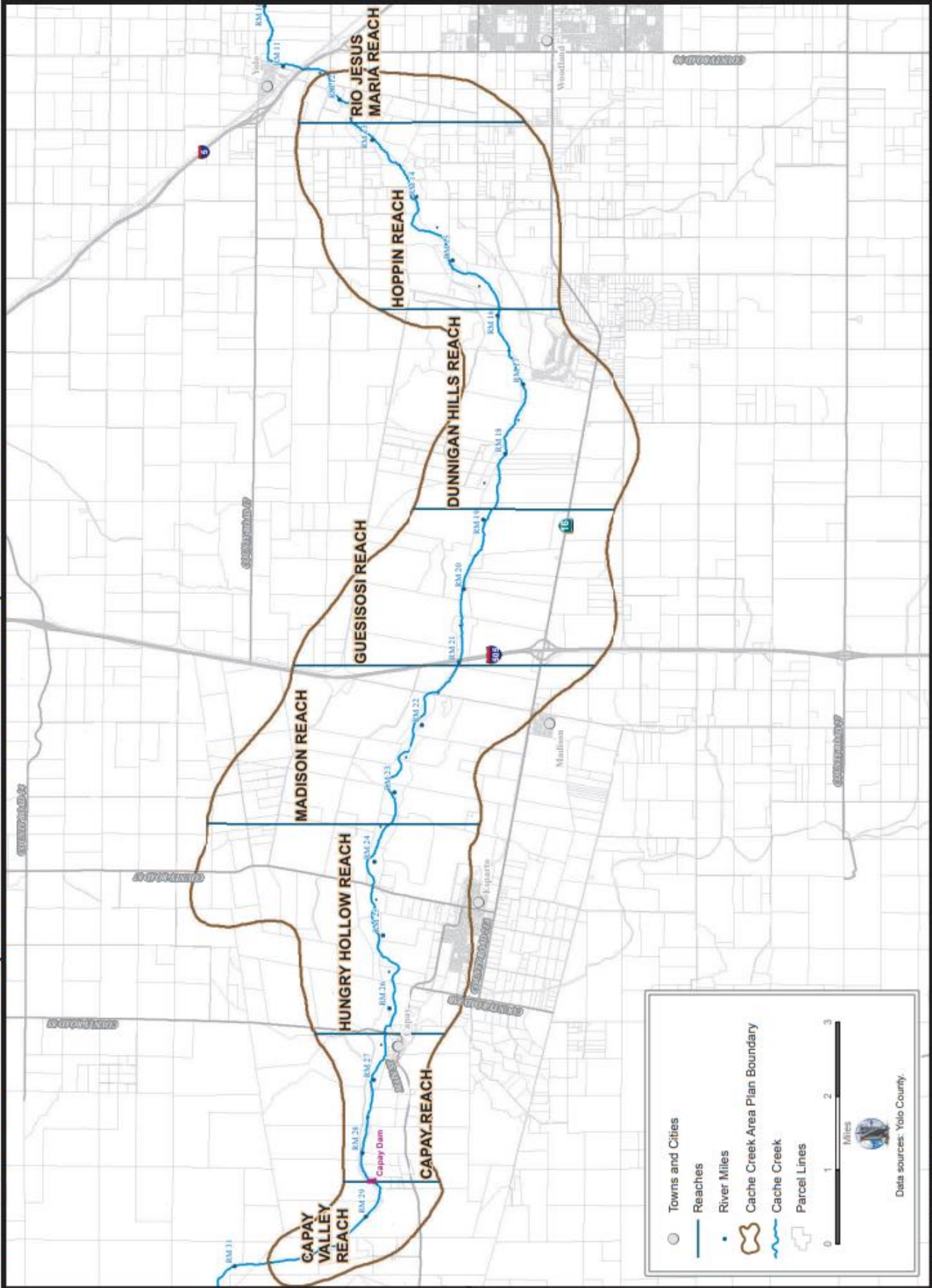


Figure 1

May 10, 2017

Once major constrictions are removed or improved and channel smoothing and widening projects are complete, annual anticipated channel maintenance requirements will decrease as the creek becomes more stable over time.

### **3.4 MANAGEMENT OF CHANNEL FORM (EXPLANATION OF THE TEST 3 RUN BOUNDARY AND CHANNEL FORM TEMPLATE)**

#### **Test 3 Concept**

The 1995 Technical Studies described a series of hydraulic (computer modeling) sensitivity analyses that were performed to test the effects of widening and smoothing the channel. The Test 3 Run Boundary was ultimately recommended by the 1995 Technical Studies and integrated into the CCRMP as the appropriate management target for channel form. The channel configuration embodied in the Test 3 Run Boundary was conceptual; the sensitivity results presented in the 1995 Technical Studies were not intended for design purposes. The goal of the Test 3 Run Boundary was to resculpt the channel shape to slightly widen constrictions, smooth out irregular bank lines, and eliminate abrupt changes in channel widths, so that the hydraulic capacity and sediment transport characteristics would be smoothed to create a more stable and balanced creek system. Bridge crossings tend to be the most constricting features along the creek. The Test 3 Run Boundary called for smooth channel transitions into and out of the bridges to reduce energy losses and local scour. It assumed that fixed (hardened) bed elevations at bridge openings would be implemented as a part of then-planned major stabilization projects. The Test 3 Run Boundary provided a target channel shape for creek stabilization plans.

The Test 3 Run Boundary recognized that target slopes and sinuosities would change over time as the channel adjusts to reshaping projects, regular maintenance, and natural events. Recommendations regarding where, when, and how adjustments to specific channel dimensions and hydraulic characteristics would be implemented, would be made by the TAC following the evaluation of long-term monitoring information (refer to Chapters 2, 4 and 6).

The Test 3 modeling demonstrated what were considered at the time to be “much improved conditions over present conditions.” This meant that the modeling showed the Test 3 Run Boundary as having sediment supply closer to equilibrium with sediment transport capacity, and the elimination of sediment supply and transport imbalances at bridges largely because the channel bottom was assumed to be hardened.

It was recognized in 1996 that major channel smoothing and shaping projects would be too extensive to implement simultaneously and would require phased implementation. The CCRMP establishes a mechanism for implementation of large segments of the channel improvements through Development Agreements or other arrangements with off-channel aggregate producers. Through the notification process described in Chapter 2, it was anticipated that the TAC would promote and facilitate localized channel improvement projects.

## Channel Form Template

While the Test 3 Run Boundary has been implemented with all applicable projects constructed since 1996, channel bed areas at bridges have not been hardened, and extensive smoothing of the channel boundary has not occurred. Because these major stabilization projects have not been realized, the Test 3 Run Boundary has not been fully achieved as envisioned. Despite the fact that these changes have not been implemented, channel evolution towards more stable conditions has occurred since 1996, and channel bed elevations at bridges have not experienced the extensive lowering from scour predicted by the Test 3 modeling on a long-term basis. Furthermore, significant aggradation has occurred in many places throughout the CCRMP area, resulting in more natural, active channel slope and sinuosity conditions.

As a part of the 2017 Technical Studies, the Test 3 Run Boundary was reviewed with a goal of refining it based on the latest available modeling techniques and over twenty years of observations of creek channel evolution without in-stream gravel mining. The Channel Form Template (Figure 2) replaces the Test 3 Run Boundary but carries forward many of the concepts of the original HEC-2 modeling upon which the 1996 CCAP relied.

The boundary of the Channel Form Template was determined using the new hydraulic model of the creek system and observations of channel change between 1995 and 2016. It reflects the following:

- At bridge crossings, the Channel Form Template follows the bridge abutments and generally tracks with the Test 3 Run Boundary at the bridge openings.
- Where there are existing spur dikes near bridge crossings, the Channel Form Template follows the endpoints of the training structures as they existed in 1996.
- The Channel Form Template generally follows existing top-of-bank lines where the latest modeling shows that 100-year flow is contained by such banks.
- Where the 100-year flow inundation boundary falls within the existing channel banks, the Channel Form Template tracks the outer bank line if the land between the inundation boundary and the outer high bank line is undeveloped and contains natural vegetation features.
- Where the 100-year flow inundation boundary falls outside the existing high bank, the Channel Form Template aligns with the inundation boundary unless such a location is near a bridge crossing or other location where a transition to a narrower channel is necessary.
- Similar to the Test 3 Run Boundary, the Channel Form Template smooths abrupt changes in channel width.
- Hydraulically connected off-channel areas (e.g. the Woodland-Reiff breach site and reclaimed pit) are included in the Channel Form Template to allow room for flood detention, floodplain inundation, and other beneficial processes that could lessen erosion in downstream reaches.

Management of the Channel Form Template is similar to management of the Test 3 Run Boundary. For areas within the Channel Form Template boundary, natural channel processes should be allowed to occur and drive more natural channel evolution towards smoother transitions where there are abrupt changes in channel width. Immediately adjacent to or beyond the Channel Form Template boundary, interventions are allowed, and in some cases encouraged, to protect the multiple benefits and uses of the CCRMP area. When aggregate mining operators expand their facilities or otherwise require permitting from the County under the OCMP, the Channel Form Template shall be implemented.

Major channel smoothing and shaping projects have not been implemented extensively since 1996, and future implementation will likely remain relatively limited due primarily to challenges related to state and federal permitting, and to a lesser extent to the varying interests of private ownership along both banks. The CCRMP establishes a mechanism for implementation of some channel improvements proposed under this program, through Development Agreements or other arrangements with off-channel aggregate producers. Through the notification process described in Chapter 2, the TAC will promote and facilitate other localized channel improvement projects with other property owners.

### **3.5 DESIRABLE (TARGET) CHANNEL CHARACTERISTICS BY REACH**

The channel characteristics for each subreach were originally developed in the 1995 Technical Studies and updated in the 2017 Technical Studies. The hydraulic characteristics in 1995 and 2015, along with recommended channel slopes and sinuosities are listed in Table 1 (Summary of Reach Characteristics). As previously stated, values are targets that may be adjusted over time by the TAC, depending on how the creek responds to projects that are implemented under the CCIP. Regular monitoring and analysis are required (see Chapter 6). Creek management and maintenance will focus on maintaining the targeted channel slopes and sinuosities rather than specific elevations. Figure 3 is a conceptual template that may be adapted to specific sites where removal of in-channel material has been identified to improve channel conditions.

There are four bridges that cross Cache Creek within the plan area, all of which have been subjected to erosive forces from the creek:

1. Capay Bridge at CR 85
2. Esparto Bridge at CR 87
3. I-505 (state/federal)
4. Stephens Bridge at CR 94B

The Madison Bridge at CR 89 collapsed in 1978 and was never replaced. Structural damage to the Capay Bridge resulted in closure of the bridge to all traffic and pedestrians following high flows in March of 1995. All of the bridges in the CCRMP study area are critical components of the County's transportation system and damage to them represents substantial inconvenience to residents and significant economic impacts to the County.

# Cache Creek Area Plan Update - Channel Form Template

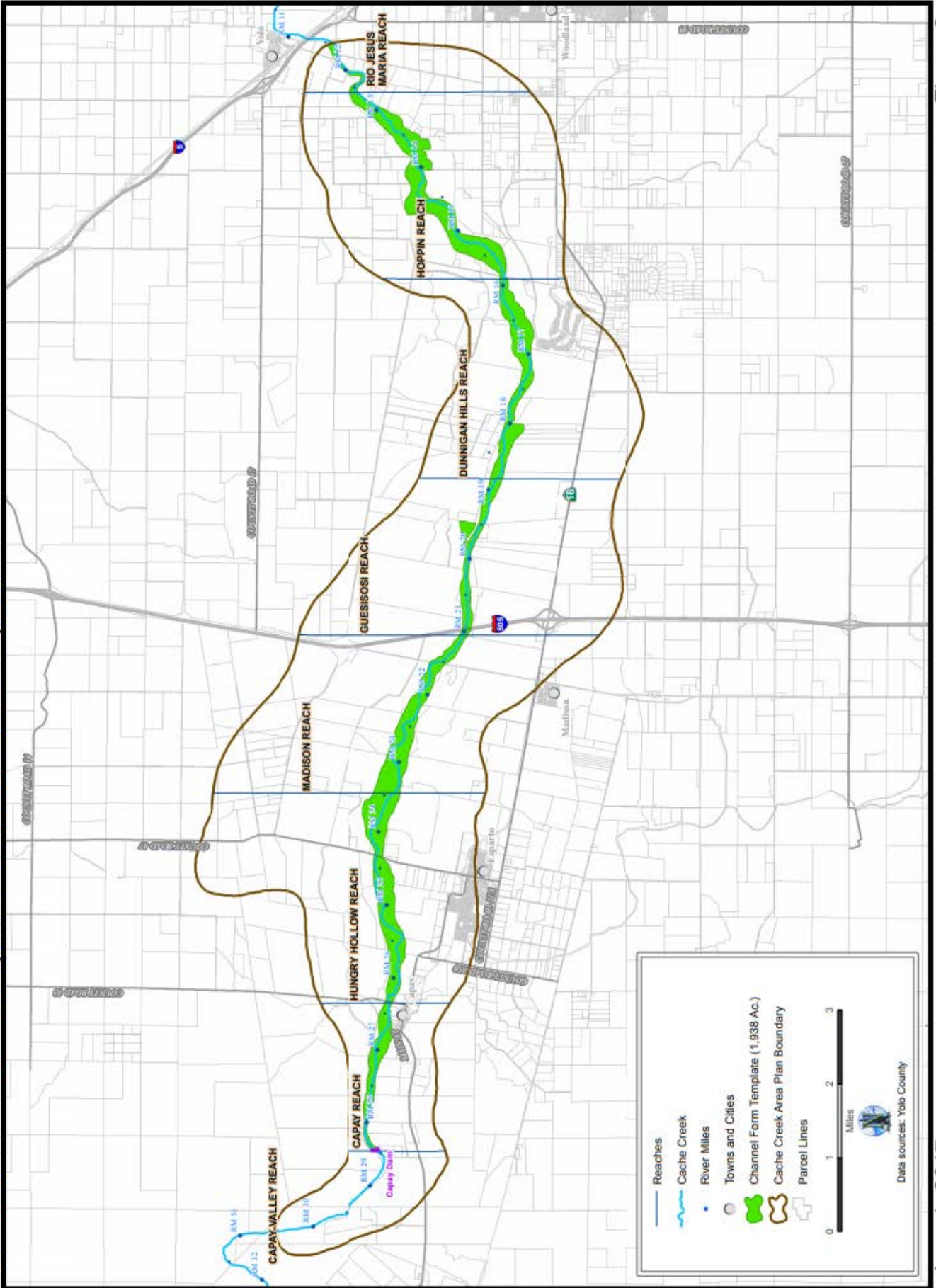


Figure 2

June 1, 2017

Table 1 – Summary of Reach Characteristics

Reach	2017		2011		1995		1905		Target	
	Sinuosity	Slope	Sinuosity	Slope	Sinuosity	Slope	Sinuosity	Slope	Sinuosity	Slope
Capay Reach	1.18	0.0015	1.09	0.0015	1.06	0.0019	1.11	NA	1.04	0.0019
Hungry Hollow Reach	1.18	0.0022	1.15	0.0023	1.20	0.0023	1.06	0.0015	1.10	0.0020
Madison Reach	1.08	0.0018	1.11	0.0018	1.08	0.0022	1.04	0.0018	1.15	0.0020
Guesisosi Reach	1.20	0.0013	NA	0.0014	1.18	0.0013	1.02	0.0014	1.05	0.0013
Dunnigan Hills Reach	1.08	0.0016	1.16	0.0016	1.09	0.0020	1.03	0.0014	1.05	0.0017
Hoppin Reach	1.07	0.0012	1.17	0.0013	1.07	0.0015	1.01	0.0010	1.15	0.0013
Rio Jesus Maria Reach	1.05	0.0013	1.05	0.0014	1.06	0.0013	1.00	0.0016	1.18	0.0013



# Cache Creek Area Plan Update - Generalized Creek Cross-Section

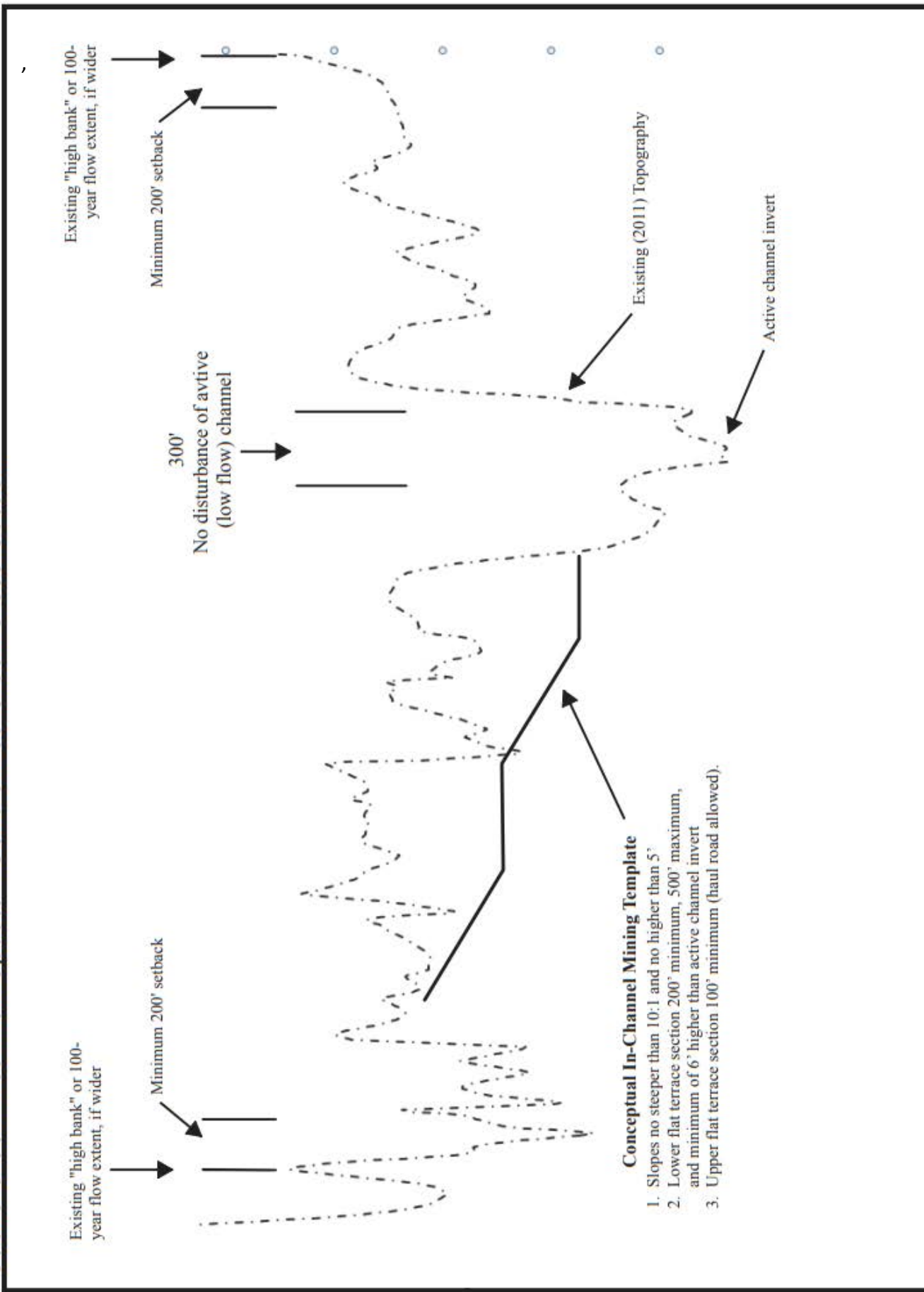


Figure 3

May 10, 2017

As described in the 1995 Technical Studies, bridges have an effect on the overall channel stability throughout the study area. They form high flow constrictions in the channel resulting in localized rapid changes in channel flow capacity and sediment transport capacity. These abrupt changes in flow and sediment transport capacity could result in alternating areas of scour and deposition that lead to progressive changes in the channel upstream or downstream of the immediate area of the bridge.

The 1995 Technical Studies demonstrated the benefits of widening narrow bridge openings but acknowledged the financial constraints on the feasibility of lengthening several bridges. Therefore, the CCRMP recommends that changes to bridges be designed to smooth channel transitions into and out of bridge openings to improve local hydraulic conditions and reduce the abrupt changes that presently occur. The 2016 Channel Form Template provides guidance on smoothing these transitions. While bridge projects are outside the purview of the CCAP, the TAC will assist with technical review of the design of individual bridge treatments should County, State, and/or Federal agencies implement project(s) at bridge transitions. The Channel Form Template should be amended as appropriate to reflect creek modifications over time.

### **3.6 PRIORITY PROJECTS**

The TAC is required to produce an annual report that identifies maintenance projects and other priority improvement projects necessary to help stabilize the creek. The requirements of this report are discussed in further detail in Chapter 6.0. These reports are retained by the County and are available for review at the County's CCAP website:

<https://www.yolocounty.org/general-government/general-government-departments/county-administrator/county-administrator-divisions/natural-resources/cache-creek-area-plan-ccap/cache-creek-annual-status-report>



## **CHAPTER 4.0 – CHANNEL MAINTENANCE**

This section describes expected channel maintenance activities under the CCIP. Channel maintenance activities are in addition to the recommended activities described in the previous section as priority channel improvement projects, and are based on the same objectives for creek stability. In general, channel maintenance activities are smaller in scale than improvement projects, and would be performed to address local conditions that need to be corrected to prevent larger creek stability problems.

### **4.1 ANTICIPATED NEED FOR CHANNEL MAINTENANCE**

Implementation of the CCRMP and CCIP has improved channel stability since 1996, but significant additional channel adjustments caused by winter and spring high flows and sediment transport should be expected, especially during periods of flow greater than 20,000 cfs. It is anticipated that channel maintenance requirements will decrease as the channel becomes more stable over time. However, some degree of channel maintenance will be required for the foreseeable future to assist with flood management, to ensure that existing flood flow capacity is not diminished, and to reduce the risk of bank erosion, lateral channel migration, and significant degradation or aggradation of the streambed in specific locations.

The 1995 Technical Studies illustrated non-uniformity in sediment transport capacities of the channel under then-present conditions. The updated 2017 CCRMP hydraulic model shows persistence of non-uniform hydraulic and sediment transport conditions in parts of the creek system. Even in the absence of aggregate extraction or other human influences, the channel can be expected to make significant adjustments by eroding or depositing sediments at various locations in the bed of the creek. These processes may lead to local changes in channel form and lateral instability. Although the channel might eventually adjust on its own to a more stable form, correction of the current imbalances in sediment transport capacity would likely take a very long time. Therefore, channel maintenance should be implemented as needed to prevent sudden changes in the channel and erosion of its banks, and to help guide the creek toward a more stable form.

The monitoring program described in Chapter 6 is designed to provide information that will assist in making decisions regarding channel management. Water and sediment discharge data will continue to be collected to better understand creek hydrologic and sediment transport processes, topographic data will continue to be collected to monitor changes in channel form and elevations, vegetation conditions will continue to be monitored, and the TAC will continue to make an annual evaluation of bed and bank stability in an annual monitoring report to the Board of Supervisors. This monitoring program will be used as the basis for making decisions regarding channel maintenance activities.

## 4.2 TYPICAL CHANNEL MAINTENANCE ACTIVITIES

The generalized typical creek cross section template (Figure 3) prescribes proposed limits on channel shaping and smoothing within the channel to improve stability. This template has been incorporated into the Floodway and Channel Stability Element of the CCRMP. Removal of in-stream sand and gravel is restricted to maintenance activities including maintenance of flood flow capacity, erosion protection, channel stabilization, protection of existing structures and infrastructure, riparian restoration, and to implement the Channel Form Template. In-stream excavation for any other purposes is precluded by the CCRMP. Use of the template to guide channel maintenance activities will result in formation of a more compound channel than presently exists. Specific maintenance activities will be recommended by the TAC based on an annual inspection and analysis of monitoring data. The following general categories of activities are anticipated:

1. *Gravel Bar Skimming to Maintain Flood Flow Capacity or Reduce the Probability of Bank Erosion*

The deposition of sediments in bars may reduce overall channel capacity, especially if dense vegetation develops on the bar. In some areas of the channel, reduction of capacity may not be adverse, or may even be beneficial. However, where existing flood flow capacity would be reduced, aggradation in the channel would not be acceptable, unless the loss of capacity is compensated by other channel modifications. Bar formation also influences the distribution of flow in the channel, and growth of bars on the inside of a bend can result in erosion of the opposite bank. In this case, skimming of the bar to reduce its size and height can reduce erosive force on the opposite bank. Mid-channel bars can result in erosive pressure on both banks. Care must be taken to protect features of bars to minimize the potential for major channel adjustment that could transfer erosion or capacity problems to another location.

Originally the CCRMP anticipated the removal of approximately 1.2 million tons of material associated with major shaping within the creek during the first five years of implementation, and approximately 210,000 tons per year of on-going maintenance (the rough equivalent of five to seven acres of work over a half mile area). In 1997, according to County records, approximately 40,000 tons were removed. In 1998 approximately 332,423 tons were removed. In 1999 no tonnage was removed. After 1999 there is no record of any excavation associated with in-channel projects implemented from 2000 to present. Implementation of the CCRMP was halted in 1999 during the resolution of a lawsuit related to mercury (see discussion of History in Chapter 1.0, Introduction). It was not resumed due to the philosophy of staff implementing the program at the time. More recently it has been precluded by expiration of the state and federal general permits.

2. *Vegetation Removal to Maintain Hydraulic Capacity or Reduce the Probability of Bank Erosion, or to Remove Undesirable Species*

Vegetation can potentially decrease flow velocities and reduce hydraulic capacity. The effect of vegetation is normally beneficial in reducing velocities and protecting streambanks from erosion. However, the presence of vegetation in the center of a channel may have a significant effect on hydraulic capacity and can adversely affect flow distribution in the channel in a manner similar to mid-channel bars. Where hydraulic capacity is a concern, vegetation should be limited to the terraces of the channel, or to relatively narrow strips along the thalweg. Bar formation and vegetative growth are often interdependent. The formation of a bar provides sites for colonization by vegetation, which may reduce flow velocities and promotes further development of the bar. This process is a normal part of creek behavior, but can in some instances result in undesirable reductions in capacity or erosion of channel banks. Removal of vegetation or reduction of vegetation densities may be sufficient to prevent further bar formation or to promote scour of the bar surface by the creek. Undesirable species, such as arundo and tamarisk, are invasive in the Cache Creek watershed and are extremely resistant to scour. Vegetation removal may involve selective clearing and thinning by hand and machine, and chemical control of dense stands and/or undesirable species. Control of these species by chemical means is necessary in any location where dense stands would result in adverse changes in hydraulic capacity or bank erosion potential. (See Actions 4.4-2 and 4.4-3 of the CCRMP.)

3. *Minor Bank Protection Works*

It is expected that bank erosion will occur in multiple locations along the channel on a small scale, as well as in a few locations on a larger scale. The larger problems, especially in the Jesus Maria Reach, are beyond the scope of channel maintenance solutions. However, smaller scale problems can be addressed in the channel maintenance program. While revetment may be necessary in some instances, maintenance activities should focus on changing hydraulic conditions that lead to the problem by promoting lower velocities close to the bank, and protecting banks with native vegetation or biotechnical erosion control techniques. Minor grading work, combined with strategic planting in suitable locations, can be used to promote the compound channel shape illustrated by the conceptual template, reducing bank heights and resulting in lower velocities in the near-bank area. Maintenance activities need not always provide fail-safe protection against bank erosion, but rather should promote hydraulic conditions that reduce the potential for erosion. Experimentation with techniques that combine minor grading, native revegetation, and bio-technical protection techniques should be promoted. These types of projects may provide opportunities for landowner or citizen group participation. Included in this category are smaller revetments and smaller groins/spur dikes both for bank protection and channel shaping.

#### 4. *Removal of Debris at Bridges or Upstream of Bridges Susceptible to Debris Accumulation*

Debris is transported downstream in the Cache Creek channel during high runoff. In major floods, debris collection on bridges can significantly reduce hydraulic efficiency of the bridge opening and result in locally high velocities and bed scour. Problems with the stability of bridge foundations, abutments, and channel banks can result. A small amount of debris collected on a bridge can promote rapid accumulation of additional debris during flood flows, resulting in a situation that prevents debris removal until after the event has passed. Normal maintenance activities should include removal of debris from the bridge area, and from channel areas upstream of bridges. Bridges with narrow spans between piers and which are skewed to the flow are particularly susceptible to debris accumulation.

#### 5. *Non-Project Levee Maintenance*

Maintenance of Cache Creek flood control levees in the Hoppin and Jesus Maria reaches is the responsibility of the Department of Water Resources. Levees (including remaining in-channel levees) associated with active and inactive mining operations will also require maintenance from time to time. In most cases this maintenance will restore the structural integrity and level of protection of levees impacted by high flows. However, it is possible that at some reclaimed mine sites (like Granite Woodland Reiff), levee breaches will need to be maintained to provide controlled connectivity between Cache creek and off-channel habitat areas.

The categories of channel maintenance activities described above involve working in the creek with heavy equipment, and therefore are subject to permitting constraints. Typical activities may include grading with dozers, hydraulic excavators, or scrapers; removal of aggregate materials from the channel by truck or scraper; removal and disposal of vegetation; removal of debris; and planting or placement of biotechnical erosion control materials.

Rights-of-way or rights-of-entry will be required for channel maintenance work. It is anticipated that most, if not all, channel maintenance work will be landowner initiated. The County will consider possibilities for cooperative design, financing, and construction of channel maintenance activities with interested landowners, and will serve as a technical resource for landowners planning these types of projects. The County will attempt to secure grants and other alternative funding for this and other components of the CCIP.

## **CHAPTER 5.0 –DESIGN GUIDELINES FOR CHANNEL STABILIZATION AND MAINTENANCE**

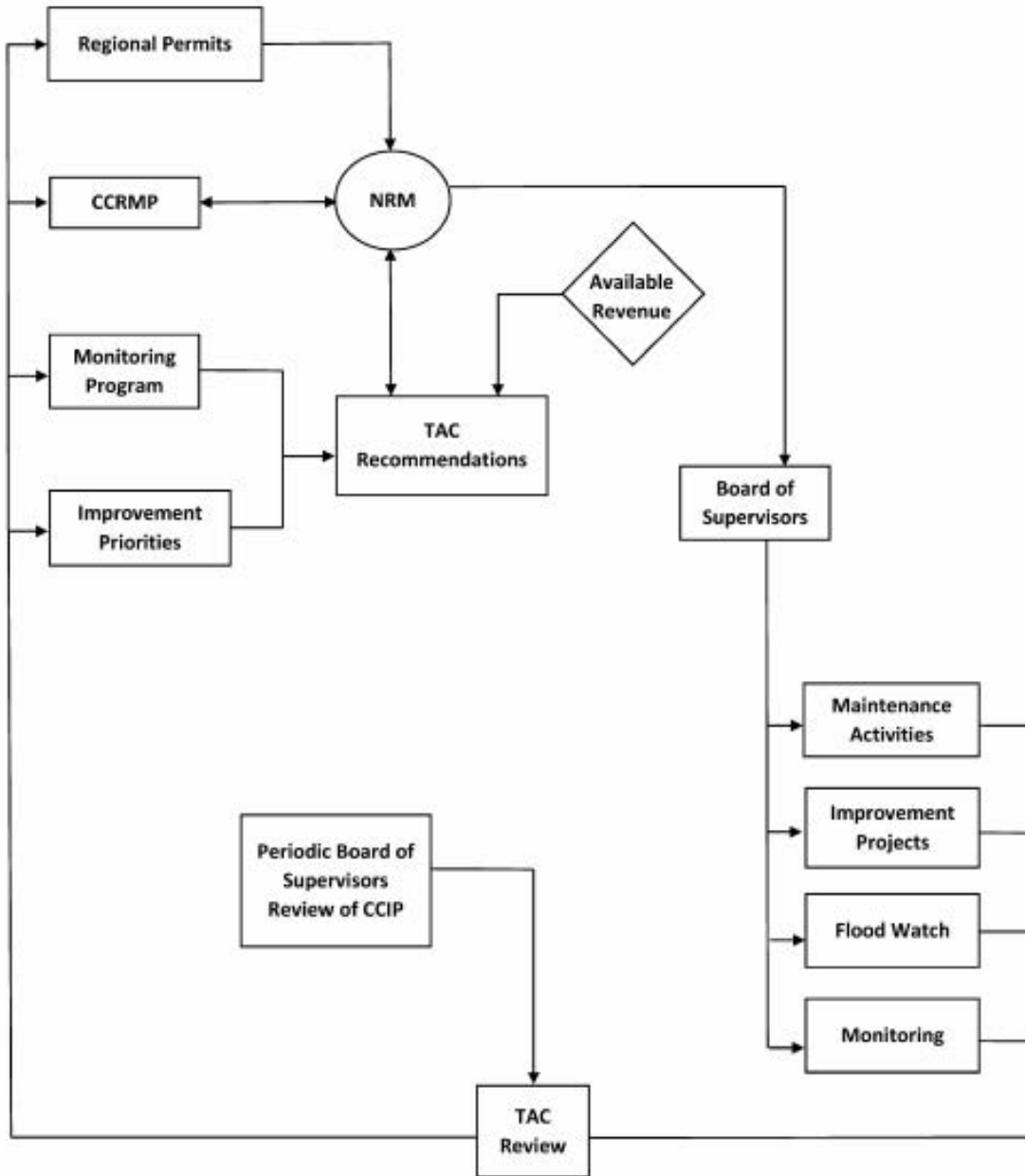
### **5.1 REVIEW PROCESS FOR CHANNEL STABILIZATION AND MAINTENANCE**

The role of the TAC in the CCIP program is presented schematically in Figure 4. The TAC will meet regularly to review: 1) maintenance activities; 2) improvement projects; 3) monitoring program data; 4) creek conditions and project priorities; and 5) in-channel activities and permit applications. Following review of annual maintenance activities, proposed improvement projects and annual monitoring information, the TAC will prepare recommendations for the coming construction and maintenance season. Depending on the amount of change in channel conditions observed from previous years, the TAC may recommend updating the County's hydraulic models and re-evaluating the hydraulic and/or sediment transport characteristics through the study area. Results from the TAC's annual inspection, review of aerial photos and review of updated hydraulic and sediment transport information will support the TAC's recommendations to the Board for various maintenance and channel improvement projects. Overall, the role of the TAC is to integrate observations from the annual creek walk, the latest topographic and aerial photos, and hydraulic modeling, to assist with the prioritization of channel maintenance/improvements, and implement these activities guided by generalized cross-section templates and best practices for bank stabilization.

Significant channel improvement projects, such as those described in Chapter 3, will require detailed engineering design and must consider results from the hydraulic model for the CCRMP area. All projects that would result in modifications to the channel within the 100-year flood hazard zone as defined by the National Flood Insurance Program require a Flood Hazard Development Permit (FHDP). Designs for these projects shall be submitted to the Yolo County Community Services Agency (or appropriate equivalent). The design of the projects would be reviewed by the TAC for conformance with the CCIP, and by staff for conformance with applicable state and federal permits, prior to approval of the FDP for the proposed project. Major projects may require the application of refined hydraulic and sediment transport models to specific creek reaches to develop design parameters. The TAC will make available flow and sediment discharge data collected under the CCIP, current versions of hydraulic and sediment transport models, and information on channel stability trends in the vicinity of the proposed project.

Annual channel maintenance activities will be smaller in scope than the significant channel improvement projects and can be accomplished based on the application of appropriate design parameters and best practices in the industry. The design guidelines described below shall guide the TAC review.

# Cache Creek Area Plan Update - Schematic of TAC Role in CCIP



NRM = Natural Resources Manager

## 5.2 DESIGN GUIDELINES

This section describes design guidelines based on results of the 1995 Technical Studies, evaluation of changes in channel conditions between 1996 and 2016 as presented in the 2017 Technical Studies, and best management practices for creek stabilization. The section applies to both channel stabilization projects and channel maintenance activities.

### *Channel Stabilization*

Current conditions on Cache Creek include discontinuities in hydraulic conditions and sediment transport capacity. These discontinuities can result in both vertical and lateral instability.

Many channel stabilization and erosion control techniques are available for controlling bed and bank erosion that occurs along alluvial creeks. The literature is voluminous regarding these measures, often referred to as *erosion control countermeasures*. A countermeasure is defined as a technique used to control, inhibit, change, delay, or minimize creek stability problems. Countermeasures can be installed at the time of the initial development of a channel improvement project or retrofitted to resolve stability problems as they develop. Retrofitting and sound maintenance practices are practical because it is difficult to predict the location, magnitude and nature of potential instability problems. When selecting a countermeasure, it is necessary to evaluate how the creek might respond to the countermeasure at the site as well as upstream and downstream of the site. A brief summary is presented here of some of the more viable methods for channel stabilization and erosion control for Cache Creek.

Creek stabilization and erosion control measures can be grouped into at least seven categories: *discharge control, revetments, dikes, vegetation (and biotechnical methods), alignment adjustments, bank drainage, and bed scour controls*. The following references provide guidance on design and implementation of these measures:

[https://www.nrcs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb1044574.pdf](https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1044574.pdf)

<https://www.fs.fed.us/biology/nsaec/assets/yochumusfs-nsaec-tn102-2gudncstrmrstrtrnhbltn.pdf>

1. *Discharge control* requires that the erosive flows are routed through an upstream detention facility (dam or reservoir) to reduce the rate of flow, thus reducing the flow's erosion potential. These types of projects are less likely to be undertaken because of state and federal permitting requirements. These are likely to be major projects that involve the impoundment of water (e.g. dams or reservoirs). Generally, areas with steep banks or canyons are the most likely locations for these types of projects and there are no areas like this along the creek from Capay to Yolo. It is possible that discharge control upstream of Capay could have beneficial effects for the downstream reaches covered under the CCRMP.

2. *Revetments* include placing stone or concrete (see CCRMP Performance Standard 3.5-7) on the channel bank to resist the erosive forces of the flow. These types of “pre-emptive” projects are likely to be useful within the Plan area at locations where stream energy scours down and undercuts the bank toe, which then slumps allowing the creek to advance laterally.

A windrow revetment is one example. This consists of a pile of stone or concrete built on the high bank above the water line. If the creek meanders, the pile is released onto the bank. Another example was utilized by the Collet operation in 1980 at a location approximately one mile upstream of the nature preserve where the creek was threatening the Moore Canal. The operator received approval to cut a keyway (trench) for installation of stone below grade to keep the creek from undercutting the canal.

The work involves using an excavator in the creek to dig a trench perpendicular to the flow. The trench is filled with large material (stone or recycled concrete). Dump trucks are needed for hauling. There is no large material naturally occurring in Lower Cache Creek. The largest material is 12 to 14 inches in the upper creek area which is not large enough for high-velocity major events but would work for low flow events. Options include importation of large rock from out of the area (“non-native natural material) or use of recycled concrete consistent with applicable local and state regulations. Recycled large material can be faced with smaller cobble for a natural appearance.

3. *Dikes*, commonly referred to as groins or spur dikes, direct flow away from eroding surfaces or reduce the erosive forces along the channel bank by diverting the stronger currents. *Permeable dikes* and *groins* are often called *flow retarder structures*. Rock dike groins and revetments can be successfully combined to slow velocity, pick up fines, and create a planting medium which supports natural revegetation. These projects are not done while the water is flowing. Construction requires rerouting the creek using a diversion channel or temporary dam and pipe/pump depending on flows.
4. *Vegetation* can be substituted in place of stone, concrete, timber or other materials for some erosion/stabilization sites. It is often advantageous to combine structural (stone or concrete) features with vegetative alternatives in the form of "*biotechnical solutions*" to erosion and/or stabilization problems. The success of vegetative measures depends on the survival of the vegetation and substrate stability. The vulnerability of vegetation should be considered in site selection.

Use of vegetation-only controls are unlikely to be effective in Cache Creek. Under high flow conditions the improvements are likely to be washed out. The combination of vegetative solutions with “hard points” to slow velocity and protect plantings effective in lower Cache Creek, particularly in the lower downstream reaches where material is finer grain and there is more water closer to surface. Upstream the water table is lower and the material is coarser which makes establishment of vegetation difficult.



This work is primarily done by hand although preparation work may be done with equipment such as a bull dozer, excavator, and/or motor grader. The scale of these projects is typically smaller – two to three days over 50- to 200-foot areas is typical.

5. For some problems *alignment adjustments* are appropriate. The creek will naturally meander over time. Creek realignments involve repositioning the creek to protect infrastructure, agriculture, or mining operations. Care must be exercised, however, to ensure that the realignment does not result in the relocation of the problem. Creek realignments usually require placement of spur dikes, groin fields and revetments to encourage the main thread of the creek's flow path to relocate.
6. *Bank drainage*. There are many locations along the study area of Cache Creek where rather significant gully erosion is occurring at locations where floodplain drainage enters the creek. This situation can also contribute to further saturation of the banks which increases the likelihood of bank failure due to mass wasting. Upper bank drainage should be collected and allowed to enter the creek in erosion resistant channels or inlets.
7. *Bed scour controls*. Channel incision and scour are very complex processes. Channel bed incision (erosion) occurs in locations where the hydraulic energy (flow) exceeds the resistive strengths of the creek bed. Rock, concrete, soil cement or biotechnical bed armoring procedures can help control bed erosion. Applications of channel bed *erosion control mattresses* are common at bridge crossings where rapid flow acceleration results in local bed scour.

The construction of check dams or grade controls using large stone to create an at-grade sill could be effective to hold the elevation and protect the piers at bridges. A similar project was undertaken by the NRCS upstream of the Capay Bridge in 1995 when the West Adams canal was threatened. A large amount of riprap was placed as an emergency measure during high flows. The project was successful and remains in place today obscured by vegetation and hidden from most views.

### *Selecting Countermeasures*

Selection of an appropriate countermeasure to resolve a specific channel stability problem is dependent on many factors, including the erosion mechanism causing the problem, local and regional creek characteristics, construction and maintenance requirements, potential for vandalism, and costs. Creek characteristics that most influence the selection of countermeasures include channel width; bank height, configuration and material properties; vegetative cover; channel bed sediment transport characteristics; channel bend radii; channel velocities; and flow depth.

### **5.3 CONDITIONS, TECHNIQUES, AND COUNTERMEASURE DESIGN CONSIDERATIONS**

The two references provided above provide applicable repair and maintenance techniques for various problem types and physical/hydrologic settings. As described in Chapters 3 and 5, the TAC will review annual needs for maintenance and improvement projects. As directed by the County, the TAC, with the assistance of consultants as needed, may develop specific project designs in accordance with the goals of the Channel Form Template and the CCRMP.

### **5.4 SUMMARY OF RECOMMENDED DESIGN GUIDELINES**

Recommended design guidelines were presented originally in the 1995 Technical Studies and carried over into the CCRMP. The guidelines, updated based on the 2017 Technical Studies, are summarized below:

1. Design and implement priority projects (see also discussion in Chapter 3) that promote beneficial adjustments in the creek which meet the stated objectives of the CCRMP, while allowing flexibility for the creek to shape its own recovery and restoration over time.
2. The TAC shall review topographic data and such other information as is appropriate to determine the amount and location of aggregate to be removed from the channel. Aggregate removal from the channel shall only be recommended in order to: 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 recreation and open space uses consistent with the Parkway Plan. Except to implement the Channel Form Template, annual aggregate removal shall not exceed the average annual amount of sand and gravel deposited since the last prior year of removal in the CCRMP area, as determined by comparison of channel topography data. Recommendations shall take into consideration the desires of the property owner where excavation is to take place, as well as the concerns of property owners in the immediate vicinity.
3. Since 1996, the estimated average annual volume of sediment delivered to the CCRMP study area is 690,800 tons per year of which 156,400 tons is estimated to be sand and gravel, and 534,400 is estimated to be fines (see Section 2.1, Introduction of the CCRMP). Annual sediment delivery varies substantially from year to year based on hydrologic conditions, and aggregate extraction should follow that variability based on results from the annual monitoring program presented in Chapter 6. Aggregate extraction in local areas may be necessary on a one-time basis as part of priority channel stabilization projects (see also discussion in Chapter 3). Extraction would be performed in accordance with the target stable channel characteristics listed in Table 1.
4. Allow in-channel reshaping and smoothing at rates at, or below, the average annual deposition since the last prior year that extraction occurred, not to exceed 690,800 annually, in order to implement the Channel Form Template.

5. The County shall review and monitor removal of aggregate and/or plant material consistent with the CCRMP and CCIP. The County, at its discretion, may enlist the aid of gravel mining operators, other private property owners, or conduct the maintenance activities using County resources.
6. Individual landowners can propose reshaping and smoothing projects to mitigate local channel instabilities. Project designs must comply with the target channel characteristics summarized in Table 1, and conform to the Channel Form Template. Final designs will comply with local County design criteria and preserve channel stability and existing flood flow capacity without adversely affecting neighboring creek reaches. Final designs must be reviewed by the TAC and the Department of Public Works.
7. Projects affecting the 100-year floodplain as defined by the National Flood Insurance Program within the CCRMP plan boundary will require review by the TAC, County approval of a Flood Hazard Development Permit (FHDP), and consistency with applicable state and federal permits.
8. The review by the TAC of all FHDP applications for Cache Creek improvement projects within the CCRMP area shall include an evaluation of potential upstream and downstream effects of the proposed channel modifications. The TAC shall evaluate data on hydraulic conditions presented in the permit application. The TAC shall also examine aerial photographs and perform a reconnaissance investigation of the site and surrounding areas to identify potential upstream and downstream effects.
9. Use management targets for channel characteristics listed in Table 1.
10. Manage grading within the channel (for priority projects or annual maintenance) in compliance with the target stable channel template shown in Table 1.
11. Opportunities for groundwater recharge and reestablishment of valuable riparian features should be considered at all project sites. This measure will be implemented in concert with Action 4.4-6 of the CCRMP.
12. Integrate native riparian vegetation into overall hydraulic and sedimentation design, and management plans.
13. Use native riparian vegetation, where appropriate, to provide bank stabilization and to create smoother transitions between reaches with differing hydraulic capacities.
14. Avoid channel bed lowering and permanent degradation through maintenance and channel management. Consider the design and installation of grade controls as major channel improvement projects if regular maintenance and channel management are unsuccessful in stopping further bed lowering in critical reaches or in the vicinity of bridges. Use vegetation and biotechnical measures wherever practical.

15. Manage the channel to encourage development of a compound cross sectional shape. Establish native vegetation and maintain at levels that will not result in overtopping of historical channel banks or increase in the 100-year flood elevation. Control weed invasion and adverse flow orientations by improving channel characteristics and performing regular maintenance.
16. Manage and maintain in-channel vegetation to ensure it is part of the solution to channel stabilization and not contributing to the problems. Annual maintenance will be guided by the TAC and will include selective clearing and thinning of in-channel vegetation, in a manner sensitive to the surrounding riparian habitat.
17. Use managed sediment removal (bar skimming) to promote and maintain channel stability and existing flood flow capacity. Use managed clearing and thinning of vegetation to promote and maintain channel stability and existing flood flow capacity. Channel maintenance will be managed by the TAC based on annual monitoring and hydraulic modeling.
18. Existing flood flow capacity shall not be reduced, and existing flood problems downstream shall not be exacerbated by channel reshaping. This shall be ensured through annual monitoring of channel geomorphology, distribution and density of plant material within the channel, and modeling to forecast changes in base flood elevations.
19. Plan, design, and implement priority projects listed in Chapter 3 to improve channel stability and promote more uniform hydraulic capacity with a stable compound shape.
20. Require completion of site-specific biological inventories before implementation of priority projects.
21. If no flood protection or erosion control measures are proposed, a setback distance of 700 feet is required from the present bank line and the edge of off-channel pits. Where control measures are proposed, or demonstrated not to be needed, consistent with Section 10-4.429 (Setbacks) of the Mining Ordinance, a minimum setback of no less than 200 feet may be considered if no adverse effects on bank stability and groundwater can be demonstrated, and if the Channel Form Template is implemented along the project creek frontage. Project-induced creek capture associated with remaining in-channel pits is discouraged unless approved by the TAC to improve habitat in reclaimed mine sites or flood flow capacity.
22. Implement smooth transitions through the bridges to reduce bed and bank scour and improve the overall hydraulics of the system. Smooth and sculpt the channel to remove or reduce abrupt channel changes.
23. Allow for flexible channel management of the creek so changes can be made to components of the CCIP, where and when necessary, based on new information in the

future. Continuously collect monitoring data and analyze and document those data yearly. Review and revise the priority project list and maintenance management procedures every five years.

24. Some projects may require the construction of sections of levees to smooth and re-sculpt the channel to a more stable configuration. Levee designs shall follow the most current guidelines from the U.S. Army Corps of Engineers, the Federal Highway Administration (FHWA), and Caltrans. All levee designs will be based on thorough geotechnical engineering analyses based on the local bed and levee materials at the project site.
25. All levee projects must be reviewed by the TAC and Yolo County pursuant to a FHDP. Other State and Federal permits may also be required.
26. Bank revetments, spur dikes, groin fields, hard points, toe revetments, bridge transition projects, rock sill, grade controls, biotechnical bank protection projects, and channel shaping (smoothing and widening) must comply with the design guidelines summarized in Table 1. Final designs must comply with County design criteria, and be reviewed by the TAC and the County Floodplain Administrator if the projects require modification to the 100-year floodplain. A FHDP permit may be required. Other State and Federal permits may also be required.
27. Modifications to the plan area shall be reviewed and approved by the TAC to ensure that sensitive biological resources are protected and enhanced; that restoration plans are consistent with the policies of the CCRMP; and that various habitat restoration projects are compatible. Actions shall include compliance with the Yolo HCP/NCCP, State Fish and Wildlife Code and the Migratory Bird Treaty Act, and other applicable regulations, plans and programs, as appropriate.

## CHAPTER 6.0 – MONITORING PROGRAM

This section describes a proposed monitoring program to collect and analyze data for the purpose of making resource management decisions for the Cache Creek channel on a continuing basis. A monitoring program is described to collect pertinent information regarding water and sediment discharge, changes in channel morphology, and changes in riparian vegetation. The monitoring program described herein is designed to be flexible and practical while assuring that essential data are regularly collected at key locations to support creek resource management decisions. Assuming the data collection program may be funded incrementally, allowing the monitoring program to possibly be expanded over time, the TAC should establish priorities for installation of gages and collection of data. The TAC will describe in their annual reports expected needs and recommended changes in the intensity and location of data collection activities as the channel adjusts over time. Data will be collected and analyzed under direction of the TAC, and integrated in a modern database paired with visual interfaces that facilitate retrieval and exploration of the data. The TAC will use the monitoring results to make decisions and recommendations for improvement projects, annual maintenance activities, and flood hazard reduction opportunities. In addition, the TAC will periodically review the monitoring program's effectiveness and costs, and suggest revisions as necessary to collect required information at minimum cost. The process by which monitoring results will be incorporated into TAC decisions is outlined in Chapter 2.

### 6.1 EXISTING DATA AND INFORMATION

#### *Water and Sediment Discharge Data*

The existing streamflow and sediment data available for Cache Creek were summarized originally in the 1995 Technical Studies, and data available since that time are identified and analyzed in the 2017 Technical Studies. Generally, streamflow data has been updated, but sediment transport monitoring is not available. On an intermittent basis, the United States Geological Survey (USGS) provides suspended sediment discharge monitoring from their gages at Yolo and Rumsey. The TAC has integrated this data into the annual reports, as it has become available. The 2017 Technical Studies applies the regional sediment transport model every year to estimate annual sediment transport throughout the system. While sediment transport monitoring would be helpful, it is both difficult and costly to implement on a system as large and flashy as lower Cache Creek, thus making it infeasible for this program. Prioritization of topographic (LiDAR) surveys after each water year with flows in excess of 20,000 cfs is a more important program task.

Figure 5 shows the location of existing stream gages for the portion of the Cache Creek basin upstream of Yolo. The gages of particular importance to the CCRMP area are the Rumsey and Yolo gages. Data availability plays a role in limiting the current understanding of Cache Creek hydrologic and sediment transport processes.

The most complete streamflow records available to characterize flows in the study area are from the Rumsey gage (upstream of Capay) and the Yolo gage (immediately downstream of the study

# Cache Creek Area Plan Update - Regional Stream Gage Station Locations

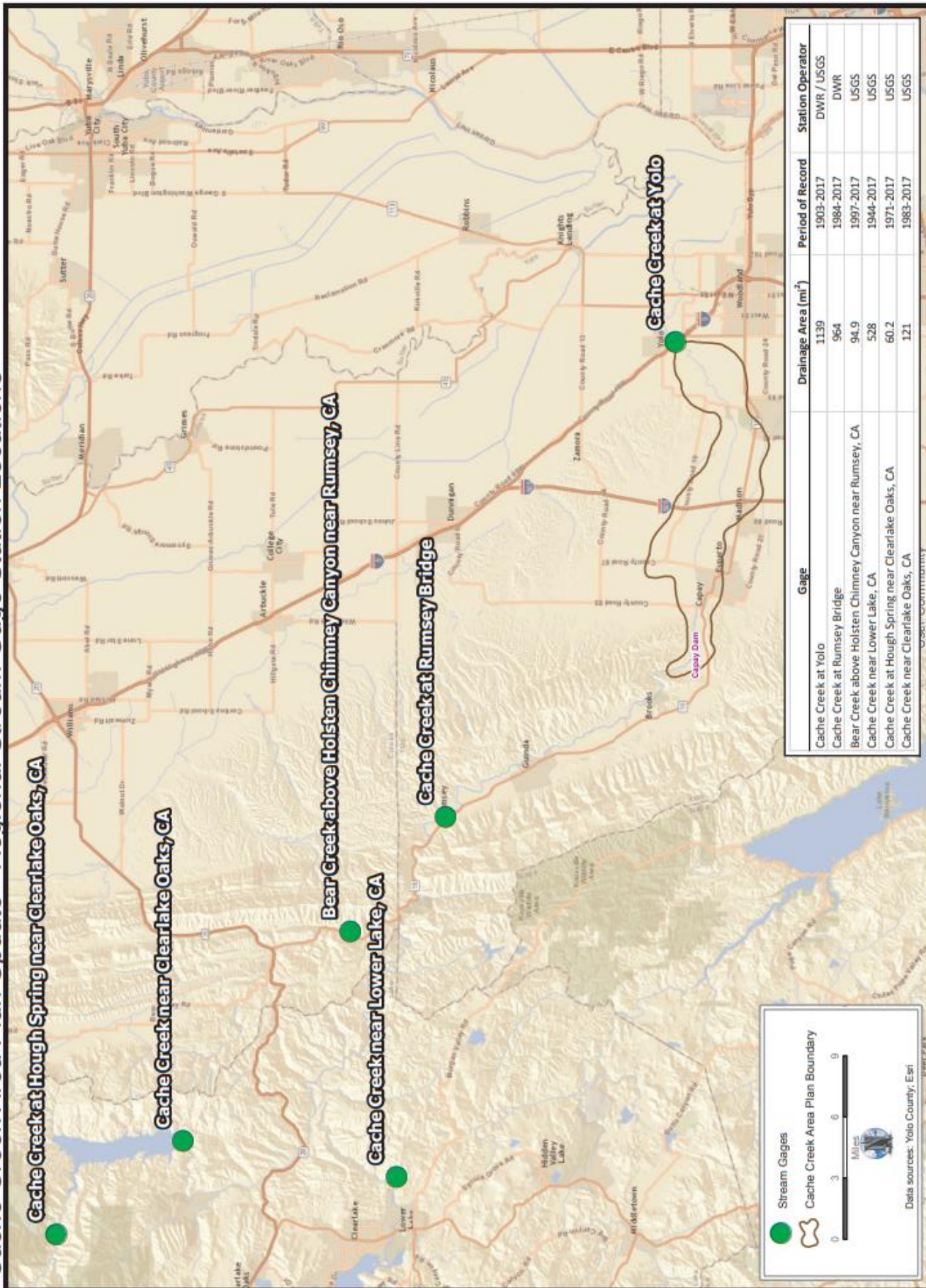


Figure 5

May 10, 2017



area). Historical observations show that under most circumstances, peak discharge at Rumsey for a particular storm event is higher than peak discharge at Yolo. There are several possible explanations for this phenomenon, and it is likely that some combination of all these factors contributes to this behavior:

1. There are no significant tributaries adding to Cache Creek flow between Capay and Yolo. There are minor tributaries that contribute additional flow, but whether these tributaries would increase the peak at Yolo depends greatly on the relative timing of their peaks compared to the peak at Yolo.
2. Absent significant tributary inputs, storm discharge peaks tend to widen and decrease as the flow pulse moves downstream and encounters resistance to flow.
3. The bed of Cache Creek is made up of well-draining sediments and losses to groundwater between Rumsey and Yolo are likely great enough to be observed as a decrease in flow except for when several storm events occur in rapid succession. A series of storms can saturate the channel bed, raise the local groundwater table, and limit or stop losses to groundwater.
4. Inaccuracies in rating curves at both gages can contribute to a margin of error in predicting discharge for a given creek stage at the gage sites.

#### *Topography and Channel Form*

Since 1981, Yolo County has completed topographic mapping of Cache Creek between Yolo and Capay during the fall of the year. Mapping for the years 1981 to 1985 is available in hard copy format, and mapping for years 1986 to 2011 is available in digital form. Figure 6 provides an overview of the format of available aerial data, by year. The 1995 to 2011 data has been incorporated into the County's GIS system, and was used during the 2017 CCAP Update to evaluate changes in channel conditions before and after exclusion of mining from the channel in 1996.

#### *Riparian Vegetation*

Existing riparian habitat in the CCRMP area was summarized in the 1995 Technical Studies. The current extent and distribution of riparian vegetation is described in detail in the 2017 Technical Studies (see also Figure 7). Figure 7 summarizes habitat types and acreage within the plan area. These data have been incorporated into the County's GIS system. Information regarding the extent of riparian habitat prior to 1995 is summarized in the 1995 Technical Reports.



## Cache Creek Area Plan Update - Aerial Data Format

	Aerial Photos				Contours/DTM		Volumetric Analysis		LiDAR	
	Comp?	Format	Reso	Color	Comp?	Format	Comp?	Format	Comp?	Format
1997					X	dwg, dxf, dbg				
1998	X <sup>2</sup>	sid			X	dwg, dxf	X	dwg, dxf		
1999	X <sup>3</sup>	tif			X	dxf	X	dxf		
2000	Hard Copy				X	dwg, dxf	X	dwg		
2001	Hard Copy				X	dwg, dxf	X	dwg		
2002	Hard Copy				X	dwg	X	dwg		
2003	Hard Copy				X	dwg	X	dwg		
2004	X	tif	6"	B&W	X	dwg, shp	X	shp		
2005	X <sup>4</sup>	tif	6"	B&W	X	dwg, dng, shp	X	shp		
2006	X	tif	8"	color	X	dxf			X	rrd, tif
2007	X <sup>5</sup>	tif	6"	color	X	dwg, shp, TIN				
2008 <sup>1</sup>	X	tif	6"	color					X	ecw
2009	No aerials taken									
2010	X	tif, SID	6"	color	X	dwg, gdb	X	dwg, shp	X	las, tif
2011	X	tif, SID	6"	color	X	dwg, shp	X	GRID, shp, dwg	X	las, tif
2012	No aerials taken <sup>2</sup>									
2013	No aerials taken									
2014	No aerials taken <sup>2</sup>									
2015	X	tif	3-4"	color	X	shp, gdb			X	las simulated LiDAR
2016	No aerials taken <sup>2</sup>									
2017	X	tif, SID	3"	color	X	las <sup>6</sup>			X	las

**Notes:**

- 1- Data received from DWR's CVFED project  
 2- Data from NRCS Data Gateway  
 3- Only 3 of the 8 photos are georectified  
 4- Portions of Granite Esparto, Cemex and Syar are cut off  
 5- Portions of Granite Esparto, Teichert Esparto, Cemex and Syar are cut off  
 6- LAS Files that can be generated into contours

- las - LiDAR  
 dwg - CADD file  
 tif - Image file  
 SID - Aerial image mosaic of multiple images  
 GRID - Raster terrain model (GIS data)  
 shp - Esri Shapefile (GIS data)  
 gdb - Esri Geodatabase (GIS data)

October 8, 2018

Data sources: Yolo County

Figure 6

## Cache Creek Area Plan Update - CCAP Vegetation Summary

Reach	Area	Acreage Per Vegetation Class (2015)				
		Riparian Forest	Oak Woodland	Dense Scrub	Scattered Scrub	Herbaceous
Capay Valley <sup>1</sup>	CCRMP	NA	NA	NA	NA	NA
	OCMP	45.34	152.62	46.36	2.25	502.48
	<i>Total</i>	<i>45.34</i>	<i>152.62</i>	<i>46.36</i>	<i>2.25</i>	<i>502.48</i>
Capay	CCRMP	43.32	0.54	13.18	3.88	96.42
	OCMP	7.08	431.39	1.22	0.00	288.00
	<i>Total</i>	<i>50.40</i>	<i>431.93</i>	<i>14.40</i>	<i>3.88</i>	<i>384.42</i>
Hungry Hollow	CCRMP	3.73	0	12.92	12.33	68.49
	OCMP	6.57	3.14	12.43	10.42	308.65
	<i>Total</i>	<i>10.30</i>	<i>3.14</i>	<i>25.35</i>	<i>22.75</i>	<i>377.14</i>
Madison	CCRMP	10.23	0	32.29	14.27	94.38
	OCMP	11.29	1.00	21.93	3.64	91.25
	<i>Total</i>	<i>21.52</i>	<i>1.00</i>	<i>54.22</i>	<i>17.91</i>	<i>185.63</i>
Guesisosi	CCRMP	28.66	2.35	18.17	5.08	48.17
	OCMP	42.46	0.00	16.75	6.51	124.83
	<i>Total</i>	<i>71.12</i>	<i>2.35</i>	<i>34.92</i>	<i>11.59</i>	<i>173.00</i>
Dunnigan Hills	CCRMP	121.99	0	48.23	8.25	77.36
	OCMP	159.08	5.78	28.05	12.25	117.90
	<i>Total</i>	<i>281.07</i>	<i>5.78</i>	<i>76.28</i>	<i>20.50</i>	<i>195.26</i>
Hoppin	CCRMP	37.79	0	34.01	5.15	78.27
	OCMP	90.80	0.00	74.27	17.45	396.82
	<i>Total</i>	<i>128.59</i>	<i>0.00</i>	<i>108.28</i>	<i>22.60</i>	<i>475.09</i>
Rio Jesus Maria	CCRMP	5.95	0.00	4.95	0.36	11.85
	OCMP	9.92	0.00	6.09	0.00	5.61
	<i>Total</i>	<i>15.87</i>	<i>0.00</i>	<i>11.04</i>	<i>0.36</i>	<i>17.46</i>
<b>CCRMP Total by Class</b>		<b>251.67</b>	<b>2.89</b>	<b>163.75</b>	<b>49.32</b>	<b>474.94</b>
<b>OCMP Total by Class</b>		<b>372.54</b>	<b>593.93</b>	<b>207.11</b>	<b>52.52</b>	<b>1835.53</b>
<b>CCAP Total by Class</b>		<b>624.21</b>	<b>596.82</b>	<b>370.86</b>	<b>101.84</b>	<b>2310.47</b>

<sup>1</sup>Capay Valley reach is upstream of Capay Dam, outside CCRMP area but within OCMP area

May 10, 2017

Data source: Yolo County

Figure 7

### *Bridges and Infrastructure*

The 1995 Technical Studies summarized the history of bridges within the CCRMP area, and computed potential scour depths at all bridges. The TAC has not updated the calculations of scour depths at the bridges. The 2017 Technical Studies do not show any significant persistent scour at bridge locations. The new 2-D hydraulic model developed during the 2017 Technical Studies can evaluate shear stress at any location within the plan area, including at bridge locations and thereby contribute to quantification of potential scour risk at bridges.

### *Water Quality*

Water quality data collected from Cache Creek shall be regularly evaluated by a trained professional to determine whether the use of chemicals in the habitat restoration areas is affecting water quality. If chemicals are used and a correlation between chemical use and the degradation of water quality is established, the use of chemicals in the habitat restoration areas shall be reevaluated.

## **6.2 MONITORING PROGRAM OVERVIEW**

The purpose of the monitoring program is to provide dependable, up-to-date channel condition data that the TAC can use to support recommendations for management of the creek. In particular, the results of monitoring will be used to evaluate the need for improvement projects, annual channel maintenance, and hazard response. The data will be used directly in the design of these projects and activities. Analysis of monitoring program data promotes a better general understanding of Cache Creek processes, and their importance in channel stability. Changes in the recommended channel improvement program, and in the monitoring program itself, are expected based on this improved understanding. It is therefore anticipated that the annual monitoring program will be modified and refined over time as the TAC's understanding and management of the creek improves.

The objectives of the proposed monitoring program are to:

1. Improve present estimates of average annual inflowing sediment load;
2. Improve the present understanding of creek hydrology, including flood-frequency, flow-duration, and channel storage/loss relationships;
3. Estimate inflowing sediment load on an annual basis;
4. Monitor changes in channel form and topography, including those directly associated with improvement project and channel maintenance activities;
5. Monitor changes in biological resources annually, with a focus on both native and non-native riparian vegetation ; and

6. Monitor bridges, levees, and other infrastructure to maintain awareness of damage related to creek conditions.

These data will be evaluated annually by the TAC in reviewing designs and making recommendations for channel improvements, channel maintenance and hazard response activities.

### 6.3 RECOMMENDED MONITORING PROGRAM

#### *Water and Sediment Discharge*

The water and sediment discharges of the creek, and their pattern over time, interact with biological and human influences to determine channel morphology. Due to the high degree of variability in Cache Creek discharge from year to year and through each annual cycle, long-term data records are necessary to evaluate statistical relationships and to identify trends.

The monitoring program outlined here is intended to focus on specific needs of the CCRMP. The following data will be collected at the proposed monitoring locations:

**Water Discharge, Continuous** – Continuous creek stage recording gages are located at the Rumsey Bridge and near Yolo. These gages are currently maintained by the USGS, and their data are available in real-time on the respective website for each gage. A gage at the Capay Dam, including a cableway, should be installed and maintained by the County (or by agreement with another agency) as data from this location would significantly assist in understanding the timing and magnitude of flood flows within the CCRMP area. Data from the Capay and Yolo gage sites would provide information at both inflow and outflow boundaries to the study reach only.

**Sediment Discharge, Sampling Program** – In addition to continuous water discharge monitoring, periodic sampling of suspended and bedload sediments, over a range of flow conditions, would improve the available sediment discharge rating curve and should be collected when the TAC has identified a need for additional data in the previous year annual report. Real time discharge data for lower Cache Creek is available on the internet. Sediment transport measurements should be made to develop sediment transport rating curves. Sediment transport measurements (suspended and bedload) should be conducted at the same gage locations as continuous streamflow monitoring (or the closest feasible location) using appropriate techniques following the guidance of the USGS. The TAC should use these measurements to develop sediment transport (bedload and suspended load) rating curves for several locations in the program area at flows determined by the TAC in the prior year annual report.

**Longitudinal Water Surface Elevation Profile Survey** – When a flow at, or exceeding, 10,000 cfs is predicted at the Yolo stream gage, a field crew should be mobilized to survey a water surface elevation profile at no less than eight locations between Capay Dam and Yolo. This survey should be used to calibrate the program hydraulic model. The TAC undertook this in the winter of 2015/16 and 2016/17.

**High Flow Water and Sediment Discharge** – When funding is available, and the TAC has identified a need for data, additional sediment transport measurements should be completed. Monitoring of water and sediment discharge during high flow events requires mobilization of field crews during winter runoff events to measure discharge, suspended sediment, and bed load.

**Bed Material Sampling** – After flow events greater than or equal to 20,000 cfs, the TAC shall complete coarse level channel bed surface pebble counts at approximately one to three locations per reach, to determine grain size distribution. If possible, these pebble counts should be completed during the annual Creek Walk.

Sediment transport measurements (suspended and bedload) should be conducted at the same gage locations as continuous streamflow monitoring (or the closest feasible location) using best available technology according to guidance provided by the USGS (see the following website as an example: [https://water.usgs.gov/osw/techniques/Diplas\\_Kuhnle\\_others.pdf](https://water.usgs.gov/osw/techniques/Diplas_Kuhnle_others.pdf)).

Sediment transport measurements should be conducted to develop sediment transport rating curves for the program that improve with time following guidance on the flow levels for sampling provided by the TAC in the previous years' annual report.

#### *Topography and Channel Form*

Aerial surveying of the creek will be conducted every five years or after a major creek event defined as 20,000 cfs or greater at the Yolo gage. Changes in channel form will be monitored by comparison of aerial topography surveys to prior years. Aerial topography survey data (e.g., LiDAR) may be supplemented with additional field or aerially surveyed cross-sections in areas where increased accuracy is determined to be necessary by the TAC. Aerial survey data will be compiled in Digital Terrain Model (DTM) format (or files compatible with terrain model generation in the County's GIS system) to facilitate updated hydraulic and sediment transport modeling, for use in volumetric comparisons, and for use in design of improvement projects and maintenance activities. Horizontal coordinates will be based on the California Coordinate System, Zone 2. Existing survey control points will be used in the aerial surveys, with annual checks to repaint and reset, where necessary, disturbed control points. Every five years the control net will be checked (resurveyed by the County surveyors or survey contractor) for vertical accuracy to detect variations due to land subsidence.

#### *Riparian Vegetation*

Every five years, the TAC Riparian Biologist shall conduct reconnaissance-level biological survey of lower Cache Creek annually at an appropriate time of the year to convey the maximum amount of useful biological data.

In addition, the TAC Riparian Biologist will conduct a comprehensive riparian habitat survey at least every five years at the scale of the entire CCRMP area (and potentially at the scale of the broader CCAP area is deemed appropriate by the County and the TAC). Such a survey was last

performed in 2016, and standardized survey and analysis methodologies are detailed in the 2017 Technical Studies. The survey should include classification of vegetation using consistent class descriptions) by reach from recent high-resolution aerial photography, preferably from within one year. Vegetation classifications should be verified through ground-truthing and corrected accordingly. Changes in native and non-native vegetative characteristics from previous evaluations, including a discussion of implications for other biological resource elements (wildlife, invertebrates, and fish), should be presented by reach and for the CCRMP area overall, including detailed maps and databases of spatial data collected and analyzed during the survey. The riparian habitat survey may also include additional data, including but not limited to:

1. Percent cover of native or non-native species (may be obtained from permanent monitoring plots if established);
2. Crown height of trees (by age or size class);
3. Vigor (e.g., die-back);
4. Changes in the extent and/or distribution of priority invasive species (or particular species of concern);
5. List of special-status species (plant, animal, invertebrate, or fish) present;
6. Native species recruitment/regeneration;
7. Instances of significant disturbance (e.g., fire, flooding, drought, OHV use) and impacts on biological resources; and
8. Status of previous revegetation or restoration projects, in addition to priority sites for future revegetation or restoration projects.

These measurements will be recorded on maps in a format suitable for incorporation into the County's GIS system. Maps will be produced through a combination of field inspection and use of aerial survey information.

### *Annual Inspections*

At the end of each runoff season (ideally April or May if conditions allow), the TAC will make an annual inspection of the creek (referred to as the "Creek Walk") to document channel conditions. Conditions that will be noted include:

1. Evidence of changes in channel dimensions or bank erosion;
2. Evidence of bed degradation or aggradation;

3. Significant changes in the locations or sizes of bars and other channel features;
4. Degree of channel armoring and bed material imbrication;
5. Vegetation located within the center portion of the channel (within 100 feet of the low flow channel), including type, density, and size;
6. Conditions at bridges along levees and other major infrastructure;
7. Potentially hazardous conditions involving public safety or property damage;
8. General hydraulic condition of the channel based on qualitative comparison with previous years (e.g., restrictions due to vegetative growth, changes in bed form, etc.);
9. General evaluation of channel and bank stability on a reach-by-reach basis; and
10. Identification of areas where vegetation may be getting so thick as to adversely alter flow direction or reduce channel capacity.

### *Flood Monitoring*

Significant channel changes have historically occurred on Cache Creek during major floods. During periods of major floods in which the discharge at Rumsey exceeds 20,000 cfs, more intensive data collection is warranted to collect important data. The YCFCWCD monitors gages during high water events. Depending on access and safety, additional efforts should be considered to conduct monitoring measurements during rising flow periods, peak flows, and recession flow periods.

The Cache Creek channel has historically responded to major floods by adjusting channel form both vertically and laterally. Bank migration, loss of riparian vegetation, damage to bridges and other infrastructures, overbank flooding, and channel incision are problems that occur during large floods.

This section does not prescribe a comprehensive flood management plan, but outlines the participation of the TAC in flood watch activities and a high-flow monitoring program. Such a program can become an integral component of a more comprehensive, county-wide flood management plan. The TAC does not have responsibility or authority for flood hazard response, but is available to participate, on behalf of the County, to monitor and analyze Cache Creek floods. Several elements of the monitoring program described will assist the County in monitoring flow conditions on a real-time basis, and preparing for potential flood conditions.

Observation and measurement of how Cache Creek responds to high-flow events is critical to the CCIP. Understanding how the creek responds during high flows is important for proper creek resource management and maintenance activities. Flood watch activities include monitoring

creek flows, precipitation, and watershed conditions to determine when flood flows are likely to occur in the CCRMP area; mobilizing personnel and equipment to monitor conditions in the area; and coordinating the activities of these personnel.

The County's Office of Emergency Services (OES) has designated the position of TAC Flood Coordinator as a Technical Specialist to the County OES during periods of activation. On an ongoing basis, the TAC identifies a primary and alternate Flood Coordinator.

### *Data Analysis*

Data compilation and analysis will be under the direction of the TAC. Data will be stored in a database integrated with the County's GIS system, and such storage, data formatting, and quality control should be coordinated with the relevant TAC member to the extent possible. Retrieval of data for use by the private sector will be billed at standard rates or by hourly charge for the time spent by County employees. Collection of the data is the first step in assembling the database. However, data checking, compilation, and analysis must also be performed on an ongoing basis to result in useful long-term data. This section describes the procedures for compiling the data into a database system and making preliminary analyses for use by the TAC.

**Water and Sediment Discharge** – Water discharge at continuous gages is computed by means of a stage-discharge rating curve. This curve relates stage in the stream (water surface elevation) to discharge. Changes in the channel at, or in the vicinity of, the gage will result in changes in the rating curve. Streams that are in the process of adjusting to changes in sediment supply and transport rates, like Cache Creek, may require annual adjustments in the rating curve. The rating curve is established and maintained with actual discharge measurements, usually involving measurement of velocity and flow area in segments of the creek's cross-section. To develop a rating curve, multiple measurements are required over a range of discharges; therefore, initial installation of a continuous gage requires many measurements in the first few years to establish a reliable rating curve, and measurement of high flows continues to be important to the accuracy of the rating curve throughout the gage's service life. Data collected by continuous recorders or via telemetry must be checked to eliminate errors. In addition, the gage equipment itself must be periodically checked and maintained to ensure proper operation and to collect recorded data.

Sediment data collection requires field sampling and laboratory analysis. The field sampling work involves collection of suspended and bed sediment samples, organizing and labeling the samples, and transporting samples to a laboratory for analysis. Suspended sediment samples are analyzed for total weight of sediment per unit weight or volume of water, and for gradation of the sediment by size. Bedload samples may be analyzed for weight collected per unit time and for gradation. Laboratory analysis may be performed, as needed, to yield gradation of the collected samples. Bedload transport supplies aggregate to the CCRMP area in the sizes that were historically commercially mined, through 1996. Bedload samples are useful in confirming the ratio of bedload to suspended load transport at various discharges (necessary to compute total load), and to confirm the accuracy of transport functions used in sediment transport modeling. However, at very high flows, bedload sampling may not be practical due to limitations in field



equipment and methods. When possible, as a component of the TAC monitoring of Cache Creek, bedload samples should be taken from the flowing creek and dry bed material samples should be collected in each reach at the time of the annual inspection, for laboratory analysis of gradation. Bedload transport can be calculated from stream properties and bed material size.

**Topography and Channel Form** – Changes in channel topography and form will be determined primarily from Digital Terrain Models (DTM) produced using LiDAR or aerial photogrammetry after peak flows greater than 20,000 cfs, or every five years, whichever occurs first. The DTM modeling will be used to quantify key channel characteristics for comparisons with previous years. In addition, a longitudinal profile of the stream within the entire CCRMP area will be developed from this data and compared to previous years.

The DTM will be used to locate areas of aggradation and degradation in the creek by comparing DTM surface elevations for the current year with that of the previous year. A grid plot of elevation differences will be produced for areas within the channel. Where significant elevation differences (e.g., greater than two feet over areas exceeding one acre) are identified or suspected, the two surfaces will be compared digitally, and a volumetric estimate of aggradation or degradation made. The DTMs will also be used to update the hydraulic model and evaluate hydraulics to identify new areas of concern.

**Riparian Vegetation** – Data generated during riparian vegetation monitoring will be compiled and stored in the County's GIS system. The TAC Riparian Biologist will review monitoring data to determine trends by subreach. Data will be compiled and plotted to illustrate changes in acreage by habitat type over the entire CCRMP area, and changes in specific characteristics by reach. Data comparisons to be tabulated or plotted shall include, but not be limited to, area, percent cover, crown height of trees, number of species present, and level of invasion by non-native species.

**Annual Inspection** – Maps and notes from annual inspections will be stored in an appropriate format. Additional analysis of annual inspection results is not required. The observations of the annual inspections will be supplemented by analysis of digital terrain model data for the purpose of identifying and quantifying changes in the channel.

**Flood Monitoring** – Data from flood monitoring should be reported in each year's annual report and be compiled, stored, and analyzed as described for other water and sediment discharge measurements.

#### **6.4 HYDRAULIC AND SEDIMENT TRANSPORT MODELING**

The 1995 Technical Studies relied on a hydraulic (HEC-2) and sediment transport (HEC-6) model to evaluate hydraulic and sediment transport conditions throughout lower Cache Creek channel. In 2001/02 and again in 2006, HEC-2 modeling was conducted on a portion of the lower creek, from CR 94B to the I-5 bridge. The 2017 Technical Studies contain new HEC-RAS 2-D modeling to evaluate current hydraulic and sediment transport conditions throughout lower Cache Creek based on data collected since 1996. As changes occur in the creek, additional modeling will be

required to maintain sufficiently accurate quantitative tools for making management decisions on the creek. Modeling is necessary both to support long-term management decisions and for use in the design of specific improvement projects or maintenance activities. Topics which can be addressed using hydraulic modeling include flood flow capacity, bridge scour potential, channel stability, sediment transport characteristics, channel hydraulic characteristics (e.g., width, average velocity, and depth at two-year flow frequency), and location of hydraulic constrictions or controls. As monitoring data are collected, the ability of hydraulic models to duplicate and predict observed conditions will improve.

The TAC shall regularly update the program hydraulic model and identify locations where the 100-year flood flow is no longer contained in the channel or has otherwise changed significantly. The TAC shall coordinate with interested parties to promote awareness of changes in flood flow capacity in Cache Creek over time. Flood flow capacity associated with Cache Creek near the City of Woodland shall not be exacerbated by in-channel activities conducted under either the CCRMP or the CCIP.

The use of hydraulic modeling in the future will be at the discretion of the TAC, as necessary to evaluate significant changes in the creek's morphology (including changes in channel roughness due to vegetation and bar and terrace formation) or evaluate specific projects. The TAC will be responsible for maintaining a current version of the hydraulic model for the entire CCRMP area. The hydraulic model will be made available for landowners and/or their consulting engineers for use in the design of channel improvement projects.

## **6.5 PROJECT PERFORMANCE EVALUATION**

The TAC will be responsible for evaluating and commenting on the performance of proposed improvement projects in the creek. Projects may be evaluated using normal annual monitoring data, or additional data may be collected for evaluation of specific projects. The TAC will include the costs for any applicable monitoring requirements in the estimated budget for review of proposed improvement projects. These costs shall be borne by each individual project applicant, unless the County determines the TAC's review will result in program-wide value.

## **6.6 ANNUAL MONITORING REPORT**

The TAC will produce an annual report in January of each year for the Board of Supervisors that describes the data collected and analysis conducted as part of the monitoring program. In 2013, the annual reporting period was changed from the calendar year (January 1 through December 31) to the water year (October 1 through September 30). This change was made to allow the TAC adequate time to respond to and analyze water events that may occur towards the end of the calendar year without delaying the publication of the annual report.

The annual report serves as a regular opportunity for the TAC to step back and take a larger perspective in looking at both the creek and at the CCRMP with a critical eye for improvement. Although this is a complex and ambitious project, it is designed to be adaptive, so that monitoring

requirements and management techniques can appropriately address the ever-changing creek system environment. In order to be effective, the annual report should not be seen as a chronicle of recent success or a lackluster recitation of dry data, but must reflect thoughtful self-evaluation. Is information being used? Are other forms of monitoring needed? Is there unnecessary or less-than-useful monitoring that can be eliminated or consolidated? Given the limited budget of the CCIP, are activities being carried out in a cost-effective manner and are the most important priorities being emphasized? Are objectives being met? Are the policy and technical assumptions still valid? Fundamental questions such as these should underlie the annual report, so that recommendations made by the TAC take into account the long-term benefit of both the creek and the community. Review of the report by the Board of Supervisors will provide the necessary policy direction, as well as provide an ongoing public forum for focusing the County's attention on the unique issues that concern Cache Creek. The format of the report will be as follows:

1. Brief description of annual monitoring activities, changes from previous years, and costs. Summary of significant findings, problems, and needs for upcoming year;
2. Summary of annual water and sediment discharge data and notable variations from previous years or period of record;
3. Summary of changes in channel topography and form, including identification of problem areas and summary of desirable and undesirable trends, including any areas where existing flood flow capacity has been significantly reduced;
4. Estimate of location and volume of annual sediment replenishment;
5. Summary of changes in biological resources, with a focus on both native and non-native vegetation;
6. Summary of flood monitoring results, if applicable;
7. Evaluation of bed and bank stability in the CCRMP area, considering data summarized above. A description of the relationship of problem areas to recommended improvement projects and maintenance activities (see Chapter 2);
8. Recommendations for changes in prioritization of channel improvement projects; and
9. Recommendations for changes in monitoring program in coming year.

## REFERENCES

1. *Technical Studies and Recommendations for the Lower Cache Creek Resource Management Plan*, prepared for the Yolo County Community Development Agency, October 1995.
2. *2017 Technical Studies and 20-Year Retrospective for the Cache Creek Area Plan*, prepared for the Yolo County Administrator's Office, March 17, 2017.
3. Cache Creek Annual Status Reports (1998, 1999, 2006, 2010 through 2016)
4. *2006 Cache Creek Status Report and Trend Analysis, 1996-2006*, prepared for Yolo County Planning, Resources, and Public Works Department, July 25, 2006.
5. *Cache Creek Area Plan Program Audit and Management Tools*, September 22, 2011.

## ACKNOWLEDGEMENTS

### 2019 Update

The Cache Creek Area Plan (CCAP) is a rivershed management plan that sets policy for and regulates off-channel surface mining along, as well as in-channel restoration and maintenance within, Lower Cache Creek. The program is based on the concept of adaptive management, and relies on on-going detailed monitoring, analysis, and re-evaluation. A comprehensive ten-year review is mandatory under the program. The 2019 CCAP Update constitutes the second mandatory ten-year program review since the program was put into effect in 1996. The purpose of the Update was to analyze trends and adjust the program to avoid unexpected effects on Cache Creek resources focusing on changing in creek conditions; analysis of collected data; and new regulatory requirements.

### 2019 Yolo County Board of Supervisors

Don Saylor	District 2 (Chair)
Gary Sandy	District 3 (Vice-Chair)
Oscar Villegas	District 1
Jim Provenza	District 4
Duane Chamberlain	District 5

### 2019 Yolo County Planning Commission

Patrick Reynolds	District 4 (Chair)
Darin Hall	District 1 (Vice-Chair)
Elisabeth Dubin	District 2
Chuck Dudley	District 3
Amon Muller	District 5
Trini Campbell	At Large
Marcia Gibbs	At Large

### 2019 Key Members of Staff

Patrick Blacklock	County Administrative Officer
Elisa Sabatini	Manager of Natural Resources
Casey Liebler	Natural Resources Program Coordinator
Stephanie Cormier	Principal Planner
Jeff Anderson	Senior Parks Planner
Ronald Miller	Senior Mining Planner

Project management was provided by Heidi Tschudin of TSCHUDIN CONSULTING GROUP, under contract to the County as an extension of staff.

The primary technical basis for this Update was provided by the *2017 Technical Studies and 20-Year Retrospective for the Cache Creek Area Plan* (March 2017). Andrew Rayburn, CERP, Ph.D., Paul Frank, P.E., CED, and Mark Tompkins, P.E., Ph.D. were the primary authors of this report.

Funding for this project was provided by CEMEX, Granite Construction Company, Syar Industries, and Teichert Aggregates.

### **1996 CCIP**

Cache Creek has historically been a dynamic system, influenced by high flood flows, large sediment supplies, and steep slopes in the upper watershed. These dynamics have been exaggerated by the multiple demands placed upon the creek in the past few decades, as mining, agriculture, and infrastructure have intruded into the floodplain. As a result, the creek has become increasingly degraded and imbalanced. Left on its own, the creek will eventually heal itself and adjust to the artificial constraints placed upon it, but the healing would take decades and may threaten property and lives in the process. Instead, the CCIP provides a program for managing riparian resources in a responsible and sensitive manner, that allows the creek to establish a new, more natural equilibrium. As the process of reshaping the channel and restoring in-stream habitat progresses, the creek will respond to these changes, requiring adjustments in the CCIP to account for these changes. This process will be guided by professional judgement, science, and an extensive monitoring program to keep abreast of Cache Creek as it evolves. The elimination of commercial in-stream mining is an important first step in solving the serious concerns currently associated with the creek, but other problems will continue. In order to properly manage riparian resources, the County must take a larger perspective and look at all of the components of the creek as an integrated system. The CCIP is a broad-based and flexible program, that provides the County with such a perspective, and the means, for enhancing the precious natural resources of Cache Creek.

### **1996 Yolo County Board of Supervisors**

Mike McGowan	District 1
Helen Thomson	District 2
Tom Stallard	District 3
Betsy Marchand	District 4
Frank Sieferman	District 5

### **1996 Yolo County Planning Commission**

Bob Heringer	District 1
Barbara Webster	District 2
Harry Walker	District 3
Jim Gray	District 4
Henry Rodegerts	District 5
Nancy Lea	At Large
Kent Lang	At Large

### **1996 Key Members of Staff**

Roy Pederson	County Administrative Officer
David Morrison	Resource Management Coordinator

Project management was provided by Heidi Tschudin of TSCHUDIN CONSULTING GROUP, under contract to the County as an extension of staff.

The primary technical basis for this Plan was provided by the *Technical Studies and Recommendations for the Lower Cache Creek Resource Management Plan* (October, 1995). Kevin O'Dea of Baseline Environmental Consulting was the primary author of this report, with assistance from Bob MacArthur of Northwest Hydraulic Consultants, Inc. The County is grateful for their involvement in this process.

Funding for this project was provided by R.C. Collet, Solano Concrete Company, Syar Industries, and Teichert Aggregates.



To find out more about this Program, or the process through which it was developed and updated, please contact:

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**YOLO COUNTY  
CACHE CREEK AREA PLAN  
ORDINANCES**

***CACHE CREEK AREA PLAN IN-CHANNEL ORDINANCE  
OFF-CHANNEL SURFACE MINING ORDINANCE  
SURFACE MINING RECLAMATION ORDINANCE  
GRAVEL MINING FEE ORDINANCE***



**TITLE 10, CHAPTER 3  
CACHE CREEK AREA PLAN IN-CHANNEL ORDINANCE**

The current version of this ordinance can be accessed online via the following link:

<https://codelibrary.amlegal.com/codes/yolocounty/latest/yolo/0-0-0-17054>

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**TITLE 10, CHAPTER 4  
OFF-CHANNEL SURFACE MINING ORDINANCE**

The current version of this ordinance can be accessed online via the following link:

<https://codelibrary.amlegal.com/codes/yolocounty/latest/yolo/0-0-0-17331>

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**TITLE 10, CHAPTER 5  
SURFACE MINING RECLAMATION ORDINANCE**

The current version of this ordinance can be accessed online via the following link:

<https://codelibrary.amlegal.com/codes/yolocounty/latest/yolo/0-0-0-17871>

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**TITLE 10, CHAPTER 11  
GRAVEL MINING FEE ORDINANCE**

The current version of this ordinance can be accessed online via the following link:

<https://codelibrary.amlegal.com/codes/yolocounty/latest/yolo/0-0-0-22187>