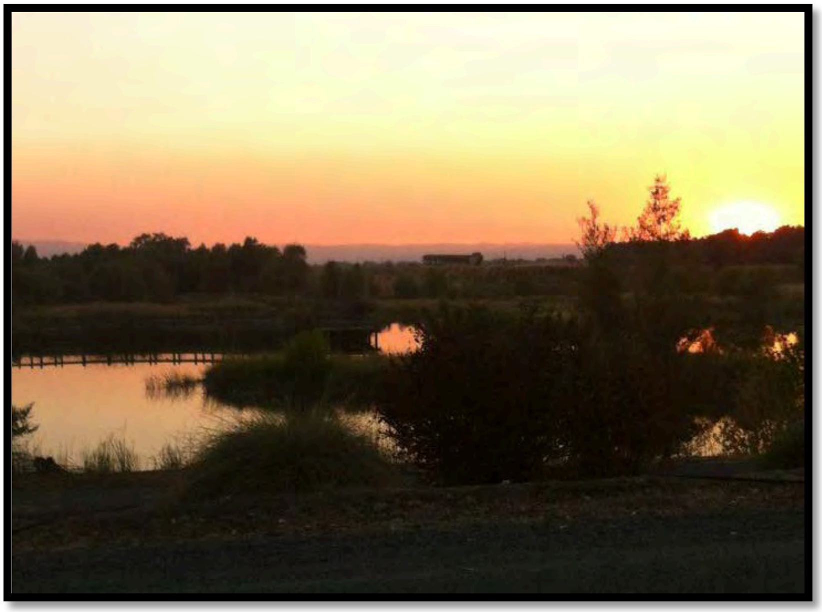
2013 CACHE CREEK
ANNUAL STATUS REPORT



Sunset at the Cache Creek Nature Preserve

For the period of

October 1, 2012 to September 30, 2013

Prepared by:

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TABLE OF CONTENTS

FIGURES

TABLES

CHAPTER 1 - EXECUTIVE SUMMARY

1.1 PURPOSE OF THE REPORT

The Cache Creek Resources Management Plan (CCRMP), adopted August 20, 1996 and amended August 15, 2002, eliminated in-channel commercial mining (mining inside of the actual creek channel) and established an improvement program for implementing ongoing projects to improve channel stability and restore riparian habitat. The CCRMP provides a policy framework for restoration of 14.5 miles of lower Cache Creek and includes specific implementation standards. The Cache Creek Improvement Program (CCIP) is the implementation plan for the CCRMP and identifies specific categories of projects that include: bank stabilization, channel maintenance, revegetation, and habitat restoration.

As a management plan that recognizes Cache Creek and its resources as a dynamic system, the CCRMP is not a static vision of management of the creek. The program is designed to evolve and adapt in response to new creek conditions and improved understanding of creek processes.

Information gathering and landowner participation are critical components in the implementation of the CCRMP and CCIP. The monitoring mandated by the CCIP provides data on stream flow, water quality, erosion, and vegetation that guides creek management recommendations made by the three-member Technical Advisory Committee (TAC). The requirements for this annual monitoring report are contained in the CCIP (Chapter 6).

The CCIP requires that the TAC complete a physical inspection of Cache Creek each year at the end of the runoff season (p. 36). This annual inspection is frequently referred to as the “Creek Walk”. The CCIP also provides the following description of the role of the TAC in the production of this annual report and clearly identifies the report’s intended purpose.

> “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. 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 riparian environment. In order to be effective, the annual report should not be seen as a chronicle of success or a lackluster recitation of dry data, 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."

-Cache Creek Improvement Program, page 41

1.2 ACCOMPLISHMENTS

Yolo County has implemented an annual monitoring program since 1997. A number of activities were undertaken or completed in 2013 that implement the CCRMP and CCIP. These activities included monitoring work, public meetings, permitting, and program activities. Brief descriptions of major activities are given here:

1. The **annual reporting period** has been changed from the calendar year (January 1 to December 31) to the **water year**. The water year begins on October 1st and ends on the following September 30th.

2. Four (4) public **Technical Advisory Committee (TAC) meetings** were held during 2013. TAC meetings were attended by TAC members, County staff, members of various agencies, stakeholders, and the public.

3. County staff continued the process of seeking **reauthorization of general permits** required for the efficient implementation of the CCRMP, including a Section 404 Discharge Permit from the US Army Corps of Engineers, a Streambed Alteration Agreement (Section 1600) from the California Department of Fish and Wildlife, and a Section 401 Water Quality Certification from the Central Valley Regional Water Quality Control Board. Although the process of securing reauthorizations from regulatory agencies continues to be challenging, County staff anticipates that the reauthorizations will be secured by spring of 2014. Further information can be found in Chapter 7.

4. The TAC conducted its **2013 Creek Walk on May 8, 9, and 10th**. The Creek Walk is the annual physical inspection of the creek to document channel conditions, as required by the CCIP (p. 36). Ten or more participants walked each day and covered the length of CCRMP area over the three day period. Participants included the TAC, gravel producers, community stakeholders, and County staff.

5. Natural Resources staff compiled a list of all of the **TAC's past recommendations**, from program inception to 2012. This historical record is attached as Appendix C.

6. The Natural Resources Division began using the **County's on-line system to create agenda packets, take meeting notes, and provide meeting minutes** in 2013, saving energy and paper resources. Moving the program even closer to being "paperless", the TAC used iPads preloaded with previous years' observations and CCIP reference materials to document conditions observed on the 2013 Creek Walk and to produce draft Creek Walk notes in a digital format linked to a spatial Geographic Information System (GIS).

7. The Natural Resources Division worked closely with Planning and Public Works (PPW) staff to compare observations from the required **annual mining inspections** by PPW staff to the observations made on the Creek Walk inspection to provide early identification of potential problem areas.

8. **HEC-RAS model development** for the entire CCRMP continues. The TAC Geomorphologist has been collaborating with the California Department of Water Resources and Wood Rodgers in building this model which is expected to be completed by January 2014.

9. There was **one (1) surface water quality sampling** event in the 2013 water year. The samples were collected on November 30, 2012 during the first flush on Cache Creek that peaked at 5,810 cfs at Yolo and 10,739 cfs at Rumsey. Samples collected at Capay Bridge, Stephens Bridge, upstream of Gordon Slough, I-5 bridge, and in Gordon Slough were analyzed for a suite of water quality constituents. The results are discussed in detail in Chapter 3.

10. The Yolo County Water Resources Association developed a **Water Resources Information Database (WRID)**. The WRID became available for use by the TAC hydraulic engineer and County staff in 2013. The TAC hydraulic engineer and County staff completed training on the WRID in 2013 that enabled them to both query and add data to the WRID. Most of the historical CCIP surface water quality data was added to the WRID in 2013.

11. The County contracted with Dr. Darrel Slotton (UC Davis) in 2011 to **study ambient mercury levels** in fish and invertebrates in both Cache Creek and several off-channel mining pits. The results of this study were provided to the County in 2013 and are available on the Natural Resources webpage

12. County staff, the TAC, and various stakeholders **reviewed current monitoring and programmatic protocols**. Many of the recommendations included in this annual report are the result of this effort.

13. In 2013 the County's Natural Resources Program Coordinator was appointed the chair of the Cache Creek Conservancy's Projects Committee showing the Conservancy's

renewed commitment to incorporate TAC recommendations into its project development processes.

14. The County continued **partnerships** with the Yolo County Sheriff's Department and Cache Creek Conservancy to reduce problems associated with illegal Off-Highway Vehicle use in Cache Creek.

1.3 SUMMARY OF SIGNIFICANT FINDINGS

Based on monitoring, analysis, regulatory requirements, and professional experience the TAC has made the following findings. This document makes reference to "river miles" to describe the physical location of observations and recommendations. A map of Cache Creek showing river mile markers is provided as Appendix A.

1.3.1 Hydrologic and Water Quality Findings

Chapter 3 of the CCRMP (p. 44, 3.4-3) describes surface water quality testing measures. The information collected as a result of these measures will assist in habitat restoration efforts and allows the County to monitor water quality trends within the planning area.

Hydrologic and hydraulic conditions in 2013 were consistent with the trends of previous years. This can be attributed to the relatively dry conditions that persisted in 2013. In 2012, total and dissolved mercury concentrations were ten times greater than concentrations measured in recent years. In 2013, dissolved mercury concentration approximately doubled again from the 2012 concentrations at the Gordon Slough and I-5 Bridge sites, and total mercury concentration approximately doubled again from 2012 concentrations at the Capay Bridge, Gordon Slough, and I-5 Bridge sites. Total mercury concentrations at all sites remained below the California Toxics Rule (CTR) threshold for mercury of 0.05 micrograms per liter. Mercury and other water quality data are discussed in further detail in Chapter 3.

The TAC also investigated the risk of water quality degradation associated with the "vehicle boneyard" (RM 26.6, near the town of Capay) in 2013 based on the proximity of the site to the right bank of Cache Creek. The creek bank has not moved significantly since 2005 and remains over 100 feet away from the vehicle boneyard. This analysis and its results are also discussed in greater detail in Chapter 3.

1.3.2 Geomorphology Findings

1. The 2013 annual total transport rate ranks (in occurrence frequency) as 44 percent in the record since 2005, which makes it an event of about average occurrence. But, because of the extreme differences in transport from year to year, this moderate occurrence event carried less than 3 percent of the total sediment transport in the last nine years. This suggests that there would be relatively little erosion and deposition, and that changes in channel morphology would be relatively minor.

2. There were no significant changes in channel conditions near the bridges.

3. RM 23.2: There is a possible inadequate setback (less than 200 feet) between the mining operator levee and the active channel. This item has been referred to the Off-Channel Mining Plan (OCMP) Administrator for follow-up.

4. RM 19.8: The berm, with erosion at the toe, is susceptible to partial failure. The top edge of the berm appears to be only 30-40 feet from a conveyor belt and road. Berm failure has the potential to cause damage to the conveyor and road.

5. RM 20.3 - 20.8 contains a mid-channel bar which is causing pressure on south bank.

1.3.3 Biological Resource Findings

There were no new significant findings related to biological resources to report. The spread and control of target invasive species continues to be an issue of concern. On-going monitoring of vegetation growth that may eventually interfere with flood flows, such as the I-505 undercrossing, remains important but no maintenance intervention appears necessary at this time. The loss and damage to mature cottonwood trees by beavers in the CCRMP area should be monitored to determine if some protection measures are appropriate.

1.4 SUMMARY OF 2013 RECOMMENDATIONS

There are a number of new recommendations identified below. Recommendations from the 2011 and 2012 Cache Creek Annual Status Reports also remain applicable. If accepted by the Yolo County Board of Supervisors, the 2013 recommendations will be merged with previous year's recommendations and the TAC will be tasked with prioritizing all the recommendations for review and/or implementation going forward. Chapter 6 of this report provides a complete listing of the 2011 and 2012 TAC recommendations as well as the implementation status of each recommendation. A complete compilation of all TAC recommendations from 1998 to present is attached as Appendix C.

1.4.1 Hydrologic and Water Quality Recommendations

Because conditions in 2013 were consistent with previous years' trends, hydrologic and hydraulic recommendations for 2013 focus mostly on observations made during the 2013 Creek Walk:

1. The increased mercury concentrations detected in the 2013 surface water quality sampling should be communicated to the California Department of Water Resources (DWR) and US Geological Survey (USGS) staff currently working on mercury studies in the Cache Creek Watershed (as was done in the previous year). In addition, because total mercury concentrations have remained closer to the CTR threshold of 0.05 ug/L for

two consecutive years, the CCIP should initiate more extensive coordination with other entities assessing broader mercury issues in the Cache Creek watershed, including DWR, the Regional Water Quality Control Board (RWQCB), and the Bureau of Land Management (BLM) to determine if the concentrations detected in the previous two years are pertinent to the broader on-going mercury studies. In addition, the TAC Hydraulic Engineer may request additional surface water quality samples if the results of the "first flush" sampling warrant further exploration or confirmation.

2. More systematic methods were used in 2013 to guide water quality observations made during the 2013 Creek Walk, including condition assessments on water quality concerns documented in previous creek walks (e.g. abandoned car bodies, storage drums, drainage pipes, eroding infrastructure, tributaries, etc.). The catalogue of potential water quality impacts initiated in 2013 should be refined in 2014 to include:

    a. Source assessment of the pond drain pipe in the Madison reach (RM 22.0)
    b. Source assessment of the perched drain pipe in the Guesisosi reach (RM 20.35)
    c. Source and contaminant assessments for the vehicles and perched drain pipes in the Dunnigan Hills reach (multiple, RM 16.15 – 18.9)
    d. Source and contaminant assessments for the vehicle (RM 15.6), storage drum (RM 15.1), and perched drain pipe in the Hoppin reach (RM 13.5)

1.4.2 Geomorphology Recommendations[1]

If warranted, the landowner will be notified of the bank or channel condition described below.

1. Monitor for bank retreat at the following locations:
    a. RM 26.9 (south [right] bank)
    b. RM 26.4 (south bank)
    c. RM 26.0 (south bank)
    d. RM 25.4 -25.5 (south bank)
    e. RM 22.0 (north bank)
    f. RM 21.6 (north bank)
    g. RM 20.4 (south bank)
    h. RM 19.8 (south bank)
    i. RM 18.8-18.7 (south bank)
    j. RM18.2-18.0 (north bank)
    k. RM 15.4 (south bank)
    l. RM 15.0 (beneficial deposition on both banks)
    m. RM 14.3 (north bank)

[1] "Monitor" means that it is an area of concern that does not require action at this time.
"Observe" means that is an area of interest, including areas of positive changes. "Positive changes" include changes such as the creation of new floodplain through deposition and the renewal of bank swallow habitat through bank erosion.

2. Make observations at the following locations:
    a. RM 21.8 (south bank)
    b. RM 20.4 (potential for bar skimming) (mid-channel)
    c. RM 17.8 (north bank)
    d. RM 11.6 (south bank)

3. RM 11.7 (upstream from Huff's corner on north side): remove large bar to reduce erosive pressure on bank

4. Monitor levee erosion on north bank at RM 23.0-22.8

5. RM 23.2 (north bank): confirm existing and required setback distances. This item has been referred to the OCMP Administrator for follow-up.

6. RM 20.4 and RM 19.8: erosion at the toe of the embankment on south bank; property owner should be encouraged to remedy.

7. Remove berm/cement barrier at Correll-Rodgers (RM 14-13.8 within Correll-Rodgers on south side of creek) (low priority)

8. Mid-channel bars have formed in selected areas. Bar-skimming for channel maintenance is possible in the following locations:
    a. Near RM 26.1
    b. Near RM 25.5
    c. Near RM 25.0
    d. Near RM 21.6 (currently low priority)
    e. Near RM 20.3-20.8 (High potential and benefits)

1.4.3 Biological Resource Recommendations

New recommendations related to biological resources identified in 2013 relate to opportunities to increase surface water flows to sustain riparian vegetation and the need to monitor the effects of beavers on mature trees in the project reach.

1. Explore opportunities to increase surface water flows in Cache Creek through the CCRMP area to improve conditions for establishment and sustaining native freshwater marsh and riparian vegetation. The lack of available surface water is a major limiting factor in some project reaches, particularly the Hungry Hollow, Rio Jesus, and portions of the Madison and Guesisosi Reaches. These reaches are "losing" reaches (inflow to the reach of the river is greater than outflow) but upstream diversion, annual rainfall, and flows in Cache Creek influence where, and to what extent, these reaches dry out. This recommendation includes coordination with the Yolo County Flood Control and Water Conservation District for available, unused tailwater that could be diverted by the

District back into Cache Creek.

2. Continued monitoring of tree loss and damage by beavers in the CCRMP area should be provided as part of future Creek Walks to determine if intervention is appropriate through protection of tree trunks at selected locations. Loss of mature cottonwoods can lead to a substantial reduction in habitat values where existing tree canopy is limited, and should be a priority for protection if intervention is considered appropriate. The Cache Creek Conservancy has installed trunk protection on many of the riparian trees at the Cache Creek Nature Preserve, and a partnership between the County, private landowners and the CCC to accomplish this intervention is recommended.

CHAPTER 2 - ANNUAL MONITORING REPORT

This section describes the data collected and analysis conducted as part of the annual monitoring program. The TAC provides recommendations below based on data and trend analysis, and field observations. The CCRMP and CCIP recommendations are designed to be adaptive, so that monitoring requirements and management techniques can appropriately address the ever-changing riparian environment.

This annual report uses the monitoring data collected, critical analyses of those data, and TAC collaboration to evaluate the program objectives, methods, and results. Where previously-specified monitoring, technical assumptions, or policy guidelines are no longer appropriate, changes are recommended; and monitoring priorities are critically evaluated in order to maximize efficiency. The recommendations made by the TAC take into account the long-term benefit of both the creek and the community.

This section includes brief descriptions of annual monitoring activities, including results from previous years, review of in-channel Flood Hazard Development Permits (FHDPs), review of habitat restoration proposals, and changes from previous years.

2.1 TAC REVIEW OF PROJECTS AND PROPOSALS

2.1.1 Flood Hazard Development Permits

The TAC did not review any flood hazard development permits in 2013.

2.1.2 Restoration Proposals

The TAC Biologist worked with staff from the County, Cache Creek Conservancy (CCC), and Granite in evaluating options for possible tree plantings on the 115.52 acre Granite Woodland Reiff site. Granite is considering establishing a conservation easement over the site to serve as mitigation for loss of Swainson's hawk foraging habitat on another of their properties. And the County is interested in using a portion of the site as mitigation for required tree replacement on road improvements undertaken by the Department of Public Works. Conceptual plans for mitigation tree plantings were prepared with assistance from staff of the CCC, focusing on installing trees in the vicinity of a future parking area to be part of the future Creek Trail and along the eastern boundary of the site. At the request of the TAC Biologist, the feasibility of installing tree mitigation plantings along the lower terrace of Cache Creek was explored to provide riparian habitat enhancement and improve connectivity between existing stands of woody trees and shrubs along the edge of the low flow channel. Challenges include securing a short-term supply of temporary irrigation water during establishment of planted trees and ensuring that the mitigation plantings don't conflict with the goal of Granite to maintain suitable foraging habitat for Swainson's hawk on the property. These appear achievable based on the preliminary review and revised schematic plans.

2.1.3 Other Proposals

The TAC Biologist worked with County staff in evaluating the adequacy of the updated reclamation plan at the 132.8-acre Woodland Plant site prepared by Teichert Aggregates. The updated reclamation plan was prepared to meet condition 17 of the Schwarzgruber conditional use permit (CUP ZF#2011-0035), which calls for an updated reclamation plan, consistent with Yolo County's Cache Creek Area Plan. A draft updated Reclamation Plan was reviewed by the TAC Biologist and comments provided regarding adequacy of habitat restoration, performance standards and success criteria.

The TAC Hydraulic Engineer worked with County staff to provide input and recommendations on Teichert's Application for Minor Modification to Temporarily Suspend Water Quality and Quantity Monitoring in 2013. This application was submitted for their Esparto facility, which became "idle" in January 2010. The TAC Hydraulic Engineer determined that the suspension of monitoring at the Teichert Esparto site would not pose any significant problems with respect to water quality or groundwater conditions in the Cache Creek Improvement Program (CCIP) area provided that "Conditions of Approval" regarding recent detections of metals in monitoring well M1 at the site and resumption of monitoring at the site if CCIP surface water quality monitoring detects constituents of concern that could reasonably be attributed to the Teichert Esparto site were followed.

2.2 CHANGES FROM PREVIOUS YEARS

The only significant water quality change from previous years was that total and dissolved mercury concentrations approximately doubled (compared to 2012) at the Capay Bridge, Gordon Slough, and I-5 Bridge sites during surface water quality sampling. Further discussion and recommendations are provided in Chapter 3.

In 2013 there were no significant changes in channel geomorphology. This was in large part due to the fact that the total sediment transport in 2013 was less than three (3) percent of the total sediment load (over the past 9 years).

There were also no significant changes in the condition of vegetation observed in the CCRMP area based on the field reconnaissance survey conducted as part of the 2012 Creek Walk. Indications are that invasive white-top perennial pepperweed (*Lepidium latifolium*) is spreading through the riparian habitat in the lower to mid-reaches of the CCRMP area. Loss and damage to mature cottonwoods by beavers also appears to be an increasing problem that requires continuing monitoring and possibly preventative measures in the future.

2.3 RECOMMENDED CHANGES TO MONITORING PROGRAM

This section includes recommendations for changes in the monitoring program in the coming year to ensure effectiveness and minimize cost, including recommendations for periodic updates and refinements of existing protocols, and recommended changes in the intensity and location of data collection activities as the channel adjusts over time.

2.3.1 Annual Reporting Period

The annual reporting period has been changed from the calendar year (January 1 to December 31) to the water year. The water year begins on October 1 and ends on the following September 30th. The reporting period was changed to allow the TAC adequate time to respond to and analyze any water events that may occur towards the end of the calendar year without delaying the publication of the annual report. This annual report covers the period from October 1, 2012 to September 30, 2013.

2.3.2 Ambient Mercury Testing Protocols (Under Development)

In 2011, the County contracted with Dr. Darrel Slotton (UC Davis) to study ambient mercury levels in fish and invertebrates in both Cache Creek and several off-channel mining pits. The results of this study were provided to the County in 2013 and are available on the Natural Resources webpage. The data collected and published establish a “baseline” for existing mercury conditions in Cache Creek and several off-channel mining pits. The baseline conditions are then used for comparative analysis in future mercury testing of off-channel pit lakes as required by the Off-Channel Mining Plan. The information contained in this report will be used to create a set of water quality testing protocols for off-channel pit lakes in 2014.

2.3.3 Recommended Changes to Water Monitoring Protocols

In 2012, the TAC Hydraulic Engineer recommended changes to the Water Monitoring Protocols that included a reduction in sampling frequency from three times per year to once per year (with a provision for additional sampling if unexpected water quality constituents are detected) and a reduction in sampling sites from five to three.

Review of surface water monitoring protocols continued in 2013, and a “first flush” sampling threshold (i.e. the flow level in Cache Creek each water year at which water quality sampling should be conducted) was established based on a review of hydrology and water quality sampling completed in previous years that suggested first flush conditions (i.e. significant surface and tributary runoff to Cache Creek and sediment transport in Cache Creek) are likely to occur when the forecast for the Rumsey streamflow measurement site[2] exceeds 1,000 cfs for the first time each water year. Therefore, surface water quality sampling should be initiated when this occurs. In addition, because total and dissolved mercury concentrations in 2013 have increased significantly each of the past two years, the TAC Hydraulic Engineer recommends initiation of extensive coordination with other entities assessing broader mercury issues in the Cache Creek watershed, including DWR, the Regional Water Quality Control Board (RWQCB),

[2] http://water.weather.gov/ahps2/hydrograph.php?wfo=sto&gage=rmsc1

and the Bureau of Land Management (BLM) to determine if the concentrations detected in the previous two years are pertinent to the broader on-going mercury studies. In addition, the TAC Hydraulic Engineer may request additional surface water quality sampling if the results of the "first flush" sampling warrant further exploration/confirmation.

2.3.4 Methodology for Annual Vegetation Monitoring

Over the years there have been numerous recommendations regarding the methodology that should be used to complete the annual vegetation survey (CCIP, p.33). In some years it has been recommended that the annual vegetation monitoring be completed using the Andregg Transects, and in other years, it is recommended that a comprehensive vegetation survey be completed using data from aerial surveys. During the TAC's review of the historical recommendations it was determined that the best method going forward is to use the data from aerial surveys for a CCRMP-wide vegetation survey and then use the Andregg Transects as verification points to be checked in the field during the annual creek inspection.

CHAPTER 3 – HYDROLOGY

3.1 WATER QUALITY

The CCRMP requires water quality sampling at least once per year at the upstream and downstream ends of the CCRMP area during the "first flush" flow event (p. 44, 3.4-3). Because there were only two relatively small peak flows in water year 2013, only one sampling event occurred in 2013. There were three sampling events in water year 2011 and one in water year 2012. The 2013 sampling event occurred on November 30, 2012, which coincided with the first flush as measured at both the Yolo and Rumsey streamflow gage sites. Water quality sampling was not conducted at peak flow or base flow conditions in 2013, as per the surface water quality sampling protocols recommended in the 2012 annual report and adopted by the Board of Supervisors.

The CCAP program continues to use the services of the Yolo County Flood Control and Water Conservation District, under the supervision of the TAC Hydraulic Engineer, to conduct the surface water quality monitoring as described on pg. 44-45 of the CCRMP. The program's water quality data is now included in the Water Resources Information Database (WRID). For more information about the WRID, see Chapter 7, pg 52. Surface water data is coded and categorized in the WRID as follows:

Value Map

Source Value	Destination Value
Capay Bridge	CC10
Upstream of Gordon Slough	CC11
Gordon Slough	CC12
Stevens Bridge	CC13
Nature Preserve Creek	CC20
I-5 Bridge	CC14

Figure 1: Key to water quality data in the Water Resources Information Database

The 2011 Cache Creek Annual Status Report summarized water quality trends from 1999 through 2011 for constituents that have been detected in Cache Creek, and the 2012 annual report summarized significant differences from these trends that were observed in 2012. Notable water quality trends include no detection of herbicides or pesticides since 1999, periodic low dissolved oxygen in Gordon Slough, elevated summer temperatures, highly variable ammonia nitrogen concentrations with some historical exceedances of standards and a possible source near Gordon

Slough, slightly elevated mineral nitrogen concentrations, orthophosphate phosphorus concentrations that exceeded standards in Gordon Slough in 2009-2011, high background levels of boron, abundant coliforms, and high turbidity during high flows.

This report describes trends and significant changes in water quality observed in the 2013 water quality monitoring data. At the five sites (Capay Bridge, Stephens Bridge, upstream of Gordon Slough, I-5 bridge, and in Gordon Slough) sampled on November 30, 2013, pH, electrical conductivity (EC), temperature, color, odor, total dissolved solids (TDS), total suspended solids (TSS), turbidity, ammonia nitrogen, nitrate nitrogen, nitrite nitrogen, and total kjeldahl nitrogen remained in the ranges measured in previous years and did not exceed any recommended contaminant limits. In addition, orthophosphate phosphorus, total petroleum hydrocarbons as diesel, and total petroleum hydrocarbons as gasoline were not detected in 2013.

3.1.1 Boron

As in previous years, Boron (a naturally occurring contaminant in the watershed) continued to be present in 2013 in concentrations above US EPA drinking water standards and in a range that might be harmful to plants.

3.1.2 Fecal Coliforms

Similarly, fecal coliforms continue to exceed the recommended range for swimming contact and total coliforms remain relatively high. The most likely source of total and fecal coliform bacteria in Cache Creek is fecal material from the intestinal tracts of wildlife, livestock, pets, or humans in the watershed. Fecal coliform bacteria multiply rapidly after introduction, especially during warm, low flow summer conditions. Data from recent surface water quality sampling in Cache Creek indicates high variability and generally high concentrations of fecal and total coliforms, with concentrations typically increasing downstream and Gordon Slough contributing significant coliform loads to downstream reaches.

3.1.3 Mercury

Of note in 2013 were total and dissolved mercury concentrations that approximately doubled from 2012 concentrations at the Capay Bridge, Gordon Slough, and I-5 Bridge sites (Figure 2 and Figure 3). It is important to note that there are no threshold criteria for dissolved mercury and therefore this summary of results focuses on total mercury. In addition, mercury transport is strongly linked to sediment transport. Total mercury concentrations are still below the CTR threshold of 0.05 micrograms per liter.

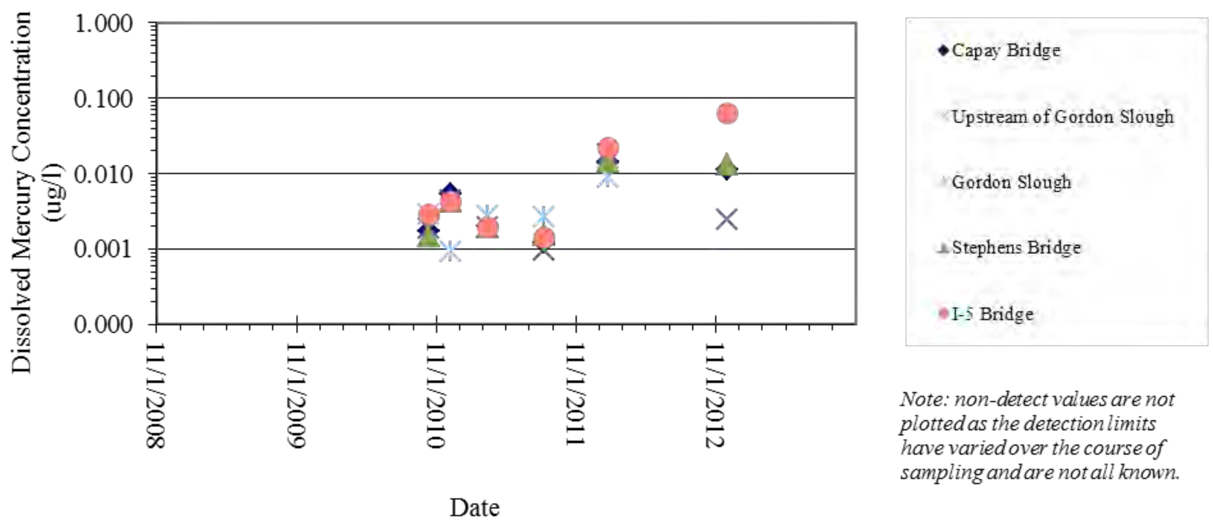


Figure 2 : Dissolved mercury concentrations in the CCIP area from water year 2008 through water year 2013.

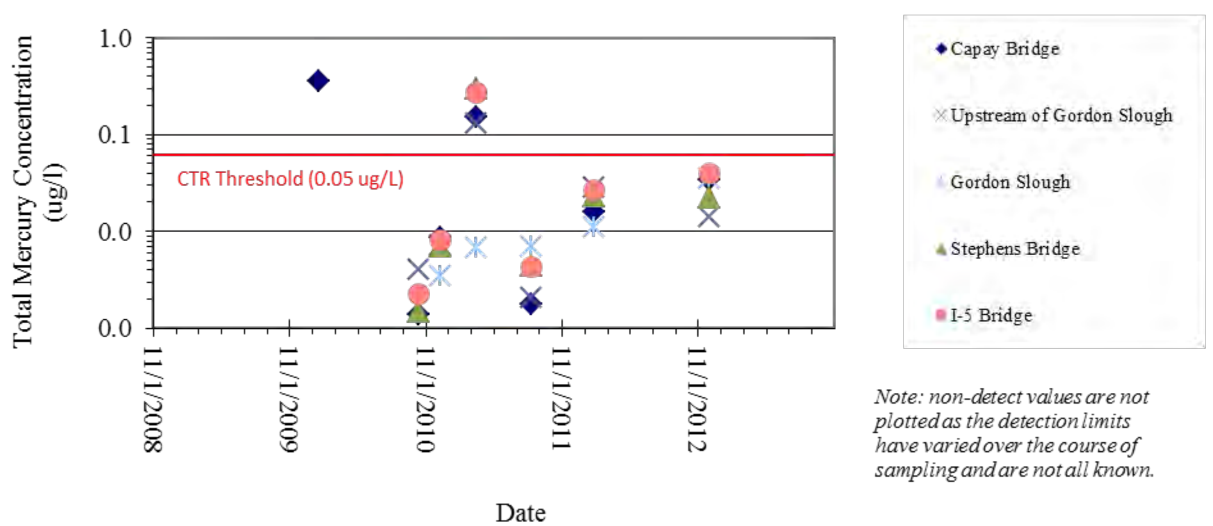


Figure 3: Total mercury concentrations in the CCIP area from water year 2008 through water year 2013.

3.1.4 Vehicle Boneyard Water Quality Risk

In 2013 the TAC quantified Cache Creek channel bank migration at the vehicle boneyard site by digitizing the edge of the vehicle boneyard closest to Cache Creek and the edge of the bank of Cache Creek and the distance between them using a series of historical aerial photographs from 2002 to 2013. The channel bank has migrated towards the vehicle boneyard approximately 50 feet from the 2002 to 2013 at this location (Figure 4and Figure 5), with nearly all of the migration occurring between 2002 and 2005. The 2013 measurement of 111 feet provides a baseline for future monitoring of potential water quality degradation associated with the vehicle boneyard, and action should be taken to prevent water quality degradation if the distance between the vehicle boneyard and the creek decreases to below fifty (50) feet. At this distance, it is possible that contaminants from the abandoned vehicles (e.g. gasoline, oil, etc.) could be carried by surface runoff into Cache Creek and contaminate downstream reaches.

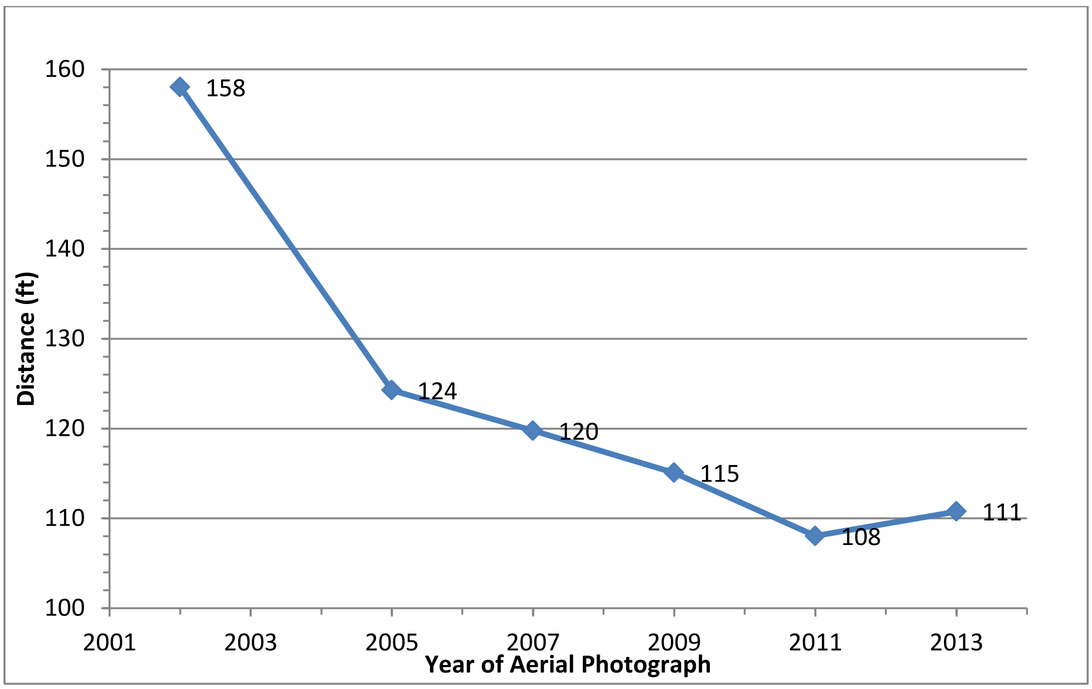


Figure 4: Distance between the edge of the vehicle boneyard and the right bank of Cache Creek from 2002 through 2013.

Figure 5: Digitized features used to measure the distance between the edge of the vehicle boneyard and the right bank of Cache Creek from 2002 through 2013.

3.2 SUMMARY OF ANNUAL WATER AND SEDIMENT DISCHARGE DATA

Peak flows in Cache Creek are an important driver of sediment transport processes as well as water quality conditions in the CCRMP area. The CCIP requires that the TAC monitor hydrology at the upstream and downstream ends of the CCRMP area, and this annual report summarizes this monitoring, with a focus on observations and conditions not already documented in previous annual reports. The 2013 water year was relatively dry, with a peak flow of 10,900 cfs at the downstream end of the CCRMP area and 14,638 cfs at the upstream end. Peak flows at both locations had recurrence intervals of approximately four (4) years. Figure 6 and Figure 7 below compare instantaneous flows at the Rumsey (upstream) and Yolo (downstream) gages in water year2013. Peak flows were significantly higher in 2013 than in 2012, however there were only two peaks during the entire year and the remainder of the year was extremely dry.

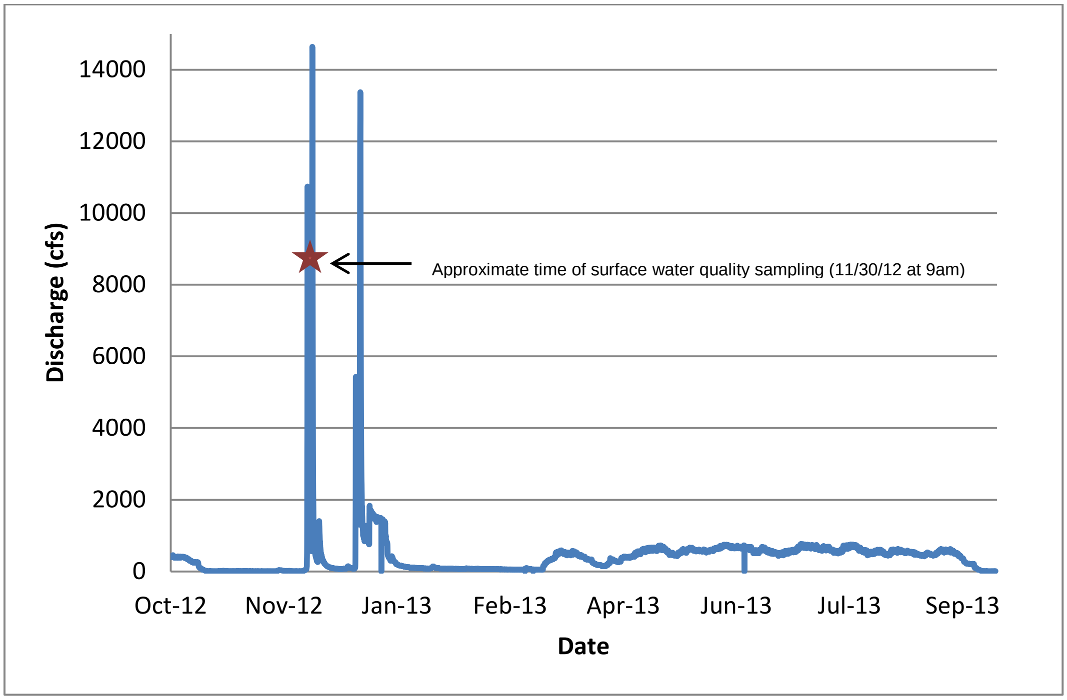


Figure 6***: Instantaneous (i.e. hourly) flows in water year 2013 at the Rumsey gage.***

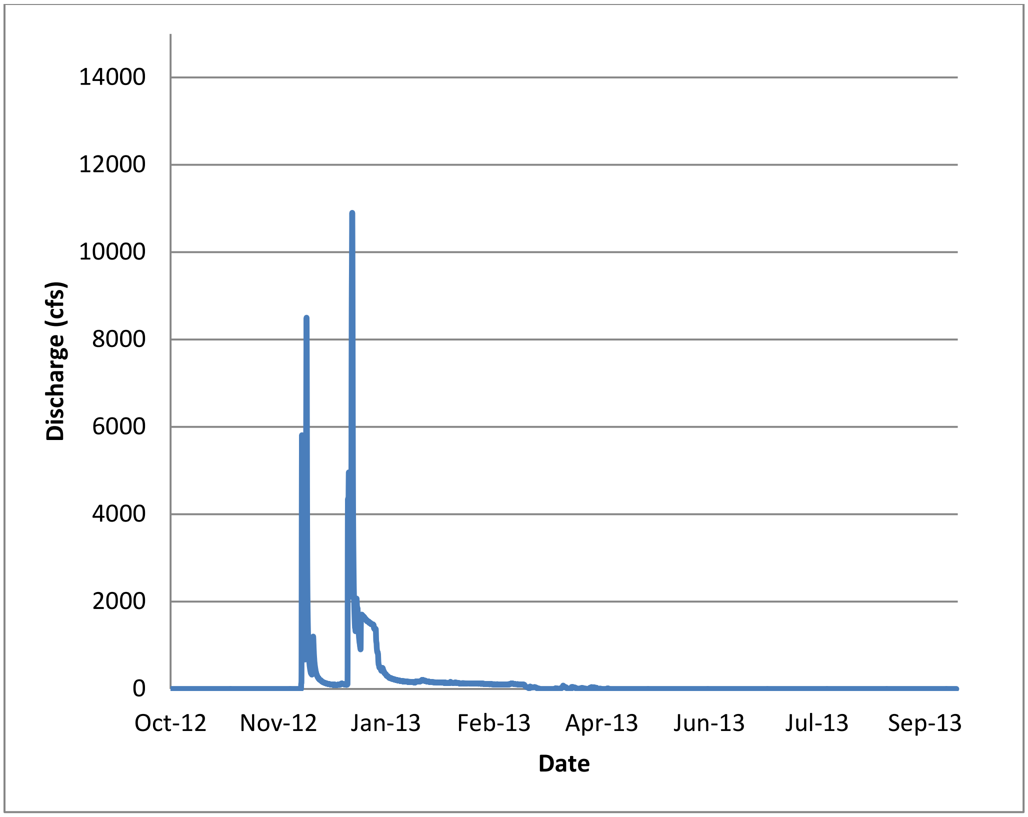


Figure 7*: Instantaneous (i.e. hourly) flows in water year 2013 at the Yolo gage.*

3.3 SUMMARY FLOOD MONITORING

Due to the relatively dry conditions in 2013 and the fact that Cache Creek never reached a flood stage of 20,000 cfs (p. 37, CCIP), no flood monitoring activities were required in 2013.

CHAPTER 4 – GEOMORPHOLOGY

4.1 SUMMARY OF ANNUAL SEDIMENT DISCHARGE DATA

Sediment transport calculations were made based on sediment transport rating curves developed for Cache Creek based on pre-1996 data (for details see Appendix D). These calculations are based on the annual flow rate, and sediment transport rate is directly correlated with the flow rate. Because the aggregate material of interest to the TAC is the material that is deposited in the channel (CCIP, p. 34), the total load was also separated into "fines" (which wash through the system) and "sand and gravel" which are measured as sediment load.

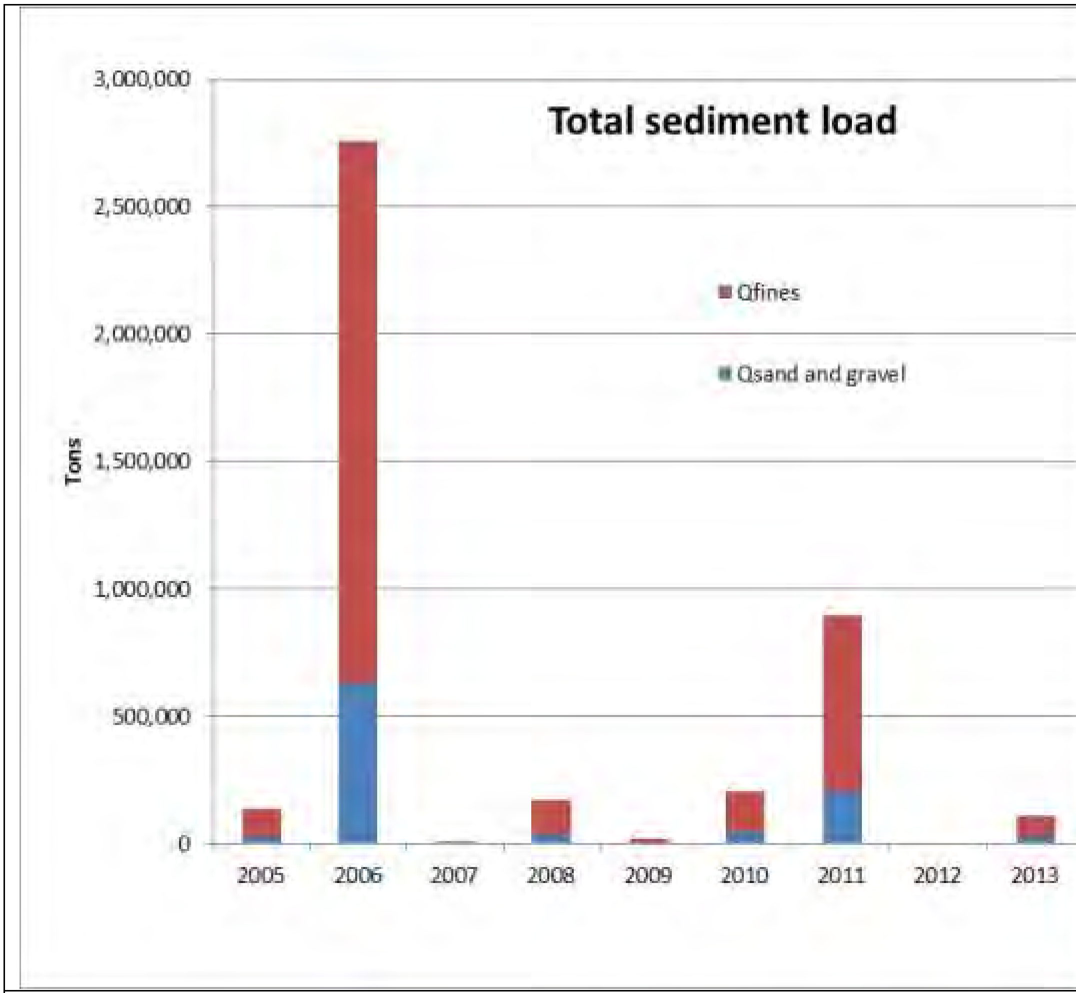


Figure 8: Total sediment transport in tons

The results (Figure 8 and Table 1) show the sediment load in 2013 compared with the sediment load (in tons) since 2005.

Because there is a great variation in observed sediment transport from year to year, and because actual transport in any year might differ from the calculated estimate that is shown in

Figure 8, another useful way to consider the patterns over a number of years is to consider the "cumulative percentage frequency", which is the percentage of years with a transport rate *equal to or less than* the particular annual transport rate in question. The cumulative percentage frequency (Table 1) answers the question 'How *often* has the annual quantity been this much or less?' Also shown in the table is the percent of the total transport in all 9 years. This answers the question 'How much of all the material that was deposited over the last nine years was deposited in *this* year?'

Water year	Cumulative percentage frequency (occurrence)	% of total transport in all 9 years
2006	100%	63.9%
2011	89%	20.7%
2010	78%	4.8%
2008	67%	4.0%
2005	56%	3.3%
2013	44%	2.5%
2009	33%	0.5%
2007	22%	0.1%
2012	11%	0.1%

Table 1: Annual sediment transport

Cumulative percentage frequency and percent of total for 9 years of record

The annual total transport in 2013 ranks (in occurrence frequency) as 44% in the record since 2005, which makes it an event of about average occurrence. This means that in 44% of the years, the transport rate has been less than or equal to the 2013 transport. But, because of the extreme differences in transport from year to year, this moderate occurrence event carried less than three percent (3%) of the total sediment transport in the last nine years. In other words, of all the sediment deposited in the last nine years, about two and a half percent (2.5%) of it was deposited in 2013. This suggests that there would be relatively little erosion and deposition, and that changes in channel morphology would be relatively minor.

4.2 EVIDENCE OF CHANGES IN CHANNEL DIMENSIONS OR BANK EROSION (BANK RETREAT)

Cut and fill analyses form aerial photos and LIDAR have not been done since 2010-2011 because there have not been flows of large enough magnitude to warrant photos and measurements. Evidence of significant change in bank dimensions was observed at the sites listed in Table 2. The 2010-2011 channel cut and fill analyses were used to consider past (2010-2011) and continued bank retreat. These sites were then checked in the field during the Creek Walk in 2012 and again in 2013. Additional sites were added after the 2013 Creek Walk. Some bank retreat is beneficial, allowing natural channel processes to occur. Beneficial bank retreat can provide regeneration of riparian habitat and diversity of in-channel habitat that might not exist otherwise. Some of the sites identified here were observed to have no significant negative consequences, and other sites (for example, RM 15.4 and 15.0) were considered beneficial bank retreat because they provide habitat for bank swallows.

Moderate flow conditions in water year 2013 resulted in only slight changes in bank retreat patterns. The following provide identification of problem areas and a summary of desirable and undesirable geomorphologic trends over the past four (4) years.

Table 2: Evidence of changes in channel dimensions or bank erosion (bank retreat)

River Mile	Location description	2010	2011	2012	2013	Recommendation
RM 26.9	(Site of PG&E pipe crossing)	Baseline observation	Movement	No change	No change	Continue to monitor
RM 26.4	(Near Capay Bridge)	Baseline observation	Movement	No change	No change	Continue to monitor
RM 26.0	Hungry Hollow	-	-	-	Exposed geotextile on RB	Monitor
RM 25.4 - 25.5	(In the vicinity of the Jensen property)	Baseline observation	Movement	No change	No change	Continue to monitor
RM 22.0	(Near the Old Madison Bridge) LB	Baseline observation	Movement	No change	No change	Continue to monitor
RM 21.8	Near RB	-	-	-	Eroding bank	Observe
RM 21.6	(Near the Old Madison Bridge)	Baseline observation	Movement	No change	Continued vegetation establishment on LB; mid-channel bar deposition	Potential for **bar skimming;** continue to monitor
RM 20.4	Near plant conveyor belt	-	-	-	Eroding toe of bank	Potential for **bar skimming** ; monitor
RM 19.8	Near plant conveyor belt	-	-	-	Eroding toe of bank	Potential for **bar skimming** ; monitor
RM18.8 -18.7	Near RB	-	-	-	Degraded nose of old dikes; exposed concrete ruble	Potential for **bar skimming** ; monitor
RM18.2 -18.0	(Upstream from the Moore Siphon)	Baseline observation	Movement	No change	Beneficial in-stream habitat created by erosion	Continue to monitor
RM 17.8	Dunnigan hills	-	-	-	Beneficial erosion; vegetation established	Observe
RM 15.4	Hoppin Reach	Baseline observation	Minor movement	Minor movement	Beneficial erosion	Continue to monitor; examine for bank swallows
RM 15.0	Hoppin Reach	Baseline observation	Minor movement	Minor movement	Beneficial erosion	Continue to monitor; examine for bank swallows
RM 14.3	Hoppin Reach	-	-	-	No change since 2012	LB breach; monitor
RM 11.6	Jesus Maria Reach	-	-	-	Deposition at site of 2012 erosion	Observe

4.3 EVIDENCE OF BED DEGRADATION OR AGGRADATION AND SIGNIFICANT CHANGES IN THE LOCATIONS OR SIZES OF BARS AND OTHER CHANNEL FEATURES

"Bar skimming" has been identified as a possible management action where there is significant aggradation taking place (CCIP p. 20). Bar skimming is the removal of material (generally gravel and sediment) that has deposited and created large mid-channel bars. Gravel bar skimming can reduce erosive effects and maintain flood capacity. The basic idea is that some areas deposit more material than is necessary for equilibrium channel maintenance, and that, in some areas, it would be beneficial to reduce the pressure on the banks in the vicinity of such deposition. "Equilibrium channel maintenance" assumes that the bed of the channel has been restored to a defined elevation, and that subsequently, over time, the amount eroded and the amount deposited are in balance.

The CCIP recognizes gravel bar skimming as a typical channel maintenance activity to maintain hydraulic capacity or reduce the probability of bank erosion. The deposit of sediments in bars in the creek channel influences the distribution of flows in the channel and can reduce the overall channel capacity. Depending on the location of the gravel bar, erosive pressure on one or both creek banks may increase. In addition, gravel bars may become vegetated, further reducing flood capacity. Gravel bar skimming is encouraged in areas where the gravel bar could potentially reduce flood capacity below the 100-year flood protection level or in areas where the bar may affect bank stability.

One of the challenges of selective bar skimming is implementation. Bar skimming requires state and federal permits, which are in the process of being renewed. In addition, the cost of bar skimming may be prohibitive.

Table 3 includes possible sites for bar skimming, as well as other areas of aggradation and degradation. More information regarding the sites where gravel bar skimming is recommended can be found in Appendices F and G.

Table 3: Aggradation, degradation, and possible sites for bar skimming

Location	Description	2012	2013	Recommendation
RM 26.1	RB	-	Possible erosion along RB and potential area for LB bar skimming	Potential for selective bar skimming
Near RM 25.5	In the vicinity of Granite Construction North Bank Stabilization Project	Potential for selective bar skimming	Lower priority	Potential for selective bar skimming
Near RM 21.6	Near the old Madison Bridge site	Potential for selective bar skimming	Lower priority- channel is evolving	Potential for selective bar skimming
20.8	Downstream from 505 bridge	-	Start bar skimming here – also aid to bridge	High potential for selective bar skimming
Near RM 20.3-20.5	Mid-channel bar in the vicinity of the most upstream of the CEMEX repair sites (called site F)	Potential for selective bar skimming	High Potential for selective bar skimming	High potential for selective bar skimming
11.7	Upstream from Huff's corner	-	Remove large bar to reduce erosive pressure on bank	Remove bar
11.6	Jesus Maria Reach	-	Fine deposition beneficial to bank stability	Positive value Observe

4.4 BRIDGE CONDITIONS

The Cache Creek monitoring program directs the program to "monitor bridges, levees, and other infrastructure to detect and prevent damage" (CCIP, p. 33). Responsibility for the maintenance and repair of public bridges is held by other agencies (Caltrans or Yolo County Public Works, for example). Current conditions at the bridges were noted on the Creek Walk and observations were compared to observations made over the last three years, as reported in the following table. In the event that changes are noted in the future at any of the bridge or infrastructure locations, the maintaining agency will be notified immediately.

Table 4: Bridge conditions

Location	General conditions	2010	2011	2012	2013	Recommendation
Capay Bridge at Road 85 (RM 26.35)	2007 Caltrans report: "no scour." Some erosion of the south bank upstream of the bridge in 2010, with no observable negative consequences to the bridge.	Observed condition	Continued bank retreat	No change	No change	Monitor
Esparto Bridge at Road 87 (RM 24.35)	2006 Caltrans report: "signs of aggradation." Observed in 2010: tendency for erosion on the north side, and the northern-most pier is slightly undercut.	Observed condition	Continued bank retreat	No change	Possible aggradation	Monitor
Highway I-505 Bridge (RM 21.0)	2005 Caltrans report: "Scour holes at each pier." 2010, 2-10 feet of sediment build up (aggradation) around the two southern bridge bays, with vegetation growing on the deposited material	Observed condition	Continued bank retreat	No change	Although there is undercutting, there is no change. Consider how vegetation on south side impedes flow.	Monitor
Road 94B Bridge (RM 15.9)	2007 Caltrans report: "Abutment 1 is undermined up to 18 inches. " Relatively stable channel conditions in 2010.	Observed condition	No change	No change	The vegetation filling the left-hand bay here looking downstream is dense and would impede the flow and reduce flow capacity. It is not clear whether this has changed since last year.	Monitor

4.5 SUMMARY OF CHANGES IN CHANNEL TOPOGRAPHY AND FORM

The CCIP describes one of the objectives of the monitoring program as the monitoring of the "changes in channel form and topography" (p. 33). This information is used to locate areas of aggradation and degradation in the stream (p. 39). A summary of changes in channel topography and form is provided below.

Because the HEC-RAS hydraulic model is not yet available from the California Department of Water Resources, the results for 2013 do not include identification of any areas where existing channel capacity can no longer contain a 100-year flood event. Performance standard 2.5-5 of the CCRMP (p. 38) directs staff and the TAC to ensure that Cache Creek management decisions do not reduce flood capacity nor exacerbate existing flooding problems downstream through channel reshaping. It further directs that "when modeling indicates that the channel is approaching loss of the 100-year conveyance capacity (or has already lost this capacity), the TAC shall identify for consideration actions by the County or landowners to reestablish capacity".

The HEC-RAS hydraulic model is under development by the TAC Geomorphologist working with the State Department of Water Resources, county, and other stakeholders.

4.6 LOCATION AND VOLUME OF ANNUAL SEDIMENT REPLENISHMENT

No aerial surveys of Cache Creek were flown in 2013 by consensus of the TAC, the County, and the Cache Creek stakeholders. Therefore there were no DTM analyses available for Cache Creek, and no spatial data on which to estimate sediment replenishment. As noted in the preceding section on sediment transport, 2013 was a relatively moderate water year with very moderate peak flows. Based on this, and the estimated sediment discharge for 2013, which is less than three percent of the average total deposited in the last nine (9) years, it is likely that there was very little sediment replenishment this year.

4.6.1 Volumetric change analyses

In 2006, the TAC recommended the use of *"DTM data to conduct a quantitative assessment of significant volumetric changes in channel capacity and areas of excessive erosion between 1997 and 2006."* Subsequent to that time, we decided that we would also compare 1997 with 2010 and 2011 Digital Terrain Model (DTM) data.

In 2013, a software program was used, called *Geomorphic Change Detection*, which is designed to automatically make the analyses and output graphics for volumetric change analyses in river systems. This software package not only facilitates comparisons of two datasets, it also automatically analyzes the degree of error that is inherent in the specific comparison. This can be very useful when comparing data that were collected by different methods (e.g. field survey versus LIDAR). This is important because one can calculate a 'volumetric change' that is in fact just a measure of the error between two measurement methods, and not an actual difference in sediment volumes from one time period to another.

The goal is to perform a volumetric change analysis from the earliest useable dataset from after the CCRMP initiation, which is a 1997 CAD dataset that can be converted to a DTM to perform a change in volume analysis to the most recent dataset, the LIDAR derived DTM of 2011. This information will illustrate how much and where the channel has filled (or degraded) since roughly the beginning of the CCRMP program.

At this time, the TAC and county staff have the program running, have performed a preliminary "test-of-concept" analysis.

4.7 CHANNEL MAINTENANCE ACTIVITIES

The CCIP (Section 4.2, starting on page 20) describes typical channel maintenance activities. The TAC reviewed all of the recommended channel maintenance activities describe and identified sites for various maintenance activities, including a number of sites recommended for gravel bar skimming reducing the probability of bank erosion. These overall recommendations are outlined in Table 5, and two sites are discussed in detail following the table.

Channel Maintenance Activities

Table 5: Channel maintenance activities

Site	Description	2012	2013	Recommendation
RM 28.3	Concrete rubble in creek channel. Possible removal project.	-	Low priority recommendation	Remove (low priority)
RM 25.0 Near Granite Construction North Bank Stabilization	Removal of mid-channel gravel bars could alleviate pressure on the north bank in this vicinity	Recommended	Recommended, but only monitoring required	Property owner should be contacted to suggest bar skimming
RM 23.2	The setback is less than 200. This is an area of concern.	-	Action suggested	Confirm existing and required setback distances. Address possible inadequate setback.
RM 23.0-22.8	Levee erosion site.	-	Monitor only.	Monitor
RM 21.6 Active bank retreat near	Near the Old Madison Bridge site, we recommend cutting a channel across the gravel bar (bar skimming) in order to relieve the pressure on the north bank. It is viewed as an experimental management action that may help relieve the pressure of erosion on the north bank. Subsequent observations will help inform future management actions.	Recommended	Monitor only. Conditions have improved	Monitor
RM 20.3 - 20.8 mid-channel bar	In the vicinity of the most upstream of the CEMEX repair sites (called site F) there is evidence of a mid-channel bar that has deposited. If the bar were removed, there would be less erosive pressure on the south bank. We recommend this location for “bar-skimming,” with subsequent observations to help inform future management actions.	Recommended	Action recommended	Property owner should be contacted to suggest bar skimming
RM 20.4	Toe erosion on bank.	-	Monitor. Consider bar skimming to alleviate hydraulic pressure.	Property owner should be contacted to encourage remedy.
RM 19.8	Erosion at the toe of the berm and not much distance from the road to the top where there's a conveyor belt and power poles. This is an area of concern.	-	Action recommended	Property owner should be contacted to encourage remedy.

4.7.1 Gravel Bar Skimming – RM 20.3-20.8

Bar skimming is recommended at the CEMEX site located between roughly RM 20.8 and RM 20.3 (Figure 9) on Cache Creek. The work would provide multiple benefits, but is not urgent for the safety of the CEMEX plant or the integrity of the banks at this location. The recommended bar-skimming would provide the benefit of reduced pressure on the south bank which has experienced severe erosion in the past and required corrective work by CEMEX to protect the conveyor system located near the top of the bank. Reducing pressure on the south bank could help to avoid further bank instability and severe erosion on the south bank in the future.

Figure 9 Conceptual area of bar skimming

4.7.2 Gravel Bar Skimming – RM 22.8 to 23

Based on observations made during the 2013 Creek Walk, the Cache Creek Technical Advisory Committee (TAC) determined that there is no apparent urgency for work in the vicinity of the Teichert Esparto levee erosion site (RM 23-22.8). Although there is some on-going concern about erosion at this site and the potential for further erosion during larger peak flows than occurred in the winter of 2012/2013, no bar skimming or other bank stabilization activities are currently recommended at this site.

4.8 YEARLY ESTIMATES OF AMOUNT DEPOSITED WITHIN THE CHANNEL

In the past the TAC has relied on data obtained from an annual aerial survey to estimate the annual deposition (how much new sand/gravel material has been deposited in the Creek). These estimates are needed to make recommendations related to Creek maintenance needs and priority projects (CCIP p. 6). In 2012 the TAC recommended that the aerial survey be conducted once every five (5) years, or after a significant storm occurs that results in peak flows of 25,000 cubic feet per second or more. (2012 Cache Creek Annual Report, p. 32) This reduction was instituted as a cost saving measure and because the TAC indicated that there were other methods of obtaining the data needed to estimate the annual deposition in Cache

Creek.

The TAC has determined (see memo in Appendix E) that it has access to enough data to perform reasonable analyses that will allow the TAC to make educated recommendations without using annual aerial photos. For any recommendations for channel maintenance activities under consideration by the TAC based on current conditions, the TAC will compare the amount of proposed extraction with the amount that has deposited since roughly 1997. This is because there has been little or no bar skimming in association with channel maintenance since the CCRMP was established in 1996.

For any recommendations for channel maintenance activities under consideration by the TAC in the longer term, the amount of sediment deposited in each year can be based on calibrated sediment transport calculations using the annual flow of the year in question. The calibration will be based on the measurements that are periodically verified using aerial photos, which will be obtained no less frequently than every five (5) years.

CHAPTER 5- BIOLOGICAL RESOURCES

5.1 VEGETATION AND WILDLIFE HABITAT

Previous annual reports provide a relatively thorough description of existing vegetation in the CCRMP area. Vegetation and associated wildlife habitats within the CCRMP area reflect the dynamic geomorphologic and hydrologic processes of Cache Creek, as well as past and on-going human influences. Lower Cache Creek's position in the broad Central Valley Plain, low channel gradient, annual lateral channel movement, and channel braiding provide for a limited number of riparian and upland habitat types. In general, few areas along Cache Creek remain available for riparian expansion as most of the channel is deeply entrenched, bound by levees, or restricted by adjacent land uses. But a continued focus should be made on locations where habitat restoration and enhancement are possible, and sustainable as a natural condition with limited management. Depth to groundwater and presence of surface water in the low-flow channel are the major limiting factors in establishment and maintenance of woody riparian vegetation, and ways to increase surface water flows in Cache Creek should be evaluated and promoted to improve natural succession to riparian habitat.

A spatially referenced photo log was generated by the TAC Biologist during the 2013 Creek Walk. The photo log can be used in future Creek Walks to discern changes in vegetation and habitat conditions in the CCRMP area, with photo updates and new reference locations added in subsequent years to document current conditions. This will provide an important record of field conditions in representative locations for each reach in the CCRMP area.

In general, the condition of the existing vegetation observed during the 2013 Creek Walk appears consistent with descriptions in previous Creek Walk notes and annual reports. As described in the 2012 Annual Report, the only location where dense vegetation appears to be influencing creek flows and contributing to adverse conditions is at the I-505 crossing at RM 21, which has been noted as a potential issue of concern during previous creek walks. Dense vegetation is forming along the south side of the channel bottom and contributing to concentrated flood flows at the exposed pier on the north side of the bridge. However, most of the dense vegetation is shrubs and ground cover species, and appear flexible enough to allow for storm flows to pass over the vegetated area with little resistance. No substantial changes in vegetation structure were noted at this location in comparison to the conditions observed in 2012. No intervention appears necessary at this time, but continuing monitoring of this location is recommended.

Damage and loss of mature cottonwoods by beaver was noted during the 2012 and 2013 Creek Walks. While this is a "natural" process, it appears to be accelerating in the middle-reaches of the CCRMP area. Loss of mature cottonwoods in locations where very little riparian woodland cover is present represents a major reduction in habitat values. Continued monitoring of tree loss and damage should be performed in subsequent Creek Walks, and consideration of selective tree protection methods considered if necessary to retain riparian woodland cover.

The Cache Creek Conservancy has effectively protected larger trees at the Nature Preserve from damage and loss by beaver by installing chicken wire enclosures around the bottom of the trunks. This provides a relatively inexpensive method of preventing beaver damage to the tree trunks and can help maintain developing riparian woodland cover.

As noted in the 2012 Annual Report, one of the major limitations to meaningful ongoing monitoring of vegetation resources and associated wildlife habitat in the CCRMP area is that only very limited mapping of baseline vegetation conditions have been prepared in the past. Non-digitized mapping of existing vegetative cover along the Cache Creek corridor was prepared in 1995 as part of the Technical Studies, showing only broad cover types such as riparian, grasslands, and woodlands. The assumed limits of riparian vegetation were mapped in 2006 based on infrared data and assumptions on vegetative cover classes greater than about two meters in height. In 2011, a comparative analysis of vegetative cover was conducted at the 12 permanent vegetation transects (Andregg) established in the CCRMP area in 2002, but no detailed mapping of other vegetative cover types, such as grassland and oak woodland, has yet been prepared, which is important in understanding long-term trends and evaluating the success of efforts to expand riparian cover. One of the “2011 Programmatic and Channel Improvement Priorities” (Goal 2011B.B.3, Chapter 6) was to identify the preferred method of mapping baseline vegetation conditions within the plan area, which would allow for future monitoring of changes over time. Details on the specifics of this mapping effort are still being refined with County staff, but it appears that LiDAR data collected in 2011 may be re-categorized to provide an indication of herbaceous, scrub, and woodland cover in the CCRMP area.

County staff will continue to review the 2011 LiDAR data and its usefulness in providing a baseline of vegetation conditions. The need to collect new LiDAR data to reflect baseline vegetation conditions for a more comprehensive mapping product will be determined following further review of the 2011 LiDAR. But LiDAR data should be collected at the minimum five year aerial survey intervals to provide comparative updates on the herbaceous, scrub, and woodland vegetative cover in the CCRMP area as part of a more comprehensive mapping program. On-going monitoring is necessary to demonstrate the reliability of the limited data, and determine whether there are notable losses of vegetative loss, localized or on a larger scale, and to determine the success of natural recovery and succession over an extended period of time.

The critical focus in the CCRMP efforts should continue to be on assessing vegetative cover, and enhancing the extent and complexity of riparian habitat given its known value to wildlife. This is particularly true as the County faces increasing limitations on the funds available to support implementation of the CCRMP and CCIP. But any future monitoring and assessment should be clearly defined to allow for future comparisons, as well as reliable enough to be useful as the state of the science evolves over time. It is critical to define a practical methodology with set study area boundaries, so that the reporting outcomes can lead to a common understanding of vegetation patterns and inform management decisions.

5.2 INVASIVE SPECIES MONITORING AND MANAGEMENT

Invasive tamarisk (*Tamarix sp*.), giant reed (*Arundo donax*), and ravenna grass (*Saccharum ravennae*) have been relatively well controlled within the CCRMP area due to eradication efforts by the Cache Creek Conservancy (CCC) through its annual contract with this program. Chemical treatment under CCC's Invasive Weed Control Program has had a significant positive ecological effect by reducing some of the negative impacts caused by tamarisk and giant reed, including fine sediment accumulation, vegetation restrictions, and flow redirection. The removal of invasive weeds also opens up growing space for native plants which provide better habitat for wildlife. Scattered clumps of tamarisk and arundo were observed during the 2013 Creek Walk where proximity to surface water prevented herbicide application. Young tamarisk saplings were observed along the low-flow channel where sufficient water was available to allow establishment. Several large stands of tamarisk occur immediately adjacent to the CCRMP area and act as an on-going seed source for future invasive tamarisk establishment. These include the creek margins and adjacent uplands from RM 12.9 to 13.2, RM 13.5, and RM 15.4 to 15.5. The CCC initiated efforts to eradicate tamarisk and giant reed on the county owned Millsap property in 2013, between RM 18.1 and 18.6, including mechanical and chemical treatments.

White-topped perennial pepperweed, a highly invasive non-native species, continues to spread in much of the understory along the creek corridor, starting near RM 14 and continuing downstream. Dense stands have been observed over the past several years in numerous locations, and appear to be replacing any other understory cover. This species has not been a target under the CCC's Invasive Weed Control Program and presents major challenges because of its growing abundance and aggressive root systems. Given it spreads by both seed and rhizome, feasible options for successful control appear to be limited.

The benefits of the CCC Invasive Weed Control Program are documented and need to be continued through coordinated weed management with upstream partners and adjacent property owners. The Cache Creek Watershed Weed Management Plan, prepared by the Yolo Resource Conservation District in conjunction with Cache Creek Watershed Forum partners, helps refine strategic weed management efforts in the CCRMP area and larger Cache Creek watershed. Effective control of highly invasive species requires on-going management and systematically treatment, and treatment areas must be revegetated with native cover to prevent disturbed conditions that prefer the reestablishment of other invasives which are adapted to colonizing disturbed areas. As acknowledged in the CCRMP, a specific treatment, mapping, and re-planting plan should be developed as a component of a Comprehensive, Integrated Revegetation Plan (CCRMP 4.4-10, p. 59). Chemical treatment generally precludes revegetation efforts for some length of time until the inhibiting effects of the herbicide have broken down. But this must be balanced with the invasive properties of weedy species which will otherwise colonize barren areas. Fast growing replacements, such as local willow species and perennial native grasses can be established readily on barren or sparsely weeded sites, with supporting irrigation as needed. It is also important that the CCC and Yolo Resource Conservation District continue to engage private landowners with significant weed problems in order to ensure that comprehensive management can be completed.

5.3 SPECIAL-STATUS SPECIES

Essential habitat or individuals of several species considered to have special-status were observed during the 2013 Creek Walk. These consisted primarily of elderberry shrubs which can serve as hosts for the federally-threatened Valley elderberry longhorn beetle (VELB). The distribution of elderberry shrubs represents an important consideration to implementing in-channel maintenance and enhancement activities, given the limitations on disturbance within 100 feet of shrubs of a certain size unless compensatory mitigation is provided. Spatial data on the distribution of elderberry shrubs were collected at locations considered for possible bar skimming at RM25.5, RM 21.6, and RM 20.3-20.5.

Other special-status species observed included the State-threatened bank swallow, the State-threatened Swainson's hawk, western pond turtle, and osprey. Several colonies of bank swallow were observed along the creek corridor where vertical banks are present. These include: along the north bank at RM 21.6 where this colonial nester has been observed during past creek walks; a colony along the south bank at RM 14.9; and evidence of what appear to be former bank swallow colonies between RM 13.2 to 13.4. The colony at RM 14.9 was substantially smaller in 2013 than that observed in 2012, possibly due to the reduced surface water flows at the base of the colony which may be critical for sustaining adequate insect prey. The lack of surface water and resulting effect on available prey may be a key limiting factor in the abundance and distribution of bank swallows in the CCRMP area.

Although they are not of any particular special-status, active colonies of cliff swallow and northern rough-wing swallow are considered important wildlife resources by the California Department of Fish and Wildlife and are protected under the federal Migratory Bird Treaty Act, as are the nests of most other birds when in active use. Construction and other disturbance that would disturb the nesting birds and lead to nest abandonment is prohibited under the Migratory Bird Treaty Act without specific authorization from the U.S. Fish and Wildlife Service. Numerous colonies of cliff swallow were observed at the underside of most bridge crossings and other vertical banks, including just downstream of the Capay Dam. Smaller colonies of northern rough-wing swallow were confirmed again at RM 15.4 and RM 20.2, as was observed in 2012, occurring in similar conditions to those favored by bank swallow.

CHAPTER 6 - STATUS OF PRIOR PROGRAM RECOMMENDATIONS

Starting in 2011 the Cache Creek Annual Status Report provided recommendations for channel improvement priorities. These recommendations are based on physical, hydrologic, and biological assessment of Cache Creek, pursuant to the goals, policies, and actions of the CCRMP. The prior recommendations, combined with the physical observations and data collected in the current year formed the analytical basis for TAC recommendations regarding program priorities and projects in 2013. Prior recommendations dating back to 2011 are listed below and the current status (as of December 2013) is provided for each recommendation. A complete compilation of all TAC recommendations since program inception are provided as Appendix C. New recommendations developed as part of the 2013 annual report may be incorporated into this list once they are reviewed, and if they are accepted, by the Yolo County Board of Supervisors. Bold text in the "description" column identifies the main subject that is addressed.

Table 6 Programmatic and Channel Improvement Priorities

HIGH PRIORITY RECOMMENDATIONS

	Description	Discipline	Effort	Status
2011.G.A1.1	**HEC RAS modeling** CCRMP reach completed and analyzed, and compared with 1996 conditions if possible.	GEO	MAJ	In Progress
2012.G.A.1	Assessment of **bar skimming** in the following locations: RM 26.1, 25.5, 21.6, and 20.3 – 20.5. Need to establish footprint, linear distance, and estimate of material to be removed (for ACE In-Channel Project List).	GEO	MOD	
2011.G.A2.2	Estimate the **annual rate of channel bed aggradation** over time.	GEO	MAJ	In Progress
2012.G.A.2	Channel maintenance project on upper bank at **Huff's Corner** (RM 11.6) to prevent downstream unraveling of existing bank protection	GEO	MIN	
2011.G.A3.3	Amend **Aerial survey** contract and scope of work	GEO	MIN	In Progress
2012.G.A.3	Repair levee and bank erosion at **RM 19.5**	GEO	MOD	
2012.G,H,B.4	Create Creek Walk **protocol**	GEO HYD BIO	MOD	
2011.G.A4.4	Continue to **monitor actively migrating bends**, and use a predictive model	GEO	MOD	In Progress

	Description	Discipline	Effort	Status
2012.H.A.2	Update and maintain **geo-spatially referenced photo log** for use on future Creek Walks and to document on-going changes and conditions on the Creek	HYD	MOD	On-Going
2011.H.A4.8	Continue to **monitor contaminants** of concern in creek water based on water quality database review and prioritization described above.	HYD		On-Going
2011.H.A5.9	Continue **groundwater monitoring** near Cache Creek, ~~incorporating data from mining sites~~	HYD		On-Going, Completed (WRID)
2011.B.A6.10	Complete **methylmercury** monitoring and analysis in the CCRMP study area. Consider additional partnerships to monitor and analyze methylmercury	BIO		In Progress
2011.B.A1.11	Continue to work with County staff and the aerial contractor to **further refine and classify vegetation**	BIO		In Progress
2011.B.A2.12	Determine whether **CCRMP boundary** should be updated	BIO		In-Progress (Working Study Area)
2011.B.A3.13	Coordinate with full TAC in 2012 to **identify areas and sites best suited for natural regeneration of riparian and upland habitat conditions**	BIO		
2011.B.A4.14	Continue to participate in the implementation of the **Cache Creek Watershed Wide Invasive Management Plan**	BIO		On-going
2011.G.A.15	**Channel shifting patterns** near RM 26.4 should be actively monitored	GEO	MIN	On hold (need aerials)
2011.G.A.16	**Bank erosion** at RM 26.9 on the south bank continued engagement with PG&E	GEO	MIN-MOD	On-going
2011.G.A.17	The bank retreat patterns near RM 25.4 -25.5, RM 22.0, and RM 20.6 for **regeneration of riparian habitat**. Site-specific small scale revegetation plantings explored.	GEO	MIN-MOD	In Progress
2011.G.A.18	**Active bank retreat near RM 21.6** (near the old Madison Bridge) should be monitored	GEO	MIN	On-hold (need aerials)
2011.G.A.19	Significant erosion at the I-505 crossing should be assessed vegetation should be **removed in order to protect the bridge piers.**	GEO	MIN-MOD	On-going
2011.G.A.20	**Replace dead arundo and tamarisk in the Capay Reach with native plantings.** Coordinate with Cache Creek Conservancy.	GEO		In Progress

MEDIUM PRIORITY RECOMMENDATIONS

	Description	Discipline	Effort	Status
2011.G.B1.1	Update **reach descriptions** using updated values for all channel characteristics. Standardize the reach endpoint descriptions.	GEO	MIN-MOD	In Progress (50% complete)
2012.H.B.1	Compile **Water Quality Impact Catalogue** and associated source and contaminant potential assessment	HYD	MIN	On-going
2011.H.B1.2	Continue to pursue **partnerships** to install **continuous turbidity monitoring**	HYD		On-Going
2011.B.B.3	Mapping protocols should be developed to define the procedure and schedule for **mapping vegetative cover** within the CCRMP study area	BIO		In Progress
2011.G.B.4	Complete **HEC-RAS** modeling of the Huff's corner area, and a comparison with the 1996 100-year flood capacity.	GEO	MIN-MOD	In Progress
2012.G.B.3	Channel maintenance project on **lower bank at Huff's Corner** (RM 11.6) to prevent downstream unraveling of existing bank protection	GEO	MIN	
2012.G,H.B.2	Channel maintenance project at **south bank RM 12.35** to prevent the recruitment of foreign material into the Creek	GEO HYD	MIN	
2011.G,H.B.5	Flood conveyance at **the I-505 bridge**: Coordinate with CALTRANS and stakeholders, and complete hydraulic modeling to determine before- and after-skimming water surface elevations if the bar were skimmed.	GEO HYD	MIN-MOD	
2011.H.B.6	**Implement water temperature** monitoring by placing water temperature data loggers in each reach.	HYD	MOD	

LOW PRIORITY RECOMMENDATIONS

	Description	Discipline	Effort	Status
2011.B.C.3	Undertake more detailed ancillary **wildlife assessments** in conjunction with field work.	BIO	MOD	
2011.G.C.4	Channel **bank retreat** upstream from Moore's Siphon near RM 18.1 should be monitored.	GEO	MIN	On Hold
2012.G.C.1	Establish a high-flow triggered bank stability monitoring plan for the **I-505 bridge**	GEO		Monitoring Only
2012.G.C.2	Establish a high-flow triggered bank stability monitoring plan for the south bank at the **Cemex Slope Protection Project**.	GEO	MIN	Monitoring Only
2012.G.C.3	Remove berm/concrete barrier at **Correll Rodgers**	GEO	MIN	

COMPLETED / OBSOLETE RECOMMENDATIONS

	Description	Discipline	Status
2011.H.A1.5	Complete review of hydrology and water quality objectives in CCRMP	HYD	Complete
	Review completed, recommendations reviewed at October 2012 and November 2012 TAC meetings, recommendations included in 2012 Annual Report (accepted by BOS 1/15/13)		
2011.H.A2.6	Review Cache Creek water quality data base and identify duplication of effort.	HYD	Complete
2011.H.A3.7	Prioritize and/or eliminate constituent testing based on 2011.H.A.1.5 and 2011.H.A3.7	HYD	Complete
	Review completed, recommendations reviewed at October 2012 and November 2012 TAC meetings, recommendations included in 2012 Annual Report (accepted by BOS 1/15/13)		
2011.G.C2.2	Develop a protocol and sampling schedule to measure **bed armoring**	GEO	Deleted – See 2012 Annual Report (1.4.2)
2011.G.C1.1	**Sampling the bed surface material**	GEO	Deleted – See 2012 Annual Report (1.4.2)
2012.H.A.1	**Increased mercury concentrations** detected in 2012 surface water quality samples need to be communicated to ongoing mercury studies in the watershed and evaluated in 2013	HYD	Complete
2012.H.C.1	Historical analysis on movement/migration of **the vehicle boneyard** (south bank RM 26.6)	HYD	Complete

CHAPTER 7 – PROGRAM ADMINISTRATION

Three years after the restructuring of the Natural Resources division, the Cache Creek Area Plan (CCAP) administration has settled into its roles and responsibilities and has demonstrated its commitment to delivering a program that implements the CCAP in a responsible and efficient manner. Staff has worked cooperatively and collaboratively with program stakeholders to refine the program and adaptively respond to evolving economic and environmental conditions. The Off-Channel Mining Plan (OCMP) continues to be administered by the County Planning and Public Works (PPW) Department. PPW is also responsible for the processing of all new mining permit applications and Flood Hazard Development Permits. As in previous years, an outside consultant assisted with oversight, management, and audit services, though in a less significant capacity than in previous years. Staff continues to strengthen relationships with core partners through open communication and demonstrated accountability. The production of this Annual Report is the direct result of the on-going commitment of all the CCAP partners in meeting the intended purpose and goals of the CCAP.

7.1 CACHE CREEK TECHNICAL ADVISORY COMMITTEE

The Cache Creek Technical Advisory Committee (TAC) was established to 1) provide scientific and technical review and oversight for all projects conducted under the CCIP, and 2) collect and evaluate scientific data on hydrologic, hydraulic, sediment transport, and biological conditions within the CCRMP area.

The TAC is a three-person interdisciplinary group comprised of a hydraulic engineer, a fluvial geomorphologist and riparian biologist.

The additional responsibilities of the TAC are outlined in the Cache Creek Improvement Program (CCIP, p. 5-7).

The 2013 Cache Creek Technical Advisory Committee is staffed by the following subject matter experts:

Dr. Eric Larsen, Geomorphologist

Dr. Larsen has served on the TAC since 2007 and currently serves as its Chair. He completed his undergraduate education at Harvard University and obtained his Masters' and PhD from UC Berkeley. He is currently a scientist in the Department of Environmental Design at UC Davis. Dr. Larsen's interdisciplinary training and experience in hydraulic engineering, fluvial geomorphology, and riparian habitat formation provide the foundation for strong interdisciplinary work with teams.

Jim Martin, Riparian Biologist

Mr. Martin holds a BS in Biology from UC Berkeley and has over 30 years of experience as a biologist and environmental consultant, preparing biotic resource assessments and mitigation plans for over 300 projects. In addition, Mr. Martin prepared the Biological Resource section of the 1996 EIR for the Cache Creek Resource Management Plan and Cache Creek Improvement Plan, as well as the following off-channel mining projects: Syar Industries Mining Permit EIR, Solano Concrete Interim Mining Permit EIR, the Granite Capay Mining Permit EIR, and the Teichert Schwarzgruber Mining Permit EIR.

Dr. Mark Tompkins, Hydraulic Engineer

Dr. Tompkins completed his undergraduate and Masters' degrees from the University of Illinois and earned his PhD in Environmental Planning from UC Berkeley. He is a registered Civil Engineer and has over 12 years of consulting experience in river restoration, flood management, fluvial geomorphology, hydrology, hydraulics, sediment transport, fisheries biology, environmental planning, and water resources engineering.

7.2 PROGRAMMATIC RECOMMENDATIONS

Each year County staff, program partners, and the TAC review the programmatic requirements of the CCIP and the CCRMP and identified a number of appropriate program adaptations based on what is required by the program and what is feasible and achievable from an economic and operational stand point. The CCAP anticipates ongoing program adaptations, initiated at the staff level, to ensure continued efficient implementation based on funding and staffing realities, and conditions in and around the creek.

For 2013, the following recommendations were made by staff in consultation with interested parties and program partners and approved by the TAC (or other governing body, where appropriate). More detailed documentation supporting each of these, as well as a record of the public discussion of each item at the TAC meetings is available in the program files.

7.2.1 Cache Creek Aerial Survey Drone Pilot Project

The TAC recommended, and the Board of Supervisors approved as part of the 2012 Annual Report, a change to the aerial surveys monitoring program in the CCIP. . The monitoring program could be as effectively implemented at significantly less cost if the aerial surveys were performed every five years, or after a "major event". A major event was defined by the TAC as "an event with peak flows of 25,000 cfs or more". Staff has worked diligently throughout 2013 to identify cost-sharing arrangements with other agencies in conjunction with the collection of aerial data.

In late 2013, staff was approached by a start-up company from Davis, CA that specializes in aerial data collection using drones instead of traditional aircraft. The start-up offered to shoot a small portion of the CCRMP area and provide the County with the data collected free of charge. County staff will compare the data collected by the drone to the data collected in previous aerial surveys to ascertain the quality and usefulness of said data. If the data is of sufficient quality the program will realize significant savings (approximately 60-80%) by developing a scope of work that includes data collection by drone aircraft.

Staff anticipates that the data review and revised scope of work (if necessary) will be completed in the first quarter of 2014.

7.2.2 OCMP Water Quality Protocol Review

At the request of several of the gravel producers County staff and the TAC Hydrologist reviewed the water quality monitoring protocols described in the OCMP for mining sites. The TAC Hydrologist recommended that the constituent list be modified to remove some items that either don't provide data of any value or have never been detected. Staff will perform a cost-benefit analysis to determine if there is value in modifying the program statutes to remove the recommended constituents.

7.2.3 Improved Coordination Between OCMP and CCRMP Monitoring and Implementation

Staff has amended internal protocols to ensure coordination of monitoring activities among all program sectors. Planning and Public Works staff are responsible for the physical inspection of each mining site on an annual basis. The TAC is responsible for an annual inspection of the Creek. The revised protocols ensure that the TAC is made aware of the results of the mining inspections and that PPW staff is made aware of the results of the Creek Walk inspections. This will allow for early identification of potential problem areas within the program area.

7.2.4 Revised Off-Channel Pit Mercury Testing Protocols

The County contracted with Dr. Darrel Slotton (UC Davis) in 2011 to study ambient mercury levels in fish and invertebrates in both Cache Creek and several off-channel mining pits. The results of this study were provided to the County in 2013. The data collected and published establish a "baseline" for existing mercury conditions in Cache Creek and several off-channel mining pits. The baseline conditions are then used for comparative analysis in future mercury testing of off-channel pit lakes. The information contained in this report (available on the Natural Resources Division website) will be used to create a set of water quality testing protocols for off-channel pit lakes in 2014.

7.3 FUNDING

The CCAP, and specifically the Cache Creek Resources Management Plan (CCRMP) and Cache Creek Improvement Program (CCIP), are funded through aggregate mining fees paid by aggregate producers within the CCAP boundary. The Gravel Mining Fee Ordinance, adopted by the Board of Supervisors in 1996 and amended in April, 2007, imposes a fee on each ton of gravel sold (not mined) within the CCAP, for monitoring and restoration of Cache Creek, as well as administration of the program.

7.3.1 Gravel Mining Fee Freeze and Ordinance Amendment

On October 25, 2012, the Natural Resources division received a letter from the California Construction and Industrial Materials Association (CalCIMA). CalCIMA is the industry representative for the sand and gravel producers mining lands in the CCAP program area. CalCIMA and the member gravel producers (Granite, Syar, Teichert, and CEMEX) are active partners in the implementation of the CCAP. The letter specifically requested that 1) the County freeze the fee increase scheduled for 2013 and leave the 2012 fee rate in place, and 2) engage in discussion during 2013 to reevaluate the long-term structure of the gravel mining fees.

In response to CalCIMA's request, on June 4, 2013, the Board of Supervisors adopted an ordinance that suspended the 2.1 cent gravel fee increase for 2013 and directed that staff engage in meaningful discussion with the gravel producers and their representatives to explore ways in which the current gravel fee schedule might be made more responsive to economic conditions while still meeting the needs of the CCAP program to carry out its numerous mandates and voter approved policies.

As directed by the Board, staff met with gravel industry representatives to discuss alternative gravel mining fee structures. Various options were analyzed by looking at the fiscal requirements to deliver the statutory requirements contained in the governing documents (OCMP, CCRMP, CCIP) and gravel tonnage sales. Gravel tonnage sales (and thus, fees collected) tend to fluctuate from year to year based on a number of factors including the economy and local building trends. Average tons sold over the past 16 years are 3,523,405 per year. In 2012, the aggregate sales within the CCAP totaled 1,517,741 tons, the lowest in CCAP history, resulting in fees due in 2013 of $830,205. Based on gravel industry projections, staff and industry representatives believe that tons sold over the next 15 years will be closer to an average of 3.25 million tons sold per year.

By establishing a "baseline budget" for each program area staff was able to demonstrate that the program needed to collect an average of $1.25 to $1.5 million per year in gravel fees over the next 15 years. Using the baseline budget amounts and the projected gravel sales (+/- 3M tons per year) the following draft fee chart was developed:

Revenue Needed Per Year	Projected Tons Sold Per Year		
	3M tons	**3.25M tons**	**3.5M tons**
$1.25 M	**$0.42**	**$0.39**	**$0.36**
$1.50 M	**$0.50**	**$0.47**	**$0.43**

Using the baseline budget and based on the past averages of gravel tons sold and projections of tons sold over the next 15 years, it was determined that a base fee of $0.47 with average sales of 3, 250,000 tons per year would account for efficiencies in program delivery, reflect a more accurate expectation of future annual tons sold, and allow the gravel producers some relief from the existing fee structure. It was further recommended to introduce a four percent (4%) fee escalator on January 1, 2014 (and each January 1 thereafter).

These recommendations were considered by the Board of Supervisors on November 5, 2013 and adopted on December 3, 2013. The revised fee of $0.47 cents per ton is effective on January 1, 2014. The amended ordinance (Ordinance No. 1437) is provided in Appendix H.

7.3.2 Gravel Mining Fee Distribution

Pursuant to the Gravel Mining Fee Ordinance, the purpose and use of fees are to fund the implementation of: the CCRMP and CCIP; a long-term interest bearing account for future activities called the Maintenance and Remediation Fund (M&R); the OCMP; and habitat restoration and enhancement along Cache Creek and implemented by the Cache Creek Conservancy (CCC).

Each fund receives a portion of the fee surcharge for each ton of gravel sold:

CCRMP	OCMP	M&R	CCC
55.56%	17.78%	4.44%	22.22%

Pursuant to the Gravel Mining Fee Ordinance, Section 8-11.01(a) and (c), the calculated fee split for the last five years is as follows:

		Fee Allocation			
Year	**Fee per Ton**	**CCRMP**	**OCMP**	**M & R**	**CCC**
2007	$0.450	$0.250	$0.080	$0.020	$0.099
2008	$0.468	$0.260	$0.083	$0.021	$0.104
2009	$0.487	$0.271	$0.087	$0.021	$0.108
2010	$0.506	$0.281	$0.090	$0.022	$0.112
2011	$0.526	$0.293	$0.094	$0.024	$0.117
2012	$0.526	$0.293	$0.094	$0.024	$0.117

Figure 10: Calculated Gravel Mining Fee Split (2007 - 2012)

The Fee Ordinance identifies allowable expenditures as follows:

The **CCRMP implementation fee** is to be used to implement the CCRMP and CCIP. Specifically, it can be used for the design and construction of projects for channel stabilization and bridge protection; the design and construction of channel maintenance projects; monitoring, modeling, and flood watch activities per the CCIP; and compensation of the TAC.

The **Cache Creek Conservancy** contribution is to be used for habitat restoration and enhancement along Cache Creek, and revegetation projects consistent with CCRMP creek stabilization objectives.

The **Off Channel Mining Plan (OCMP)** administration fee is to be used for the implementation of the OCMP, administration of the long-term mining permits and Development Agreements, and inspection of mining and reclamation operations.

The **Maintenance and Remediation** fee is to fund a long-tem, interest-bearing account for the following future activities: the correction of mercury bioaccumulation problems after reclamation has been completed, if necessary; clean-up hazardous materials contamination after reclamation is completed, if necessary; extended environmental monitoring of the off-channel mines, including data gathering and groundwater modeling, beyond that required in the mining permits; and maintenance of publicly held lakes within the plan area. No expenditures may be drawn from the Maintenance and Remediation fund until January 2027, at which time the fund shall be made available for the activities identified in the ordinance.

The Twenty Percent **Production Exception Surcharge** is collected for any amount of aggregate sold in excess of annual permitted production. These funds are to be divided evenly between the CCRMP Implementation fund and the Maintenance and Remediation fund.

Fee calculations for the current year are based on tons sold during the previous year. In 2012, the aggregate sales within the CCAP totaled 1,517,741 tons, resulting in fees due in 2013 of $798,332. Tons sold in 2012 were the lowest in program history. However, this is consistent with the economic downturn that is affecting all industry sectors. It should be noted that, at the discretion of the County, up to 35 percent of the CCRMP fee paid by aggregate producers may be offset by costs incurred from participating in channel improvement projects. However, such offsets cannot be utilized for bank protection mitigation measures required under the off-channel mining permits. There were no fee offsets in 2013.

7.3.2 Program Audits and Review

As required by the Gravel Fee Mining Ordinance, Sec 8-11.02(f), County staff initiated a review of the fee revenue and expenditures in 2012 to verify that program activities and expenditures fall within the scope of the CCAP, and to verify deposits into appropriate funds. The results of that audit were made available to the Natural Resources Division in 2013 and are discussed below.

The Natural Resources division contracted with the Yolo County Auditor-Controller's office to perform the review, which covered transactions during the period of July 1, 2009 through June 30, 2011. The following review objectives pertain to all fee revenue, including that paid to the Cache Creek Conservancy:

1. Determine that gravel mining fee revenue was computed correctly (based on tons sold),
2. Determine that all mining fees paid have been properly classified, and
3. Determine that expenditures incurred fall within the scope of the CCAP.

The Auditor-Controller's office reviewed internal controls over billing and accounts receivable to assess compliance with the both the Gravel Mining Fee Ordinance and Yolo County policies and procedures.

The results of the audit determined:

1. Gravel mining fee revenue was computed correctly;
2. All gravel mining fees (excluding those paid directly to the Cache Creek Conservancy which were not included in this audit) were correctly recorded and classified; and
3. Recognition that four out of the six prior audit recommendations (from 2010) had been successfully implemented. The two outstanding recommendations have been partially implemented.

The audit also provided valuable recommendations related to reducing discrepancies in tonnage reports due to variable reporting periods (i.e. fiscal year vs calendar year).

The County is also required to biennially audit tonnage claims and revenue deposits (Section 8-11.05(b), Gravel Mining Fee Ordinance). The Natural Resources Division conducts an annual analysis comparing the MRRC-2 document to the Assessor's report, and to the CCAP required tonnage report, along with the discrepancy explanations provided by the aggregate producers. The Auditor-Controller has determined that this analysis satisfies the "tonnage claim" audit requirement.

7.4 CCRMP BUDGET

The Cache Creek Area Plan (CCAP) budget consists of three (3) distinct funds: The CCRMP, the OCMP, and the Maintenance and Remediation funds. The portion of the fees paid by the aggregate producers that is ear-marked for the Cache Creek Conservancy is paid directly to the Conservancy and therefore is not included in the County's budget for the CCAP. For a complete breakdown of the CCAP budget, please see the Final County Budget available on line at http://www.yolocounty.org/Index.aspx?page=933.

Figure 11: Final Adopted 2013-2014 Budget

Fiscal Year 2013-14 Budget **Fund 032 BU2972 CAO-CACHE CREEK RESOURCE MGMT**	
Major Object	**FY2013-14 Adopted Budget**
SALARIES AND EMPLOYEE BENEFITS	$ 172,492.00
SERVICES AND SUPPLIES	$ 600,291.00
OTHER CHARGES	$ 250.00
FIXED ASSETS-STRUCTURES/IMPS	$ ---
Total Appropriation	**$ 858,529.00**
FEES AND PERMITS-SAND & GRAVEL	$ 608,766.00
INVESTMENT EARNINGS	$ 74,000.00
Total Revenue	**$ 719,647.00**

7.4.1 Expense Summary - FY2012-2013

CCAP FY 2012-13 Income and Expence Recap	FUND 032	FUND 036	FUND 053	TOTAL
REVENUE				
Permits & Fees	$495,279.96	$39,626.66	$158,337.22	$693,243.84
Investment Earnings	$3,208.25	$13,808.39	$2,277.36	$19,294.00
Charges for Services	$12,750.00	$0.00	$0.00	$12,750.00
Other-Sale of Fixed Asset	$30,688.88	$0.00	$0.00	$0.00
TOTAL Revenue	**$541,927.09**	**$53,435.05**	**$160,614.58**	**$725,287.84**
EXPENSE				
Salaries & Benefits	$238,990.03	$0.00	-$677.15	$238,312.88
Service & Supplies	$253,986.36	$0.00	$79,211.35	$333,197.71
TOTAL Expense	**$492,976.39**	**$0.00**	**$78,534.20**	**$571,510.59**
net gain (loss)	$48,950.70	$53,435.05	$82,080.38	$153,777.25
Ending Balance	$1,141,660.07	$1,576,134.06	$872,075.67	

Note:

Fund	***Program Area***
032	*CCRMP*
036	*Maintenance & Remediation (Restricted Fund)*
053	*OCMP*

Those expenditures above and beyond the anticipated revenue were covered by the residual program fund balance

7.5 GRANTS

7.5.1 Yolo County Sheriff's Department

This is the third year (beginning with FY 2009-10) that the Sheriff's department has been the recipient of Off Highway Vehicle (OHV) grant funds from California State Parks for OHV related patrol and enforcement activities in the CCRMP area. Not only is the illegal use of OHV's in the creek an enforcement problem, OHV use in Cache Creek can be problematic when it destroys riparian vegetation, and contributing to an increase in erosion on the creek banks (CCRMP, p. 68). For FY 2012-2013, the Yolo County Sheriff was awarded a grant of approximately $26,664. Figure 12 below provides a summary of how grant funds were utilized in 2012-2013.

Enforcement	Training	Equipment/Repairs	Matching / In Kind Contribution
Hours of enforcement: 281	Dual purpose motorcycle training course (1 Sergeant)	New ATV Trailer, Supplies	Personnel Costs ($7,120.02)
No. of contacts: 1,115		Repairs to ATV	Equipment & Maintenance ($960.22)
No. of citations: 1			
No. of arrests: 0			
Calls for services: 4			
Total: $11,670	**Total: $230.00**	**Total: $14,763.22**	**Total: $8,080.24**

Figure 12 - Summary of 2012-2013 Grant-funded OHV Enforcement Activity

Source: Yolo County Sheriff's Department
Reporting Period: 9/1/2012 through 8/31/2013

The California Department of Parks and Recreation awarded $37,024 of grant funding to the Sheriff's Department for FY2013/14 for OHV enforcement. The grant requires a local match of 33% ($12,371) which can be fulfilled by in-kind services

7.5.2 Cache Creek Conservancy

In 2011, the Cache Creek Conservancy received a California State Parks OHV Mitigation grant for $31,662. The purpose of the grant is for habitat restoration to offset the effects of Off-Highway Vehicles. The grant award covers a 3-year funding period. The funding period is Sept. 1, 2011 through August 31, 2014. The grant requires a minimum match of $32,954, increasing the project total to nearly $65,000.

As of August 31, 2013 the Conservancy had exhausted all of the grant allocation for restoration and mitigation work at three sites: Cache Creek Nature Preserve, Correll-Rogers Water Recharge and Habitat site, and Wild Wings Park. Most of the funding for FY2012-13 was spent on restoration and maintenance at the Wild Wings project site.

The Cache Creek Conservancy received a one-time grant of $12,000 from the Yolo Water Resources Association to repair a dilapidated barn at the Cache Creek Nature Preserve.

The Cache Creek Conservancy also received a grant from the Yocha Dehe Community Fund in 2012. The grant provides the Conservancy with $50,000 over the next three (3) years (2013-2016) for improvements to the Nature Preserve's Tending and Gathering Garden. The Tending and Gathering Garden (TGG) is a collaborative effort between the Native American community and the Cache Creek Conservancy to demonstrate the traditional land and plant management practices of California's native people. Two acres have been restored with native plants found within the Cache

Creek watershed. These plants are used for basketry, food, fiber, shelter, medicine, and watercraft. The TGG provides a place for "hands-on" education including plant identification, plant use, and traditional management methods. Projects like the TGG support the goals of the CCRMP including the development of high quality natural habitat (p. 56) and the establishment of a variety of educational opportunities along Cache Creek for use by the public (p. 71). The Nature Preserve is a county-owned property.

7.5.3 Yolo County, Natural Resources Division

The National Park Service renewed its 2011 award to Yolo County of the River, Trails, and Conservation Assistance (RTCA) program for technical assistance in the development of a Cache Creek Parkway Plan. Technical assistance from the National Park Service includes providing advice, in-kind assistance, services, and/or training to Yolo County staff. The Parkway Plan will build on the vision provided in Chapter 5 (Action 5.4-2) of the CCRMP by developing a coherent use plan for the lands and lakes that will be dedicated to the County in the coming years, enhancing opportunities for land and water-based recreation, riparian habitat conservation and restoration, and increased groundwater recharge. Technical assistance through the RTCA grant will enable County staff and partner organizations to draw on RTCA's extensive experience working on conservation and trail planning projects throughout the country. Staff anticipates the timing of the following milestones:

1. Background Report comprised of three pieces: a Property Catalog, Plan Development Overview of other planning efforts, and Property Ownership Information (for workshops, public noticing, plan development, etc.). (Mid 2014)

2. Concepts and Visions Report involving two sequential components: (Late 2014)

    a. Identify preliminary parkway concepts and visions for each property, using the Background Report;
    b. Public Outreach -- stakeholders, agencies, property owners, the gravel producers, Planning Commission Workshop, etc.

3. Preliminary Parkway Plan circulated for public review and comment (Mid 2015)

County staff began meeting in fall of 2013 with the specific goal of completing the background report.

7.5.4 Water Resources Association of Yolo County (WRA)

The WRA, in partnership with the Yolo County Flood Control and Water Conservation District (YCFCWCD), has continued in 2013 to provide grant funding in 2013 for two (2) projects of interest to the CCAP.

The first project funded is the Water Resources Information Database (WRID. This effort supports nearly all of the goals and objectives identified in the Water Resources chapter of the CCRMP (p. 43). The WRID project used grant funding to create a repository for data collected regarding ground water levels that includes Cache Creek Area Plan (CCAP) data. The WRID became available for limited public use in 2012 and for full access and use by the TAC hydraulic engineer and County staff in 2013. The TAC hydraulic engineer and County staff completed training on the WRID in 2013 that enabled them to both query and add data to the WRID. Most of the historical CCIP surface water quality data was added to the WRID in 2013. Remaining historical data and new data will be added in 2014.

The second project funded is the "Mercury TMDL Impacts and Implementation Assessment" project. This project encompasses the following activities that will provide direct benefit to the Cache Creek Watershed and the CCAP:

1. Provide an inventory for all mercury TMDL-required activities and document recent, on-going, and planned activities.

2. Provide as-needed regulatory consulting services on behalf of the WRA and its member agencies.

7.6 APPLICATIONS FOR IN-CHANNEL ACTIVITIES

As required under the CCIP (p. 6-8), the TAC is responsible for "the review of the design of projects requiring Floodplain Development Permits within the CCRMP channel boundary." The recommendations are then forwarded to the Floodplain Administrator for a final decision. The TAC did not review any applications in 2013 for in-channel activities. However, the TAC was involved with the review of several program related projects, as discussed in Chapter 2, Section 2.1.

7.7 STATUS OF PROGRAMMATIC PERMITS

The CCRMP relies on several programmatic federal and state permits/approvals that allow for annual implementation of in-channel activities and successful adaptive management. The County is in the process of seeking reauthorization of several of these permits, which streamline the process for channel improvement and habitat restoration projects in the CCRMP area. The status of each of these permits is summarized below.

7.7.1 U.S. Army Corps of Engineers (USACE)

Construction activities within wetland areas, as defined under the Federal Clean Water Act, require prior approval of a Section 404 permit from the USACE to allow for discharge into waters of the United States. The term of the original Regional General Permit No. 58 issued by the USACE was July 1997 through July 2002 for in-stream activities conducted within the CCRMP area. This permit was renewed in May 2004 for another five-year term extending through May 2009. The County applied for a third reauthorization of this permit in 2010, and has been engaged in the reauthorization process since that time. A public notice concerning the reauthorization was issued in September

2012. Since the expiration of the public notice comment period in October, 2012, the USACE requested initiation of a Section 7 consultation with the US Fish and Wildlife Service (USFWS), as summarized below. The USACE has also indicated that an update to the 1996 Cultural Resources Study is required as part of the Section 106 consultation with the State Office of Historic Preservation for compliance with the National Historic Preservation Act, and that update work has been initiated with Tom Origer & Associates, the firm that prepared the 1996 study. The regional general permit is a valuable streamlined process for supporting habitat restoration and channel stabilization and maintenance activities on Lower Cache Creek, and is integral to achieving the goals and objectives of the CCAP and of multiple partner agencies. The goal is to obtain reauthorization under Regional General Permit No. 58 by late spring of 2014.

7.7.2 U.S. Fish and Wildlife Service (USFWS)

As a part of the approval process for the Section 404 permit, the USACE is required to consult with the USFWS regarding a project's potential effects on federally listed threatened and endangered species. In October 1997, the USFWS issued a Biological Opinion for Valley Elderberry Longhorn Beetle (VELB), the only federally listed species to occur in the CCRMP/CCIP area. This opinion was relied upon by the USACE in the original and second reauthorization of the regional general permit. As part of the process to secure the third reissuance of the USACE Section 404 permit the County submitted a new draft Biological Assessment to the USACE in August 2012 for use in the consultation process with the USFWS. In October 2012, the USACE requested initiation of a Section 7 consultation with the USFWS, and forwarded the draft Biological Assessment for their review and use in determining potential impacts on federally-listed species. The USFWS responded in January 2013 that they needed additional information before formal consultation could begin. In September 2013, County staff prepared a detailed response and provided the USACE with supporting documentation which should address the remaining questions of the USFWS, including a copy of the Biological Opinion that was issued by the USFWS for the CCRMP/CCIP in 1997.

7.7.3 California Department of Fish and Wildlife (CDFW)

Construction activities within the defined bed and banks of stream channels require prior authorization from the CDFW through the Streambed Alteration Agreement process defined under Section 1600 of the State Fish and Wildlife Code. The term of the original general 1600 authorization issued by the CDFG was July 1997 through June 2002. This permit was renewed in August 2002 for another five-year term extending through August 2007. An interim extension through December 2007 was subsequently granted. In August, 2008, the general 1600 authorization was replaced by a Section 1602 Memorandum of Understanding, which establishes an individual project permit template. County staff has initiated discussions with CDFW over the preferred method to secure authorizations for in-channel activities associated with the CCRMP/CCIP. A meeting was held on September 24, 2013 with representatives of CDFW to review the history of the program, conduct a reconnaissance of the CCRMP area, and identify options that best address current authorization requirements. County staff is now preparing an application to CDFW for a Routine Maintenance authorization as part of a Streambed Alteration Agreement, which will be submitted in 2013 with the goal of securing authorization for in-channel activities by late spring of 2014.

7.7.4 Regional Water Quality Control Board (RWQCB)

Water Quality Certification, issued by the RWQCB pursuant to Section 401 of the Clean Water Act, is required in order to implement the Army Corps 404 Permit. The term of the original general 401 Certification issued by the Central Valley RWQCB was July 1999 through July 2002. This permit was reissued in August 2002 for a seven-year term extending through May 2009. In 2011, Yolo County submitted an application to the RWQCB requesting a third reauthorization of the 401 Water Quality Certification. The County has continued to coordinate with RWQCB staff in addressing their concerns throughout 2012. County staff anticipates that the 401 Certification will be issued by the RWQCB in spring of 2014, simultaneous with reissuance of Regional General Permit No. 58 by the USACE.

7.7.5 California Department of Conservation Compliance with the Surface Mining and Reclamation Act (SMARA)

Pursuant to CCRMP Action 2.4-15 the County presented a request in 1997 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 Board rejected the request and determined that the CCRMP was subject to SMARA, so a legislative solution was sought. In 1999 AB 297 (Thomson) was passed to amend SMARA to recognize the CCRMP as the functional equivalent of a Reclamation Plan for purposes of SMARA compliance. This legislation expired December 31, 2003. In 2004 AB 1984 (Wolk) reauthorized the legislation with an expiration of December 31, 2008. In 2007 AB 646 (Wolk) reauthorized the legislation a third time with an expiration of December 31, 2012. In 2011 SB 133 (Wolk) reauthorized the legislation a fourth time with an expiration of December 31, 2017.

7.8 PARTNER ORGANIZATIONS

The following entities are important partners with the County in implementing the CCRMP and CCIP:

7.8.1 Cache Creek Conservancy (CCC)

The Cache Creek Conservancy (CCC) is a 501(c)3 non-profit corporation whose mission is to preserve, restore, enhance, and promote the stewardship of the stream environment along Cache Creek. The CCC, created in 1996, manages land for wildlife habitat, controls invasive plants, and provides environmental education within the lower Cache Creek. It receives fees generated by the Cache Creek Area Plan, as well as funding from state, federal, and foundation grants. CCC is staffed by three (3) full time employees: Executive Director, an Administrative Assistant, and a Habitat Restoration Manager; and two (2) part time employees: a project coordinator and an education coordinator. All staff works under the direction of an independently elected Board of Directors.

The CCC and the County have collaborated on a number of joint ventures related to the creek, including management of County-owned lands such as the Correll-Rodgers property, the Milsap property, and the Cache Creek Nature Preserve.

As described in the 2012 Annual Status Report (pg 42) the Cache Creek Conservancy has been accommodating larger class sizes for field trips and educational programs than those that were described in the Licensing Agreement between Yolo County, the CCC, and Teichert. Teichert and the County have since executed an agreement (provided as Appendix I) that memorializes that the CCC accommodating slightly larger classes for field trips is consistent with the original intent of the Licensing Agreement.

A draft of the Conservancy's 2013 Annual Report is provided as Appendix J. (*Note: The Conservancy's Annual Report will not be reviewed by the CCC Board until January 2014)*

7.8.2 Yolo Chapter of the California Construction and Industrial Materials Association (CalCIMA)

CalCIMA is a trade association for the construction and industrial material industries in California, which includes aggregate, industrial mineral, and ready mixed concrete producers. The members of the Yolo Chapter of CalCIMA include Granite, Syar, Teichert, and CEMEX. CalCIMA and the member Producers are active partners in the implementation of the CCAP. The County and CalCIMA meet regularly in order to enable feedback and participation in program implementation. Producer representatives regularly attend CCAP TAC meetings, the annual Creek Walk and other program related activities. The producers individually, and the trade association, are all active participants in the program. The producers initiated the original effort to develop the CCAP and subsequently paid for the planning process. Both the industry and the County have benefited greatly from the resulting program which continues to be a model throughout the state

7.8.3 Yolo County Flood Control and Water Conservation District (YCFCWCD)

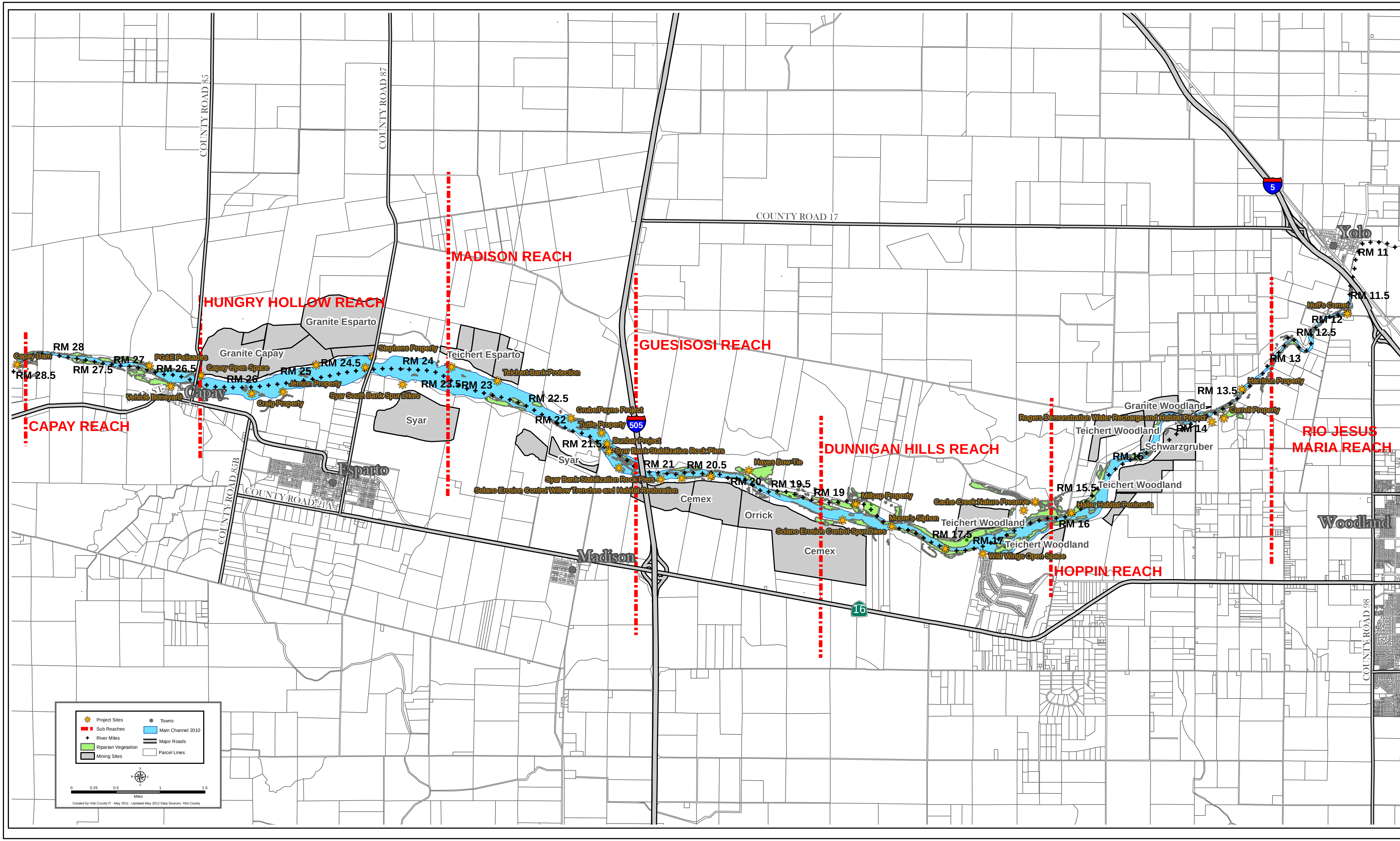
YCFCWCD's mission is "To plan, develop, and manage the conjunctive use of the District's surface and groundwater resources to provide a safe and reliable water supply at a reasonable cost, and to sustain the socioeconomic and environmental well-being of Yolo County." YCFCWCD's boundaries cover 195,000 acres of Yolo County, including the entire CCRMP area. The District operates Clear Lake, Indian Valley Reservoir, and owns the majority of water rights for Cache Creek. As such, YCFCWCD plays a central role in determining the flow of surface water within the Cache Creek watershed. The Capay Diversion Dam, at the upstream end of the CCRMP area, provides some of the water that the District distributes through more than 150 miles of canals and laterals. YCFCWCD is an important partner in stream restoration projects. YCFCWCD manages the Water Resources Association's groundwater monitoring program that provides valuable data that helps inform the CCRMP's impacts on groundwater. As discussed in the "Grants" section above, the YCFCWCD is working with the WRA to implement the WRID.

7.8.4 Yolo County Resource Conservation District (RCD)

The mission of the Yolo County Resource Conservation District (RCD) is to protect, improve, and sustain the natural resources of Yolo County. Resource Conservation Districts were first created as a result of the “Dust Bowl” crisis. Originally focusing on soil and water issues, the mission has broadened to include fish and wildlife habitat restoration, farmland preservation, and control of invasive plant and animal species. The Yolo RCD provides technical guidance, education, and on-site expertise for private landowners and growers, cities, schools, agencies, businesses, and research institutions. The Yolo County RCD is a lead agency in managing invasive plants throughout the Cache Creek watershed. In 2011, RCD was awarded a grant by the Water Resources Association of Yolo County for the development of a Cache Creek Watershed-wide Weed Management Plan. The plan was finalized in the fall of 2012 articulates priorities for invasive plant management throughout the watershed. The RCD is currently seeking funding for the implementation of the Plan.

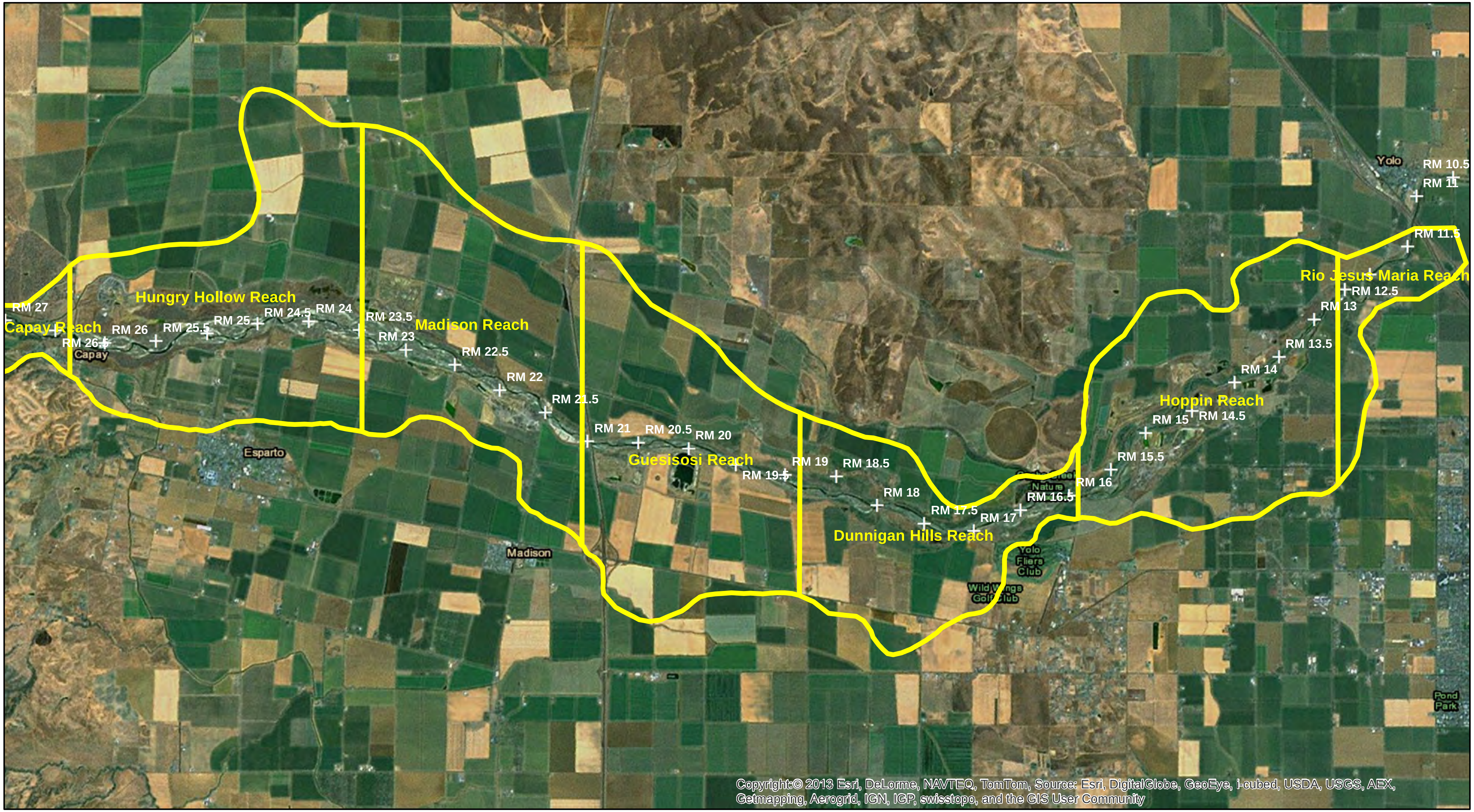
APPENDICES

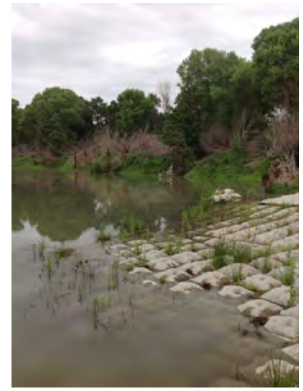
Appendix A	*Map of Cache Creek with River Miles*
Appendix B	*Cache Creek map key – River Reaches*
	B.1 Capay Reach (RM 28.4 – 26.4)
	B.2 Hungry Hollow Reach (RM 26.4 – 23.5)
	B.3 Madison Reach (RM 23.5 – 21.3)
	B.4 Guesisosi Reach (RM 23.5 – RM 19)
	B.5 Dunnigan Hills Reach (RM 19 – 16.2)
	B.6 Hoppin Reach (Rm 16.2 – 13)
	B.7 Rio Jesus Maria Reach (RM 13 – 11)
Appendix C	*Technical Advisory Committee Recommendations 1998 – 2012*
Appendix D	*Sediment Transport Calculations*
Appendix E	*Memo: Methodology for Estimating Aggradation*
Appendix F	*Memo: Gravel Bar Skimming RM 20.3 to 20.8*
Appendix G	*Memo: Gravel Bar Skimming RM 22.8 to 23.0*
Appendix H	*Ordinance No 1437 Gravel Mining Fee Ordinance Amendment*
Appendix I	*Cache Creek Nature Preserve – Intensity of Use Agreement*
Appendix J	*Cache Creek Conservancy Annual Report (draft)*


CAPAY REACH
HUNGRY HOLLOW REACH
MADISON REACH
GUESISOSI REACH
DUNNIGAN HILLS REACH
HOPPIN REACH
RIO JESUS MARIA REACH
COUNTY ROAD 85
COUNTY ROAD 87
COUNTY ROAD 17
COUNTY ROAD 85B
COUNTY ROAD 21A
COUNTY ROAD 98
Capay Dam
RM 28
RM 28.5
RM 27.5
RM 27
PG&E Palisades
RM 26.5
Capay Open Space
RM 26
Vehicle Boneyard
Capay
Craig Property
Jenson Property
RM 25
RM 24.5
Stephens Property
RM 24
Syar South Bank Spur Dikes
RM 23.5
RM 23
Teichert Bank Protection
Granite Esparto
Granite Capay
Teichert Esparto
Syar
Esparto
RM 22.5
Grube/Payne Project
RM 22
Tuttle Property
RM 21.5
Dunbar Project
Syar Bank Stabilization Rock Piers
RM 21
RM 20.5
Hayes Bow-Tie
RM 20
RM 19.5
RM 19
Millsap Property
Solano Erosion Control Willow Trenches and Habitat Restoration
Cemex
Orrick
Madison
Solano Erosion Control Spur Dikes
Moore's Siphon
Cache Creek Nature Preserve
Teichert Woodland
RM 17.5
RM 17
Wild Wings Open Space
RM 16
RM 15.5
Haller Habitat Peninsula
RM 16
Schwarzgruber
Granite Woodland
RM 14
Rogers Demonstration Water Recharge and Habitat Project
Correll Property
RM 13.5
Harrison Property
RM 13
RM 12.5
RM 12
Huff's Corner
RM 11.5
RM 11
Yolo
Woodland
5
505
16
Project Sites
Sub Reaches
River Miles
Riparian Vegetation
Mining Sites
Towns
Main Channel 2010
Major Roads
Parcel Lines
0 0.25 0.5 1 1.5
Miles
Created by Yolo County IT - May 2011 - Updated May 2012 Data Sources: Yolo County

Cache Creek

Appendix B



Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	View upstream of Palisades bank stabilization with successful arundo treatment.	Deposition has occured between the pilings.	Capay Reach	RM 26.9	
Larsen	Beaver dam	Possible beaver dam US of palisades near RB	Capay Reach	RM 26.9	

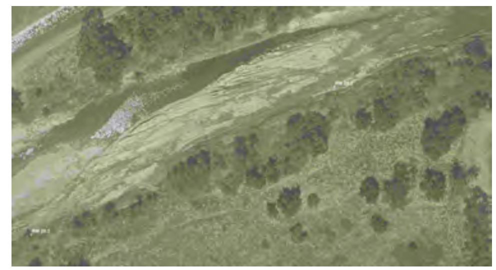
Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Bank erosion from flow diversion of PGE crossing.	AUDIO notes included here discussing methods that PGE proposes.	Capay Reach	RM 26.9	
Larsen	Bank erosion from flow diversion of PGE crossing.	AUDIO notes included here discussing methods that PGE proposes.	Capay Reach	RM 26.9	
Martin	Platings at north bank near PGE pallisades in generally good condition. Scattered arundo clumps observed along treated stands on north bank.		Capay Reach	RM 26.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Beaver dam in creek at PGE Palisades site.		Capay Reach	RM 26.9	
Martin	View upstream of Palisades bank stabilization with successful arundo treatment.		Capay Reach	RM 26.9	
Martin	Bank erosion from flow diversion of PGE crossing with channel migrating to the south.		Capay Reach	RM 26.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	View upstream of concrete pillows at PGE Palisades crossing. Some emergent establishment is visible within the pillows at crossing.		Capay Reach	RM 26.9	
Tompkins	Possible fill on RB but no significant new erosion.	Looking at the right bank from the concrete sack revetment at the Palisades. Right bank vegetation has been removed since 2012 and fill material has been placed on the bank or deposited by a high flow. Conditions in 2013 appear mostly stable, but if the new bare sediment does not revegetate before the next high flows this area could be susceptible to bank erosion and migration.	Capay Reach	RM 26.9	

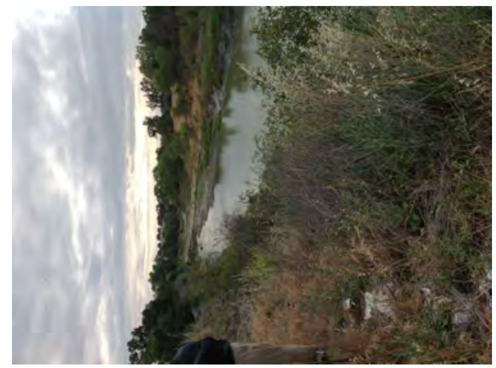
Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking DS	Looking downstream from the concrete sack revetment at the Palisades. Channel conditions in 2013 very similar to 2012.	Capay Reach	RM 26.9	
Tompkins	Looking US.	Looking upstream from a position on the concrete sack revetment. Channel conditions in 2013 very similar to 2012.	Capay Reach	RM 26.9	
Tompkins	LB to RB	Looking from left bank to right banks. The concrete sack revetment looks the same as in 2012.	Capay Reach	RM 26.9	

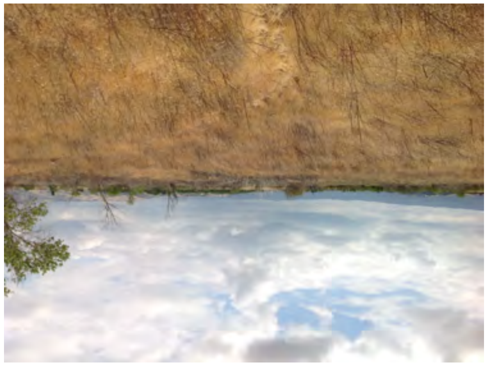
Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Palisades looking US	This photo looking upstream of the Palisades shows that there was higher flow in Cache Creek in 2013 than in 2012, but that channel conditions had not changed significantly. There was more debris present on the Palisades in 2013 than 2012 but they appear to still be functioning as designed.	Capay Reach	RM 26.9	
Tompkins	Possible beaver dam US of palisades near RB	Looking upstream towards right bank from concrete sack revetment at PGE Palisades. There appeared to be a beaver dam spanning the channel between the concrete sack revetment and the right bank. This beaver dam was not present in 2012 and could cause problematic hydraulics downstream at the exposed pipeline.	Capay Reach	RM 26.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	South bank runoff	There appears to be runoff from the south bank that appears to have cut into the bedrock of the channel.	Capay Reach	RM 28	
Larsen	"Bedrock"	Downstream from the dam, in this location, there is a large area of "bedrock" or very hard bed layer. It is possible that this will protect against any "headcutting."	Capay Reach	RM 28.2	
Martin	Concrete rubble in creek channel. Possible future removal project as part of CCRMP.		Capay Reach	RM 28.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Grade control	It would be beneficial to get the design drawings of the grade control structure.	Capay Reach	RM 28.4	
Larsen	Capay Dam	Note that the rock has moved downstream from the apron.	Capay Reach	RM 28.4	
Martin	Looking downstream just below Capay Dam.		Capay Reach	RM 28.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Capay dam - Max Stevenson - YCFCWCD - built 1914 - no flood storage. West Adams canal (1/3 of diversion) on river left. Winters Canal (2/3) on river right. 700 turnouts along 160 miles of canals. 2013%	Capay dam - Max Stevenson gave a brief overview of the dam history and system performance. The Yolo County Flood Control and Water Conservation District maintains the system. Capay Dam was built 1914 and has no flood storage. The West Adams canal takes 1/3 of diversion on river left, the Winters Canal takes 2/3 of the diversion on river right. There are 700 turnouts along 160 miles of canals.	Capay Reach	RM 28.4	
Tompkins	Capay Dam	Capay Dam appears the same as it did on the 2012 Creek Walk.	Capay Reach	RM 28.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Riprap migrating downstream of dam.	We observed riprap that had migrated a short distance downstream of dam face where it was originally placed. The riprap does not appear to have moved significantly since the 2012 Creek Walk.	Capay Reach	RM 28.4	
Tompkins	Channel downstream of dam.	The Cache Creek channel downstream of dam had more water in it in 2013 than in 2012, however bank conditions appeared relatively unchanged since 2012.	Capay Reach	RM 28.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	View up and downstream of treated tamarisk stand with natural regeneration.	Looking upstream and downstream at a treated tamarisk stand where natural regeneration appears to be occuring and may require additional eradication treatment.	Hungry Hollow Reach	RM 23.6	
Tompkins	View up and downstream of treated tamarisk stand with natural regeneration.	Looking upstream and downstream at a treated tamarisk stand where natural regeneration appears to be occuring and may require additional eradication treatment.	Hungry Hollow Reach	RM 23.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	DS	Looking downstream at location where channel conditions in 2013 are very similar to 2012.	Hungry Hollow Reach	RM 23.9	
Tompkins	Across	Looking across at location where channel conditions in 2013 are very similar to 2012.	Hungry Hollow Reach	RM 23.9	
Tompkins	US	Looking upstream at location where channel conditions in 2013 are very similar to 2012.	Hungry Hollow Reach	RM 23.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	DS	Looking downstream at location where channel conditions in 2013 are very similar to 2012.	Hungry Hollow Reach	RM 24	
Tompkins	Across	Looking across at location where channel conditions in 2013 are very similar to 2012.	Hungry Hollow Reach	RM 24	
Tompkins	US	Looking upstream at location where channel conditions in 2013 are very similar to 2012.	Hungry Hollow Reach	RM 24	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	DS	Looking downstream at location where channel conditions in 2013 are very similar to 2012.	Hungry Hollow Reach	RM 24.2	
Tompkins	Across	Looking across at location where channel conditions in 2013 are very similar to 2012.	Hungry Hollow Reach	RM 24.2	
Tompkins	US	Looking upstream at location where channel conditions in 2013 are very similar to 2012.	Hungry Hollow Reach	RM 24.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	View from bridge	On bridge looking US	Hungry Hollow Reach	RM 24.3	
Larsen	View from bridge	On bridge looking DS	Hungry Hollow Reach	RM 24.3	
Larsen	Bridge piers	Bridge piers with possible aggradation.	Hungry Hollow Reach	RM 24.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	View upstream and downstream of bridge. No major changes in vegetation establishment discern able. Major swallow colony under bridge primarily over water.		Hungry Hollow Reach	RM 24.3	
Martin	View upstream and downstream of bridge. No major changes in vegetation establishment discern able. Major swallow colony under bridge primarily over water.		Hungry Hollow Reach	RM 24.3	
Tompkins	On bridge looking US	Looking upstream from County Road 87 bridge. No major channel change since 2012. However, definite gravel (estimate 45-64mm median diameter) that was mobilzed during the high flows of winter 2012/2013 and forms a lobe prograding downstream towards the bridge. Also slightly more riparian vegetation in 2013.	Hungry Hollow Reach	RM 24.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	On bridge looking DS	Looking downstream from County Road 87 bridge. No major channel change since 2012. Slightly more riparian vegetation in 2013.	Hungry Hollow Reach	RM 24.3	
Tompkins	Bridge piers with possible aggradation.	Looking upstream and across to right bank at highway 87 bridge. Possible gravel aggradation at the bridge. Does not appear to be significant scour at bridge piers since 2012.	Hungry Hollow Reach	RM 24.3	
Martin	Spur dike with some early successional shrubs.		Hungry Hollow Reach	RM 24.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	US	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Hungry Hollow Reach	RM 24.6	
Tompkins	Across	Looking across showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Hungry Hollow Reach	RM 24.6	
Tompkins	DS - LB training berms	Looking downstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012. This photo also shows the training berms that do not appear to have changed significantly since 2012.	Hungry Hollow Reach	RM 24.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	US LB training berm.	Looking across at left bank training berm showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Hungry Hollow Reach	RM 24.6	
Martin	View of spur dikes at Granite Esparto site.		Hungry Hollow Reach	RM 24.7	
Martin	View of spur file on north bank witherennoal pepper weed.		Hungry Hollow Reach	RM 24.7	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	US	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Hungry Hollow Reach	RM 24.8	
Tompkins	Across	Looking across showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Hungry Hollow Reach	RM 24.8	
Tompkins	DS	Looking downstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Hungry Hollow Reach	RM 24.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	US	Looking upstream from just south of the Teichert plant. No significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Hungry Hollow Reach	RM 25.1	
Tompkins	Across	Looking across the channel from just south of the Teichert plant. No significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Hungry Hollow Reach	RM 25.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	DS - Ben noticed possible RB channel and vegetation change and we confirmed with photos from last year	Looking downstream from just south of the Teichert plant. No significant channel changes since 2012. Minor riparian vegetation increase since 2012. Ben Adamo identified right bank channel and vegetation change between 2012 and 2013 that were confirmed by the Creek Walk photo database. No major channel or vegetation changes.	Hungry Hollow Reach	RM 25.1	
Larsen	Bank stabilizatoin LB	View downstream of channel at north bank which has been stabilized in the past.	Hungry Hollow Reach	RM 25.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	View downstream of channel at eroded north bank at Granite Esparto site which has been stabilized in the past.		Hungry Hollow Reach	RM 25.2	
Larsen	Looking DS at Granite plant. Potential selective bar skimming on RB.	AUDIO - Ben Adamo is involved with a long discusion of the practical aspects related to bar skimming policy. There is also discussion of the Granite construction bank protection area, and the large spur dike on the right bank. Also includes a discussion of major bar-skimming locations and approach.	Hungry Hollow Reach	RM 25.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Looking DS at Granite plant. Potential selective bar skimming on RB.	AUDIO - Ben Adamo is involved with a long discusion of the practical aspects related to bar skimming policy. There is also discussion of the Granite construction bank protection area, and the large spur dike on the right bank. Also includes a discussion of major bar-skimming locations and approach.	Hungry Hollow Reach	RM 25.3	
Tompkins	Looking DS at Granite plant. Potential selective bar skimming on RB.	Looking downstream at Granite plant. Channel form is nearly identical to 2012 conditions. Year old willows at the edge of water in 2013 that were not present in 2012. TAC discussed potential selective bar skimming on the right bank in this location.	Hungry Hollow Reach	RM 25.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking US. Eroding RB. US end of long straight reach pointed at Granite. Land ownership issues for skimming.	Looking upstream at eroding right bank. This bank was already eroding in 2012. The eroding right bank is at the upstream end of the long, straight reach of the main channel that flows directly at the Granite plant. The TAC discussed bar skimming in this location and land ownership issues that would complicate bar skimming were raised.	Hungry Hollow Reach	RM 25.3	
Larsen	Exposed concrete rubble from dike on south bank.	AUDIO - there is a long discussion with Ben and Cindy about the CCIP regulations and policies on bar skimming	Hungry Hollow Reach	RM 25.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Exposed concrete rubble from dike on south bank.	AUDIO - there is a long discussion with Ben and Cindy about the CCIP regulations and policies on bar skimming	Hungry Hollow Reach	RM 25.4	
Martin	Exposed concrete rubble from spur dike on south bank.		Hungry Hollow Reach	RM 25.4	
Martin	View downstream showing sparse vegetation cover.		Hungry Hollow Reach	RM 25.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Possible gravel skimming alignment to relieve flood pressure on south bank and downstream pressure on north bank.		Hungry Hollow Reach	RM 25.4	
Martin	Possible gravel skimming alignment to relieve flood pressure on south bank and downstream pressure on north bank.		Hungry Hollow Reach	RM 25.4	
Martin	Elderberry location near alignment of possible gravel skimming location. Total of 14 stems over 1 inch.		Hungry Hollow Reach	RM 25.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Vigorous growth of willow scrub approaching tree height.		Hungry Hollow Reach	RM 25.7	
Tompkins	Looking DS	Looking downstream showing no major channel changed between 2012 and 2013.	Hungry Hollow Reach	RM 25.9	
Tompkins	Looking US	Looking upstream showing no major channel changed between 2012 and 2013.	Hungry Hollow Reach	RM 25.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Erosion RB	Exposed geotextile on RB.	Hungry Hollow Reach	RM 26	
Larsen	Erosion RB	Exposed geotextile on RB.	Hungry Hollow Reach	RM 26	
Martin	Bank erosion exposing geofabric on slope of previous stabilization area.		Hungry Hollow Reach	RM 26	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Elderberry establishing on channel bottom where tamarisk stumps have allowed for silt accumulation.		Hungry Hollow Reach	RM 26	
Tompkins	Exposed geotextile on RB.	Looking at the right bank where geotextile fabric has been exposed, possibly by high flows between 2012 and 2013. The geotextile indicates this is a constructed bank that is eroding.	Hungry Hollow Reach	RM 26	
Larsen	Looking downstream.	Possible erosion along RB and potential area for LB bar skimming.	Hungry Hollow Reach	RM 26.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	View of debris accumulation in channel bottom. Confirm need for channel maintenance at this location - bar skimming? Does not appear necessary given width of channel bottom.		Hungry Hollow Reach	RM 26.1	
Tompkins	LB to RB DS possible erosion along RB and need for LB bar skimming.	Looking from the left bank to the right bankand downstream where the right bank is eroding (some may have occurred between 2012 and 2013) and gravel accumulation on the left bank may be directing flow at the right bank. There was discussion of possible left bank bar skimming at this location.	Hungry Hollow Reach	RM 26.1	
Tompkins	US	Looking upstream along exposed clay hardpan downstream of CR 85 bridge. No significant channel change in this reach between 2012 and 2013.	Hungry Hollow Reach	RM 26.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	DS	Looking downstream along exposed clay hardpan downstream of CR 85 bridge. No significant channel change in this reach between 2012 and 2013.	Hungry Hollow Reach	RM 26.2	
Larsen	Erosion on south bank upstream from bridge.	Audio includes notes on erosion upstream from bridge. The right bank appears to be higher than it was last year. Ben explained that it might not be higher (i.e. lower water surface elevation) but that the lateral erosion in the south direction gives this appearance to the bank height..	Hungry Hollow Reach	RM 26.3	
Larsen	Erosion on south bank upstream from bridge.	Audio includes notes on erosion upstream from bridge. The right bank appears to be higher than it was last year. Ben explained that it might not be higher (i.e. lower water surface elevation) but that the lateral erosion in the south direction gives this appearance to the bank height..	Hungry Hollow Reach	RM 26.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Stands of creeping wild rue at Capay Open Space Park. Weeds seem to be under control. Mowing a good practice set at height high enough to retain thatch and keep weed germination down.		Hungry Hollow Reach	RM 26.3	
Martin	View downstream showing young emergent and scrub establishment.		Hungry Hollow Reach	RM 26.3	
Martin	View upstream of bridge. Large cliff swallow colony nesting under bridge. Heavy emergent cover, primarily cattail, in ponded in-channel areas. Steep bank on south side of creek.		Hungry Hollow Reach	RM 26.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Test point at Capay open space park.	Test point at Capay open space park.	Hungry Hollow Reach	RM 26.3	
Tompkins	Looking US from bridge. Eric thinks RB cut bank higher.	Looking upstream from CR 85 bridge. The right bank of the channel appears to be downcut five to ten feet below the top of bank. We did not have a photo from this location in 2012 so it is unclear whether this downcut occurred between 2012 and 2013. Future Creek Walks should assess whether this cut bank changes.	Hungry Hollow Reach	RM 26.3	
Tompkins	Looking DS. Large gravel bars DS bridge.	Looking downstream from CR 85 bridge. There continue to be large gravel bars downstream of the bridge but no signficant channel change between 2012 and 2013.	Hungry Hollow Reach	RM 26.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Groins	South side groins upstream from Highway 505. Also have a view from above of groins	Madison Reach	RM 21.1	
Larsen	Groins	South side groins upstream from Highway 505. Also have a view from above of groins	Madison Reach	RM 21.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking down stream at 505 bridge.	Looking downstream at 505 bridge. No substantial channel changes since 2012.	Madison Reach	RM 21.1	
Tompkins	Looking at left Bank	Looking at left bank.	Madison Reach	RM 21.1	
Tompkins	Looking upstream	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 21.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking at right bank mature cottonwoods.	Looking at right bank mature cottonwoods.	Madison Reach	RM 21.1	
Larsen	Groins	Ben and I are observing the toe of the groins and noticing significant deposition downstream in from the top	Madison Reach	RM 21.2	
Larsen	Groins	Pictures of groins on Southbank.	Madison Reach	RM 21.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Spur dikes on north bank are capped with soil where revegetation has been possible. Capping the spur dikes on south bank should be considered to allow for revegetation and improve habitat values.		Madison Reach	RM 21.2	
Tompkins	Right bank for spur dikes upstream 505	Looking at right bank spur dikes upstream of 505. No significant changes since 2012.	Madison Reach	RM 21.2	
Tompkins	Spur dikes built in 1998 and 1999. Looking US at RB.	Looking upstream at right bank spur dikes built in 1998 and 1999 that do not appear to have changed substantially since 2012.	Madison Reach	RM 21.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Groins	Groins It would be good to record the patterns of channel shift in the location of this groins overtime since they were first established!	Madison Reach	RM 21.3	
Martin	Lower end of terrace reach with discernably more stands of larger, woody willow and cottonwood.		Madison Reach	RM 21.3	
Martin	View of exposed spur dike ends. Mark saw a western pond turtle in large pool at base do spur dikes.		Madison Reach	RM 21.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	RB training berm with eroding face.	Looking at right bank training berm with eroding face. While this should be monitored in future years, it has not changed significantly since 2012.	Madison Reach	RM 21.3	
Tompkins	Looking US LB to RB large 10' deep pool and eroding RB between training berms.	Looking upstream from left bank to right bank at large, 10 foot deep pool and eroding right bank between training berms. Training berms appear to be creating hydraulics that maintain pool habitat in some locations.	Madison Reach	RM 21.3	
Tompkins	US	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 21.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Across LB to RB.	Looking across from left bank to right bank showing no major channel change since 2012.	Madison Reach	RM 21.4	
Tompkins	DS along LB	Looking downstream along left bank showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 21.4	
Larsen	View of berms	These berms have contributed to the bank retreat immediatelyupstream from them	Madison Reach	RM 21.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Beaver dam looking upstream.		Madison Reach	RM 21.5	
Martin	Mid-terrace riparian zone with maturing, diverse, woody vegetation. Views and downstream.		Madison Reach	RM 21.5	
Martin	Mid-terrace riparian zone with maturing, diverse, woody vegetation. Views and downstream.		Madison Reach	RM 21.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Beaver dam still intact.	Beaver dam still intact from 2012.	Madison Reach	RM 21.5	
Larsen	Channel has removed material	Across RB to LB. The bar skimming that we previously considered has been done by the channel.	Madison Reach	RM 21.6	
Larsen	Bank at old Madison Bridge site	Vegetaion is protecting the toe of the bank	Madison Reach	RM 21.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Bank at old Madison Bridge site	More of high bank, with bank swallow nests	Madison Reach	RM 21.6	
Larsen	Bank at old Madison Bridge site	More of high bank, with bank swallow nests	Madison Reach	RM 21.6	
Martin	Bank swallow nesting colony at downstream end of exposed vertical bank. At least four nesting pairs observed in 2013.		Madison Reach	RM 21.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Bank swallow nesting colony at downstream end of exposed vertical bank. At least four nesting pairs observed in 2013.		Madison Reach	RM 21.6	
Martin	Tamarisk clumps at top of bank near Syar plant off Road 89.		Madison Reach	RM 21.6	
Tompkins	US	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 21.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Across RB to LB. Bar skimming Eric proposed has been done by channel.	Looking from right bank across to left bank. TAC discussed that previously proposed bar skimming for this area may have already been accomplished by natural channel sediment transport.	Madison Reach	RM 21.6	
Tompkins	DS	Looking downstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 21.6	
Tompkins	Looking US large LB bar.	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 21.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking DS on bar	Looking downstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 21.6	
Tompkins	High cut LB with maturing riparian vegetation at toe.	Looking at high cut left bank with maturing riparian vegetation at toe - this is an example of natural bank repair and habitat creation.	Madison Reach	RM 21.6	
Tompkins	At LB note sedges and vigorous willows.	Looking at left bank where there is vigorous establishment of sedges and vigorous willows.	Madison Reach	RM 21.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	At LB note possible active erosion at top of bank orchard and irrigation return flow seep.	Looking at left bank where there is possible active erosion at top of bank orchard and irrigation return flow seep.	Madison Reach	RM 21.6	
Tompkins	Looking DS at LB.	Looking downstream at left bank showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 21.6	
Larsen	Discussion of Bar skimming at rm 21.6	AUDIO included	Madison Reach	RM 21.7	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Discussion of Bar skimming at rm 21.6	AUDIO included	Madison Reach	RM 21.7	
Larsen	Discussion of Bar skimming at rm 21.6	AUDIO included	Madison Reach	RM 21.7	
Martin	Ste vertical bank with historic bank swallow habitat. Willow becoming well established at base of slope.		Madison Reach	RM 21.7	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Ste vertical bank with historic bank swallow habitat. Willow becoming well established at base of slope.		Madison Reach	RM 21.7	
Tompkins	Discussion of Bar skimming at rm 21.6	TAC discussed potential for bar skimming in the vicinity of River Mile 21.6.	Madison Reach	RM 21.7	
Tompkins	Discussion of Bar skimming at rm 21.6	TAC discussed potential for bar skimming in the vicinity of River Mile 21.6.	Madison Reach	RM 21.7	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Across LB to RB eroding low bank at Syar	Looking from left bank across to right bank where there is an eroding low bank along the Syar plant. This erosion has not changed substantially since 2012.	Madison Reach	RM 21.8	
Tompkins	US	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 21.8	
Tompkins	DS	Looking downstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 21.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Beaver felling of mature cottonwood. Raises question of whether some protection of essential large trees should be proved to secure woodland canopy as has been done on CC Preserve.		Madison Reach	RM 21.9	
Tompkins	Small beaver dam	Small beaver dam that was not present in 2012.	Madison Reach	RM 21.9	
Tompkins	DS	Looking downstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Across	Looking across showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22	
Tompkins	US	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22	
Martin	River Mile 22 with exposed north bank and low terrace with restoration opportunity.		Madison Reach	RM 22.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	DS	Looking downstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22.1	
Tompkins	US	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22.1	
Martin	Violet green swallows foraging over ponded reach.		Madison Reach	RM 22.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Fancy planter	Large tire filled with sediment and grasses.	Madison Reach	RM 22.2	
Tompkins	Swallows RB looking US at shallow channel	Looking upstream at swallows on the right bank of a shallow channel. Good example of how eroding banks can create swallow habitat.	Madison Reach	RM 22.2	
Tompkins	Across note perched pipe.	Looking across showing no significant channel changes since 2012. Perched pipe should be added to potential water quality contaminant source database. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	US	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22.2	
Tompkins	DS	Looking downstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22.2	
Tompkins	US	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	DS	Looking downstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22.3	
Martin	Arundo reestablishment in elevated terrace with scattered black walnut on north side of low flow channel.		Madison Reach	RM 22.4	
Tompkins	Tall eroded LB just US of pond turtle pond with large black walnut tree.	Tall eroded LB just US of pond turtle pond with large black walnut tree.	Madison Reach	RM 22.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Pool occupied by western pond turtle. With bullfrog. Turtles observed in same deep pool with trunk haul outs in 2013 Creek Walk as well.		Madison Reach	RM 22.5	
Tompkins	Rough wing swallow bank holes LB.	Rough wing swallow bank holes on left bank. Bank swallows require steep eroding banks, so this bank condition is not always a bad thing.	Madison Reach	RM 22.5	
Tompkins	LB exposed pipe in bank	Small exposed irrigation type hose / pipe on left bank. Does not appear to have been active recently and does not appear to be influencing water quality. However, this should be added to the database of potential water quality contaminant sources.	Madison Reach	RM 22.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Across	Looking across showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22.7	
Tompkins	US	Looking upstream showing no significant channel changes since 2012. Minor riparian vegetation increase since 2012.	Madison Reach	RM 22.7	
Tompkins	Rough wing swallow bank holes LB	Rough wing swallow bank holes on left bank. Bank swallows require steep eroding banks, so this bank condition is not always a bad thing.	Madison Reach	RM 22.7	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Discussion on video	Short video with discussion of k-rail / log revetment situation.	Madison Reach	RM 22.8	
Larsen	Old exposed bank protection	Root wad bank stabilization along Teichert.	Madison Reach	RM 22.9	
Larsen	Old exposed bank protection	Teichert root wads now exposed	Madison Reach	RM 22.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Old exposed bank protection	LB toe of slope along Teichert. Concrete k-rail exposed at toe. Scour holes.	Madison Reach	RM 22.9	
Martin	Bank erosion where large woody debris was used to stabilize base of slope. Questa did stabilization plan with large woody debris about six years ago. Needs continuing monitoring and future treatment.		Madison Reach	RM 22.9	
Martin	Bank erosion where large woody debris was used to stabilize base of slope. Questa did stabilization plan with large woody debris about six years ago. Needs continuing monitoring and future treatment.		Madison Reach	RM 22.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	anchored and cabled root wads now exposed at base of eroded bank.		Madison Reach	RM 22.9	
Martin	anchored and cabled root wads now exposed at base of eroded bank.		Madison Reach	RM 22.9	
Martin	Exposed k-rail in mid-reach of eroded bank. K-rails were completely buried as part of original bank reconstruction.		Madison Reach	RM 22.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	US	Looking upstream at location where channel conditions in 2013 are very similar to 2012.	Madison Reach	RM 22.9	
Tompkins	Across.	Looking across at location where channel conditions in 2013 are very similar to 2012.	Madison Reach	RM 22.9	
Tompkins	DS	Looking downstream at location where channel conditions in 2013 are very similar to 2012.	Madison Reach	RM 22.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Root wad bank stabilization along Teichert.	Root wad bank stabilization along Teichert plant on left bank. This structure has been compromised but hasn't changed significantly since 2012. It should be observed on each Creek Walk, especially after high flow winters.	Madison Reach	RM 22.9	
Tompkins	Root wads LB Teichert	Root wad bank stabilization along Teichert plant on left bank. This structure has been compromised but hasn't changed significantly since 2012. It should be observed on each Creek Walk, especially after high flow winters.	Madison Reach	RM 22.9	
Tompkins	LB toe of slope along Teichert. Concrete k-rail exposed at toe. Scour holes.	Concrete k-rail exposed at toe of slope along left bank of Teichert plant. Scour holes in adjacent channel. This revetment hasn't changed significantly since 2012 but should be monitored on all Creek Walks.	Madison Reach	RM 22.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Audio	Additional images of k-rail / log revetment that is being undermined.	Madison Reach	RM 22.9	
Larsen	Concrete rubble in channel	LB secondary crap rap berm along Teichert. Looking US.	Madison Reach	RM 23.3	
Tompkins	LB secondary crap rap berm along Teichert. Looking US.	Looking upstream at an exposed rip rap toe on the left bank. This area does not appear to have changed significantly since 2012 but should be closely monitored.	Madison Reach	RM 23.3	

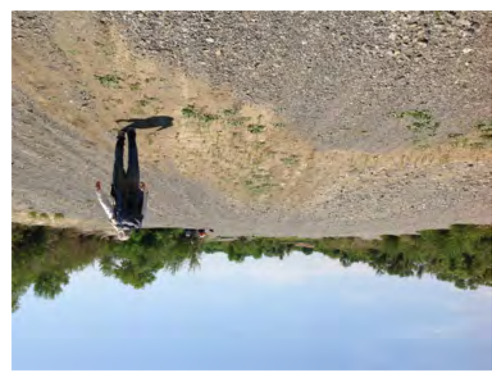
Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	More tamarisk observed along channel.		Madison Reach	RM 23.4	
Martin	More tamarisk observed along channel.		Madison Reach	RM 23.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking upstream brought reach into narrower reach with mature riparian vegetation on both banks	Looking upstream into narrower reach with mature riparian vegetation on both banks. No major channel changes since 2012.	Guesisosi Reach	RM 19	
Tompkins	Looking at the right bank from Midchannel mature stand of cottonwood trees	Looking at the right bank from midchannel at mature stand of cottonwood trees	Guesisosi Reach	RM 19	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream broad reach with mature cottonwood stand on the right thing and willows and cottonwoods on the left bank	Looking downstream at broad reach with mature cottonwood stand on the right bank and willows and cottonwoods on the left bank.	Guesisosi Reach	RM 19	
Martin	Creek channel with relatively narrow width and establishing vegetation at the edge of both north and south banks.		Guesisosi Reach	RM 19.1	
Martin	Creek channel with relatively narrow width and establishing vegetation at the edge of both north and south banks.		Guesisosi Reach	RM 19.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Creek channel with relatively narrow width and establishing vegetation at the edge of both north and south banks.		Guesisosi Reach	RM 19.1	
Larsen	Narrow area	We are coming down the reach that has been relatively narrow it's the area near CEMEX.	Guesisosi Reach	RM 19.2	
Larsen	Wider area	The area is and has been naturally wider than immmediatlely upstream. The gravel mining operations have taken advantage of this fact and used to extract from bank to bank.	Guesisosi Reach	RM 19.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Wider area	The area is and has been naturally wider than immmediatlely upstream. The gravel mining operations have taken advantage of this fact and used to extract from bank to bank.	Guesisosi Reach	RM 19.2	
Larsen	Wider area	The area is and has been naturally wider than immmediatlely upstream. The gravel mining operations have taken advantage of this fact and used to extract from bank to bank.	Guesisosi Reach	RM 19.2	
Larsen	Wider area	The area is and has been naturally wider than immmediatlely upstream. The gravel mining operations have taken advantage of this fact and used to extract from bank to bank.	Guesisosi Reach	RM 19.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	View of channel with established woody riparian vegetation on base of north and south banks.		Guesisosi Reach	RM 19.2	
Martin	View of channel with established woody riparian vegetation on base of north and south banks.		Guesisosi Reach	RM 19.2	
Martin	View of channel with established woody riparian vegetation on base of north and south banks.		Guesisosi Reach	RM 19.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	View of channel with established woody riparian vegetation on base of north and south banks.		Guesisosi Reach	RM 19.2	
Tompkins	Looking downstream relatively narrow reach with Mature vegetation on the left Bank and right bank	Looking downstream at relatively narrow reach with mature vegetation on the left bank and right bank.	Guesisosi Reach	RM 19.2	
Tompkins	Hanging corrugated metal pipe on the right bank	Hanging corrugated metal pipe on the right bank. This should be added to the potential water quality contaminant database.	Guesisosi Reach	RM 19.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking upstream relatively narrow channel with unvegetated right bank	Looking upstream at relatively narrow channel with unvegetated right bank.	Guesisosi Reach	RM 19.2	
Martin	View from active channel with limited vegetation on south bank and well-developed vegetation on north bank.		Guesisosi Reach	RM 19.4	
Martin	View from active channel with limited vegetation on south bank and well-developed vegetation on north bank.		Guesisosi Reach	RM 19.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream right bank some erosion near the top of bank	Looking downstream at right bank with some erosion near the top of bank.	Guesisosi Reach	RM 19.5	
Tompkins	Looking upstream some left bank erosion	Looking upstream at some left bank erosion.	Guesisosi Reach	RM 19.5	
Tompkins	Downstream end of long beaver pond looking upstream	Downstream end of long beaver pond looking upstream.	Guesisosi Reach	RM 19.7	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Downstream end of long beaver pond looking downstream beaver pond along right bank	Downstream end of long beaver pond looking downstream beaver pond along right bank.	Guesisosi Reach	RM 19.7	
Larsen	Bank erosion at toe of bank	This is an area where there is errosion at the toe of the berm and not much distance from the road to the top where there's a conveyor belt and power poles. This is an area of concern.	Guesisosi Reach	RM 19.8	
Martin	View of south bank with exposed vertical bank of immature woody vegetation.		Guesisosi Reach	RM 19.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking down stream large right bank pool. Possible bank treatment location right bank	Looking down stream large right bank pool. Possible bank treatment location on right bank.	Guesisosi Reach	RM 19.8	
Tompkins	Looking upstream large right bank pool	Looking upstream at large right bank pool.	Guesisosi Reach	RM 19.8	
Martin	View of vertical banks with mature woody vegetation on south side of active channel at downstream end of Cemex property.		Guesisosi Reach	RM 19.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	View of vertical banks with mature woody vegetation on south side of active channel at downstream end of Cemex property.		Guesisosi Reach	RM 19.9	
Larsen	Bar skimming discussion area	Looking downstream vegetation on both sides. Ben comments that this is an ideal spot for instream mining or bar skimming where the vegetation is on the margins; in the channel it open it and works for the industry and then the landowners wer	Guesisosi Reach	RM 20	
Tompkins	Looking upstream note ideal vegetation conditions on the left bank with large mature black walnut and the pools below large trees also healthy vegetation on the right bank	Looking upstream. Note ideal vegetation conditions on the left bank with large mature black walnut and the pools below large trees. Also healthy vegetation on the right bank.	Guesisosi Reach	RM 20	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream note healthy left Bank and right bank mature vegetation	Looking downstream. Note healthy left bank and right bank mature vegetation. No major changes since 2012.	Guesisosi Reach	RM 20	
Martin	Mature band of willow and cottonwood on north bank and successful revegetation on south bank as part of Cemex property maintenance.		Guesisosi Reach	RM 20.1	
Martin	Mature band of willow and cottonwood on north bank and successful revegetation on south bank as part of Cemex property maintenance.		Guesisosi Reach	RM 20.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Mature band of willow and cottonwood on north bank and successful revegetation on south bank as part of Cemex property maintenance.		Guesisosi Reach	RM 20.1	
Tompkins	Right bank along cemex property note repair showing willows and cottonwoods planted in the bank	Right bank along Cemex property. Note repair showing willows and cottonwoods planted in the bank.	Guesisosi Reach	RM 20.1	
Martin	Exposed vertical bank with regeneration at base of slope and exposed dead willow tree.		Guesisosi Reach	RM 20.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Exposed vertical bank with regeneration at base of slope and exposed dead willow tree.		Guesisosi Reach	RM 20.2	
Tompkins	Looking upstream from large right bank bar	Looking upstream from large right bank bar	Guesisosi Reach	RM 20.2	
Tompkins	Looking at left Bank from right bank bar	Looking at left bank from right bank bar	Guesisosi Reach	RM 20.2	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream from large right bank bar	Looking downstream from large right bank bar	Guesisosi Reach	RM 20.2	
Tompkins	Looking at right bank from large right bank bar	Looking at right bank from large right bank bar	Guesisosi Reach	RM 20.2	
Martin	Downstream end of proposed bar skimming at Cemex site.		Guesisosi Reach	RM 20.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Downstream end of proposed bar skimming at Cemex site.		Guesisosi Reach	RM 20.3	
Tompkins	Looking at left Bank hanging corrugated metal drainpipe from farm	Looking at left bank hanging corrugated metal drainpipe from farm. Pipe should be added to water quality contaminant source database.	Guesisosi Reach	RM 20.3	
Larsen	Near bar skimming area	This shows a tree in the channel where the bar skimming is proposed.	Guesisosi Reach	RM 20.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Gully filled on bank.	Site of gully erosion on the South Bank. Fully has been filled with gravel and cobble.	Guesisosi Reach	RM 20.4	
Larsen	Toe erosioni	Area of erossion on bank at CIMEX site.	Guesisosi Reach	RM 20.4	
Larsen	Near bar skimming area	Bank that will benefit from bar skimming. Photos from Jim of bank conditions	Guesisosi Reach	RM 20.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Near bar skimming area	Bank that will benefit from bar skimming. Photos from Jim of bank conditions	Guesisosi Reach	RM 20.4	
Larsen	More area that will benefit	Vulnerable bank at CEMIX site where bar skimming in center of creek is proposed.	Guesisosi Reach	RM 20.4	
Larsen	More area that will benefit	Vulnerable bank at CEMIX site where bar skimming in center of creek is proposed.	Guesisosi Reach	RM 20.4	

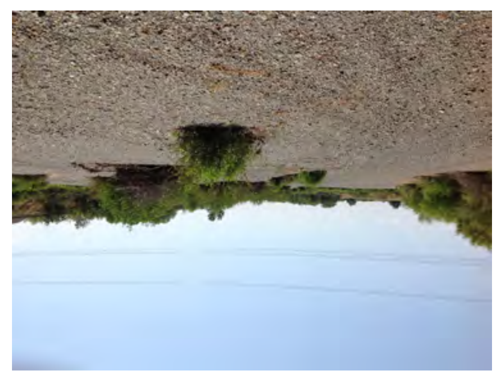
Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Vulnerable bank at Cemex site where bar skimming in center of creek is considered as management technique to reduce potential bank erosion.		Guesisosi Reach	RM 20.4	
Martin	Vulnerable bank at Cemex site where bar skimming in center of creek is considered as management technique to reduce potential bank erosion.		Guesisosi Reach	RM 20.4	
Martin	Vertical creek bank where mature trees are about to be lost downstream of possible bar skimming location near Cemex site.		Guesisosi Reach	RM 20.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Vertical creek bank where mature trees are about to be lost downstream of possible bar skimming location near Cemex site.		Guesisosi Reach	RM 20.4	
Martin	Sapling elderberry in thicket north of the proposed bar skimming at Cemex site with no stems greater than 1 inch.		Guesisosi Reach	RM 20.4	
Tompkins	Looking at RB along cemex eroded Bank. Note significant new Willow growth since 2012 potential for toe of slope protection in 10 to 20 foot strips between new willows and vertical Bank	Looking at right bank along Cemex eroded bank. Note significant new willow growth since 2012 and potential for toe of slope protection in 10 to 20 foot strips between new willows and vertical bank.	Guesisosi Reach	RM 20.4	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Near bar skimming area	Photos in vicinity of proposed bar skimming. Listen to recorded notes attached to note #20. Looking upstream with the proposed channel Would be located.	Guesisosi Reach	RM 20.5	
Larsen	Near bar skimming area	Photos in vicinity of proposed bar skimming. Listen to recorded notes attached to note #20. Looking upstream with the proposed channel Would be located.	Guesisosi Reach	RM 20.5	
Larsen	Near bar skimming area	Photos in vicinity of proposed bar skimming. Listen to recorded notes attached to note #20. Looking upstream with the proposed channel Would be located.	Guesisosi Reach	RM 20.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Near bar skimming area	Photos in vicinity of proposed bar skimming. Listen to recorded notes attached to note #20. Looking upstream with the proposed channel Would be located.	Guesisosi Reach	RM 20.5	
Larsen	Near bar skimming area	Continuation of proposed bar skimming channel near CIMEX site on the current meander of the creek.	Guesisosi Reach	RM 20.5	
Larsen	Near bar skimming area	Continuation of proposed bar skimming channel near CIMEX site on the current meander of the creek.	Guesisosi Reach	RM 20.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Near bar skimming area	More area that would benefit from bar skimming. Looking DS along eroding RB just DS of cemex RB repair note exposed roots of mature trees also note 1 to 2-year-old Willow Along the bank. Potential for extension of repair with bar skimming	Guesisosi Reach	RM 20.5	
Martin	Continuation of proposed bar skimming channel near Cemex site on current low-flow meander of the creek.		Guesisosi Reach	RM 20.5	
Martin	Continuation of proposed bar skimming channel near Cemex site on current low-flow meander of the creek.		Guesisosi Reach	RM 20.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Young elderberry shrub on north edge of proposed bar skimming at Cemex site. Elderberry with single 5 inch trunk at base with no evidence of exit holes.		Guesisosi Reach	RM 20.5	
Martin	Downstream extension of proposed bar skimming at center of creek near Cemex site. Proposal is for bar skimming to occur on either side of cottonwood tree and extend southward to low flow channel.		Guesisosi Reach	RM 20.5	
Martin	Downstream extension of proposed bar skimming at center of creek near Cemex site. Proposal is for bar skimming to occur on either side of cottonwood tree and extend southward to low flow channel.		Guesisosi Reach	RM 20.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Second elderberry shrub north of proposed bar skimming with two stems approximately 3 inches - dense vegetation precludes measurement.		Guesisosi Reach	RM 20.5	
Tompkins	Right bank looking downstream adjacent to cemex Steepbank with significant erosion	Right bank looking downstream adjacent to Cemex steep bank with significant erosion.	Guesisosi Reach	RM 20.5	
Tompkins	Looking upstream along RB repair where prograding bar filled deep pool in 2012/2013	Looking upstream along right bank repair where prograding bar filled deep pool in 2012/2013	Guesisosi Reach	RM 20.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking DS along eroding RB just DS of cemex RB repair note exposed roots of mature trees also note 1 to 2-year-old Willow Along the bank. Potential for extension of repair with bar skimming.	Looking DS along eroding right bank just downstream of Cemex right bank repair. Note exposed roots of mature trees and 1 to 2-year-old willows along the bank. Potential for extension of repair with bar skimming.	Guesisosi Reach	RM 20.5	
Larsen	Potential bar skimming area	This is an area where there is potential for bar skimming in order to protect the left bank.	Guesisosi Reach	RM 20.6	
Larsen	Potential bar skimming area	This is an area where there is potential for bar skimming in order to protect the left bank.	Guesisosi Reach	RM 20.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Potential bar skimming area to protect south bank.		Guesisosi Reach	RM 20.6	
Martin	Potential bar skimming area to protect south bank.		Guesisosi Reach	RM 20.6	
Martin	Base of slope where proposed bar skimming access could possibly be provided.		Guesisosi Reach	RM 20.6	

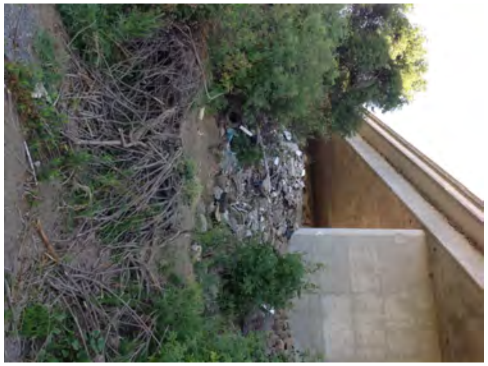
Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking upstream from Midchannel Mark from cemex suggested this area as potential for bar skimming	Looking upstream from midchannel. Mark from Cemex suggested that this area could be a potential bar skimming site to relieve pressure on banks causing migration of channel.	Guesisosi Reach	RM 20.6	
Tompkins	Looking downstream from mid channel note mature vegetation on the left bank downstream this is the potential area for Bar skimmimg	Looking downstream from mid channel. Note mature vegetation on the left bank downstream. This is the potential area for bar skimmimg.	Guesisosi Reach	RM 20.6	
Tompkins	Looking at left Bank from Midchannel	Looking at left Bank from midchannel	Guesisosi Reach	RM 20.7	

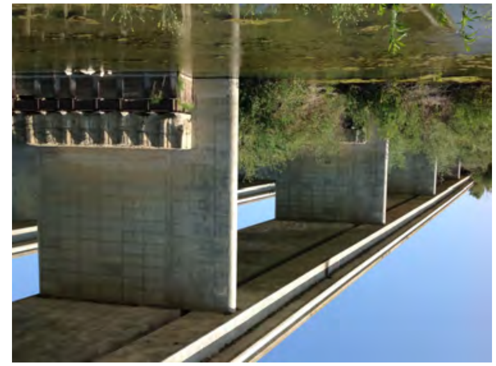
Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking at right bank from mid channel	Looking at right bank from mid channel	Guesisosi Reach	RM 20.7	
Larsen	505 bridge commments	Mark Moeller commented that the old pylons are in the correct orientation	Guesisosi Reach	RM 20.8	
Larsen	Bar of pea gravel	1995 RB bank protection project. Riprap at base of slope.1997 flows silted floodplain and seeded with grasses. Pile of pea gravel is 200,000 tons about a 2 year supply. Row of cottonwoods shows rock toe.	Guesisosi Reach	RM 20.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	1995 RB plateau project. Riprap at base of slope.1997 flows silted floodplain and seeded with grasses. Pile of pea gravel is 200,000 tons about a 2 year supply. Row of cottonwoods shows rock toe.	1995 right bank plateau project. Riprap at base of slope.1997 flows silted floodplain and seeded with grasses. Pile of pea gravel is 200,000 tons, about a 2 year supply. Row of cottonwoods shows rock toe.	Guesisosi Reach	RM 20.8	
Larsen	Another bridge pier	The second bridge Pier looks similar to the other one.	Guesisosi Reach	RM 20.9	
Martin	View of creek corridor from downstream east side of I-505 bridge, both up and downstream.		Guesisosi Reach	RM 20.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	View of creek corridor from downstream east side of I-505 bridge, both up and downstream.		Guesisosi Reach	RM 20.9	
Tompkins	Looking upstream at I 505. Note right bank pier bays heavily vegetated.	Looking upstream at I 505. Note right bank pier bays heavily vegetated, as in 2012.	Guesisosi Reach	RM 20.9	
Larsen	Vegetation near bridge	Upstream from the highway 505 bridge we notice on the south side that the vegetation has gotten taller. Last year we considered the way the vegetation impeded the flow. Last year we thought it was not impeding flow; this year we thinik that it might.	Guesisosi Reach	RM 21	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	505 bridge	It appears that the bridge abutments were built in two phases and are oriented in two significantly different directions probably somewhere between 10 and 30° difference.	Guesisosi Reach	RM 21	
Larsen	Undercut bridge piers Highway 505.	Apperar to be no change since last year.	Guesisosi Reach	RM 21	
Martin	Vegetation on southside of active channel approaching interstate 505 much taller than last year.		Guesisosi Reach	RM 21	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Vegetation on southside of active channel approaching interstate 505 much taller than last year.		Guesisosi Reach	RM 21	
Martin	Debris dump under I-505 on north bank.		Guesisosi Reach	RM 21	
Martin	Cliff swallows nesting on west side of I-505 bridge.		Guesisosi Reach	RM 21	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	View to south of I-505 bridge with expose retrofitted piers.		Guesisosi Reach	RM 21	
Tompkins	Looking downstream 505 bridge just downstream of rattlesnake Beaverdam.	Looking downstream of 505 bridge just downstream of rattlesnake beaver dam.	Guesisosi Reach	RM 21	
Tompkins	Left Bank downstream exposed bridge piers with Ben Adamo for scale still no significant change since last year	Left bank downstream of exposed I505 bridge piers with Ben Adamo for scale. No significant change since 2012.	Guesisosi Reach	RM 21	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	#75b Vegetation caught on bridge piling	The vegetation file filling the left-hand here looking downstream is dense and would impede the flow and reduce flow capacity. It is not clear whether this has changed since last year. If so only a li	Hoppin Reach	RM 15.9	
Larsen	View from Bridge at Road 94B.	Upstream and downstream photos	Hoppin Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	View from Bridge at Road 94B.	Upstream and downstream photos	Hoppin Reach	RM 15.9	
Martin	View from top of bridge at Road 94B both up and downstream.		Hoppin Reach	RM 15.9	
Martin	View from top of bridge at Road 94B both up and downstream.		Hoppin Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Cliff swallow nesting colony on underside of Road 91B.		Hoppin Reach	RM 15.9	
Martin	View from channel bottom both upstream and downstream just upstream from Road 94B. Dense woody vegetation with high bird species diversity at this reach.		Hoppin Reach	RM 15.9	
Martin	View from channel bottom both upstream and downstream just upstream from Road 94B. Dense woody vegetation with high bird species diversity at this reach.		Hoppin Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking up stream into Gordon Slough. Note somewhat turbid Gordon slew outflow.	Looking upstream into Gordon Slough. Note somewhat turbid Gordon Slough outflow as observed in previous years.	Dunnigan Hills Reach	RM 15.9	
Tompkins	Looking upstream from Gordon slew confluence.	Looking upstream from Gordon Slough confluence. No significant channel change.	Dunnigan Hills Reach	RM 15.9	
Tompkins	Looking downstream from Gordon slew confluence at 94b bridge.	Looking downstream from Gordon Slough confluence at 94b bridge.	Dunnigan Hills Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking Upstream. Road 94b. LB riprap on the left bank near bridge abutment. Scour around midstream bridge piers	Looking Upstream at Road 94b. Riprap on the left bank near bridge abutment. Scour around midstream bridge piers does not appear to have worsened since 2012 but should be monitored in future years.	Hoppin Reach	RM 15.9	
Tompkins	Looking Upstream. Road 94b. LB riprap on the left bank near bridge abutment. Scour around midstream bridge piers	Looking Upstream at Road 94b. Riprap on the left bank near bridge abutment. Scour around midstream bridge piers does not appear to have worsened since 2012 but should be monitored in future years.	Hoppin Reach	RM 15.9	
Tompkins	Looking Upstream. Road 94b. LB riprap on the left bank near bridge abutment. Scour around midstream bridge piers	Looking Upstream at Road 94b. Riprap on the left bank near bridge abutment. Scour around midstream bridge piers does not appear to have worsened since 2012 but should be monitored in future years.	Hoppin Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream from 94b bridge multiple OHV trails in the gravel bar	Looking downstream from 94b bridge at multiple OHV trails in the gravel bar.	Hoppin Reach	RM 15.9	
Tompkins	Gordon slew confluence mixing zone not as pronounced as in 2012.	Gordon Slough confluence mixing zone not as pronounced as in 2012.	Hoppin Reach	RM 15.9	
Tompkins	Debris On bridge pier With large scour hole	Debris on bridge pier with large scour hole. Scour should be monitored in future years.	Hoppin Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Unused Teichert conveyor to cross over to north side of Cache Creek Preserve. Large cliff swallow colony under bridge.		Dunnigan Hills Reach	RM 16.5	
Martin	Unused Teichert conveyor to cross over to north side of Cache Creek Preserve. Large cliff swallow colony under bridge.		Dunnigan Hills Reach	RM 16.5	
Tompkins	Downstream from conveyor bridge.	Downstream from conveyor bridge.	Dunnigan Hills Reach	RM 16.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking Us from conveyor bridge	Looking upstream from conveyor bridge	Dunnigan Hills Reach	RM 16.5	
Tompkins	Conveyor.	Conveyor.	Dunnigan Hills Reach	RM 16.5	
Tompkins	Downstream from conveyor bridge	Downstream from conveyor bridge	Dunnigan Hills Reach	RM 16.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Upstream from the conveyor bridge	Upstream from the conveyor bridge	Dunnigan Hills Reach	RM 16.5	
Martin	Vertical face supporting swallows on Teichert property near conveyor to Cache Creek Conservancy. Appears to be at least one pair of rough winged swallows nesting on west edge of cliff face.		Dunnigan Hills Reach	RM 16.6	
Martin	Vertical face supporting swallows on Teichert property near conveyor to Cache Creek Conservancy. Appears to be at least one pair of rough winged swallows nesting on west edge of cliff face.		Dunnigan Hills Reach	RM 16.6	

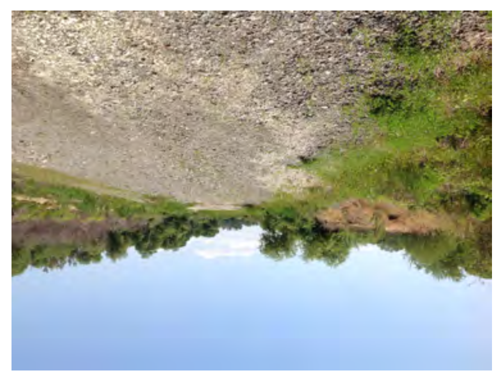
Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Shallow 25' pit at clay bottom.	Shallow 25' pit at clay bottom.	Dunnigan Hills Reach	RM 16.6	
Martin	Restoration in progress at White Wings open space.		Dunnigan Hills Reach	RM 16.9	
Martin	Restoration in progress at White Wings open space.		Dunnigan Hills Reach	RM 16.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Restoration in progress at White Wings open space.		Dunnigan Hills Reach	RM 16.9	
Martin	Restoration in progress at White Wings open space.		Dunnigan Hills Reach	RM 16.9	
Martin	Potential upper terrace restoration at Madison property adjacent to White Wing restoration.		Dunnigan Hills Reach	RM 17	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Potential upper terrace restoration at Madison property adjacent to White Wing restoration.		Dunnigan Hills Reach	RM 17	
Martin	Potential upper terrace restoration at Madison property adjacent to White Wing restoration.		Dunnigan Hills Reach	RM 17	
Martin	Lower White Wing restoration area.		Dunnigan Hills Reach	RM 17	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Lower White Wing restoration area.		Dunnigan Hills Reach	RM 17	
Martin	Potential upper terrace restoration project at Patterson property east of former pit. Need further exploration of opportunity and feasibility.		Dunnigan Hills Reach	RM 17.3	
Martin	Potential upper terrace restoration project at Patterson property east of former pit. Need further exploration of opportunity and feasibility.		Dunnigan Hills Reach	RM 17.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Potential upper terrace restoration project at Patterson property east of former pit. Need further exploration of opportunity and feasibility.		Dunnigan Hills Reach	RM 17.3	
Martin	Potential upper terrace restoration project at Patterson property east of former pit. Need further exploration of opportunity and feasibility.		Dunnigan Hills Reach	RM 17.3	
Martin	Potential upper terrace restoration project at Patterson property east of former pit. Need further exploration of opportunity and feasibility.		Dunnigan Hills Reach	RM 17.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Abundant surface water with excellent regeneration at mid to upper terraces with heavy tamarisk infestation largely eliminated on north bank.		Dunnigan Hills Reach	RM 17.3	
Martin	Abundant surface water with excellent regeneration at mid to upper terraces with heavy tamarisk infestation largely eliminated on north bank.		Dunnigan Hills Reach	RM 17.3	
Martin	Abundant surface water with excellent regeneration at mid to upper terraces with heavy tamarisk infestation largely eliminated on north bank.		Dunnigan Hills Reach	RM 17.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Abundant surface water with excellent regeneration at mid to upper terraces with heavy tamarisk infestation largely eliminated on north bank.		Dunnigan Hills Reach	RM 17.3	
Martin	Assumed natural revegetation in former extraction pit on south bank of Patterson property.		Dunnigan Hills Reach	RM 17.3	
Martin	Assumed natural revegetation in former extraction pit on south bank of Patterson property.		Dunnigan Hills Reach	RM 17.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Views of former Patterson pit with dense freshwater marsh vegetation.		Dunnigan Hills Reach	RM 17.5	
Martin	Views of former Patterson pit with dense freshwater marsh vegetation.		Dunnigan Hills Reach	RM 17.5	
Martin	Natural revegetation to freshwater marsh and willow scrub at Patterson pit.		Dunnigan Hills Reach	RM 17.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Natural revegetation to freshwater marsh and willow scrub at Patterson pit.		Dunnigan Hills Reach	RM 17.5	
Martin	Natural revegetation to freshwater marsh and willow scrub at Patterson pit.		Dunnigan Hills Reach	RM 17.5	
Martin	Former Patterson pit with natural revegetation. Mined in 1980s with south slope revegetated.		Dunnigan Hills Reach	RM 17.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Former Patterson pit with natural revegetation. Mined in 1980s with south slope revegetated.		Dunnigan Hills Reach	RM 17.6	
Larsen	Benefits of erosion	This is an example of a rather steep bank that has been allowed to naturally vegetate. This is what is not possible on area where cement and Kabul predominates.	Dunnigan Hills Reach	RM 17.8	
Larsen	#74b Audio notes on Moores siphon.	Moore siphon	Dunnigan Hills Reach	RM 18	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	#74b Audio notes on Moores siphon.	Moore siphon	Dunnigan Hills Reach	RM 18	
Martin	Moore Siphon crossing with beaver dam at crossing location.		Dunnigan Hills Reach	RM 18	
Martin	Moore Siphon crossing with beaver dam at crossing location.		Dunnigan Hills Reach	RM 18	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Instream habitat	Valuable instream habitat created by natural process of bank erosion. This is an area that would loose if you treat upstream from Morris siphon. We have agreed that this is an area that provides habitat Value in stream and off stream	Dunnigan Hills Reach	RM 18.1	
Larsen	More of the habitat created by erosion	In this area we saw the largest school of fish we have seen in the creek including a big largemouth bass. This underscores the value of this small area for habitat including the wood in the streem.	Dunnigan Hills Reach	RM 18.1	
Larsen	Swallow habitat created by erosion.	Looking upstream we see a vertically cut Bank on the northside a natural process of stream dynamics which we should acknowledge and encourage wherever it occurs. It provides habitat for swallows.	Dunnigan Hills Reach	RM 18.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Actively eroding banks taking out mature cottonwoods and other vegetation just upstream of Moore Siphon.		Dunnigan Hills Reach	RM 18.1	
Martin	Actively eroding banks taking out mature cottonwoods and other vegetation just upstream of Moore Siphon.		Dunnigan Hills Reach	RM 18.1	
Tompkins	Looking upstream mature riparian vegetation on both banks	Looking upstream at mature riparian vegetation on both banks.	Dunnigan Hills Reach	RM 18.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream towards Moores siphon. Some erosion of left Bank	Looking downstream towards Moore's siphon. Some erosion of left bank.	Dunnigan Hills Reach	RM 18.1	
Martin	Dense stand of tamarisk and arundo on north bank above vertical the space. Consider cooperative agreement to allow County to treat tamarisk and arundo at this location.		Dunnigan Hills Reach	RM 18.2	
Martin	Broad unvegetated channel bottom bordered by well-developed woody vegetation on both north and south banks with mid-level terrace.		Dunnigan Hills Reach	RM 18.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Broad unvegetated channel bottom bordered by well-developed woody vegetation on both north and south banks with mid-level terrace.		Dunnigan Hills Reach	RM 18.3	
Martin	Broad unvegetated channel bottom bordered by well-developed woody vegetation on both north and south banks with mid-level terrace.		Dunnigan Hills Reach	RM 18.3	
Martin	Broad unvegetated channel bottom bordered by well-developed woody vegetation on both north and south banks with mid-level terrace.		Dunnigan Hills Reach	RM 18.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking upstream note large mature cottonwood willow black walnut right thank and left Bank	Looking upstream. Note large mature cottonwood, willow, and black walnut on right bank and left bank.	Dunnigan Hills Reach	RM 18.3	
Tompkins	Looking downstream primary channel on the right bank adjacent to flat Terrace approximately 50 to 100 feet wide flanked by mature cottonwoods and Willow	Looking downstream at primary channel on the right bank adjacent to flat terrace approximately 50 to 100 feet wide flanked by mature cottonwoods and willow.	Dunnigan Hills Reach	RM 18.3	
Larsen	Spur dikes	The upstream photo of Southbank spur dikes. They influenced the channel so that it swings to the north bank downstream from the spur dilkes	Dunnigan Hills Reach	RM 18.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Spur dikes	The upstream photo of Southbank spur dikes. They influenced the channel so that it swings to the north bank downstream from the spur dilkes	Dunnigan Hills Reach	RM 18.5	
Martin	At least two pair of rough winged swallows nesting on vertical cliff of north bank.		Dunnigan Hills Reach	RM 18.5	
Tompkins	Looking downstream left bank erosion at bedrock toe	Looking downstream left bank erosion at bedrock toe.	Dunnigan Hills Reach	RM 18.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking upstream at right bank erosion of spur Dykes	Looking upstream at right bank erosion of spur dykes.	Dunnigan Hills Reach	RM 18.5	
Martin	Heavy beaver loss of cottonwood trees at outside edge of low flow channel in view upstream just downstream of Rincon spur dikes. View downstream of exposed bank with nesting swallows.		Dunnigan Hills Reach	RM 18.6	
Martin	Heavy beaver loss of cottonwood trees at outside edge of low flow channel in view upstream just downstream of Rincon spur dikes. View downstream of exposed bank with nesting swallows.		Dunnigan Hills Reach	RM 18.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Dike nose erosion	Exposed concrete rubble where erosion has moved into a former spur dike. This area has degraded habitat value. This is a good example of the degraded habitat that occurs with cement rubble is used to make spur dikes.	Dunnigan Hills Reach	RM 18.7	
Larsen	Dike nose erosion	Exposed concrete rubble where erosion has moved into a former spur dike. This area has degraded habitat value. This is a good example of the degraded habitat that occurs with cement rubble is used to make spur dikes.	Dunnigan Hills Reach	RM 18.7	
Tompkins	Right bank eroded spur dike note small relatively small concrete rubble eroding out of spur dike	Right bank eroded spur dike. Note relatively small concrete rubble eroding out of spur dike. This should be monitored after future high winter flows.	Dunnigan Hills Reach	RM 18.7	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Dike toe erosion	Photos of possible toes of dikes from pre-ordnance construction here.It would be possible to lessen the erosion pressure here by bar skimming	Dunnigan Hills Reach	RM 18.8	
Larsen	Dike toe erosion	Photos of possible toes of dikes from pre-ordnance construction here.It would be possible to lessen the erosion pressure here by bar skimming	Dunnigan Hills Reach	RM 18.8	
Larsen	Dike nose erosion dumping rubble into the creek	There is exposed concrete rubble in the tophus burdocks upstream from more siphon. Each of the Forsberg likes is a rodent. It is unsightly and his discharging cement Creek. JIm remarked that this concrete limits the habitat vlalue.	Dunnigan Hills Reach	RM 18.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Dike nose erosion dumping rubble into the creek	There is exposed concrete rubble in the tophus burdocks upstream from more siphon. Each of the Forsberg likes is a rodent. It is unsightly and his discharging cement Creek. JIm remarked that this concrete limits the habitat vlalue.	Dunnigan Hills Reach	RM 18.8	
Martin	Severe erosion on south bank of active channel at spur dikes installed in 1998. Possible future treatment area for bar skimming to relieve pressure at south bank.		Dunnigan Hills Reach	RM 18.8	
Martin	Concrete rubble at eroded spur dikes on Solano Concrete property at river mile 18.1. Concrete rubble limits habitat value and could be capped as part of future restoration.		Dunnigan Hills Reach	RM 18.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream towards the right bank where erosion scallops are present erosion was also present in 2012	Looking downstream towards the right bank where erosion scallops are present erosion was also present in 2012.	Dunnigan Hills Reach	RM 18.8	
Tompkins	Looking upstream towards left Bank with mature cottonwood trees	Looking upstream towards left bank with mature cottonwood trees.	Dunnigan Hills Reach	RM 18.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	#75b Vegetation caught on bridge piling	The vegetation file filling the left-hand here looking downstream is dense and would impede the flow and reduce flow capacity. It is not clear whether this has changed since last year. If so only a li	Hoppin Reach	RM 15.9	
Larsen	View from Bridge at Road 94B.	Upstream and downstream photos	Hoppin Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	View from Bridge at Road 94B.	Upstream and downstream photos	Hoppin Reach	RM 15.9	
Martin	View from top of bridge at Road 94B both up and downstream.		Hoppin Reach	RM 15.9	
Martin	View from top of bridge at Road 94B both up and downstream.		Hoppin Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Cliff swallow nesting colony on underside of Road 91B.		Hoppin Reach	RM 15.9	
Martin	View from channel bottom both upstream and downstream just upstream from Road 94B. Dense woody vegetation with high bird species diversity at this reach.		Hoppin Reach	RM 15.9	
Martin	View from channel bottom both upstream and downstream just upstream from Road 94B. Dense woody vegetation with high bird species diversity at this reach.		Hoppin Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking up stream into Gordon Slough. Note somewhat turbid Gordon slew outflow.	Looking upstream into Gordon Slough. Note somewhat turbid Gordon Slough outflow as observed in previous years.	Dunnigan Hills Reach	RM 15.9	
Tompkins	Looking upstream from Gordon slew confluence.	Looking upstream from Gordon Slough confluence. No significant channel change.	Dunnigan Hills Reach	RM 15.9	
Tompkins	Looking downstream from Gordon slew confluence at 94b bridge.	Looking downstream from Gordon Slough confluence at 94b bridge.	Dunnigan Hills Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking Upstream. Road 94b. LB riprap on the left bank near bridge abutment. Scour around midstream bridge piers	Looking Upstream at Road 94b. Riprap on the left bank near bridge abutment. Scour around midstream bridge piers does not appear to have worsened since 2012 but should be monitored in future years.	Hoppin Reach	RM 15.9	
Tompkins	Looking Upstream. Road 94b. LB riprap on the left bank near bridge abutment. Scour around midstream bridge piers	Looking Upstream at Road 94b. Riprap on the left bank near bridge abutment. Scour around midstream bridge piers does not appear to have worsened since 2012 but should be monitored in future years.	Hoppin Reach	RM 15.9	
Tompkins	Looking Upstream. Road 94b. LB riprap on the left bank near bridge abutment. Scour around midstream bridge piers	Looking Upstream at Road 94b. Riprap on the left bank near bridge abutment. Scour around midstream bridge piers does not appear to have worsened since 2012 but should be monitored in future years.	Hoppin Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream from 94b bridge multiple OHV trails in the gravel bar	Looking downstream from 94b bridge at multiple OHV trails in the gravel bar.	Hoppin Reach	RM 15.9	
Tompkins	Gordon slew confluence mixing zone not as pronounced as in 2012.	Gordon Slough confluence mixing zone not as pronounced as in 2012.	Hoppin Reach	RM 15.9	
Tompkins	Debris On bridge pier With large scour hole	Debris on bridge pier with large scour hole. Scour should be monitored in future years.	Hoppin Reach	RM 15.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Unused Teichert conveyor to cross over to north side of Cache Creek Preserve. Large cliff swallow colony under bridge.		Dunnigan Hills Reach	RM 16.5	
Martin	Unused Teichert conveyor to cross over to north side of Cache Creek Preserve. Large cliff swallow colony under bridge.		Dunnigan Hills Reach	RM 16.5	
Tompkins	Downstream from conveyor bridge.	Downstream from conveyor bridge.	Dunnigan Hills Reach	RM 16.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking Us from conveyor bridge	Looking upstream from conveyor bridge	Dunnigan Hills Reach	RM 16.5	
Tompkins	Conveyor.	Conveyor.	Dunnigan Hills Reach	RM 16.5	
Tompkins	Downstream from conveyor bridge	Downstream from conveyor bridge	Dunnigan Hills Reach	RM 16.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Upstream from the conveyor bridge	Upstream from the conveyor bridge	Dunnigan Hills Reach	RM 16.5	
Martin	Vertical face supporting swallows on Teichert property near conveyor to Cache Creek Conservancy. Appears to be at least one pair of rough winged swallows nesting on west edge of cliff face.		Dunnigan Hills Reach	RM 16.6	
Martin	Vertical face supporting swallows on Teichert property near conveyor to Cache Creek Conservancy. Appears to be at least one pair of rough winged swallows nesting on west edge of cliff face.		Dunnigan Hills Reach	RM 16.6	

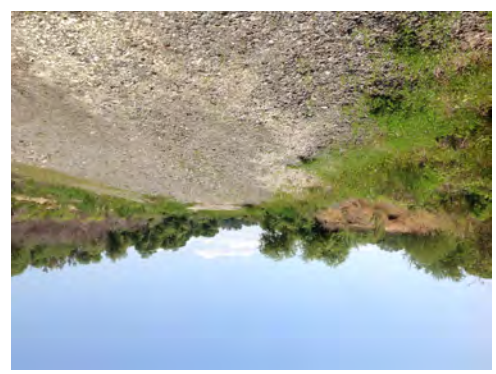
Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Shallow 25' pit at clay bottom.	Shallow 25' pit at clay bottom.	Dunnigan Hills Reach	RM 16.6	
Martin	Restoration in progress at White Wings open space.		Dunnigan Hills Reach	RM 16.9	
Martin	Restoration in progress at White Wings open space.		Dunnigan Hills Reach	RM 16.9	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Restoration in progress at White Wings open space.		Dunnigan Hills Reach	RM 16.9	
Martin	Restoration in progress at White Wings open space.		Dunnigan Hills Reach	RM 16.9	
Martin	Potential upper terrace restoration at Madison property adjacent to White Wing restoration.		Dunnigan Hills Reach	RM 17	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Potential upper terrace restoration at Madison property adjacent to White Wing restoration.		Dunnigan Hills Reach	RM 17	
Martin	Potential upper terrace restoration at Madison property adjacent to White Wing restoration.		Dunnigan Hills Reach	RM 17	
Martin	Lower White Wing restoration area.		Dunnigan Hills Reach	RM 17	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Lower White Wing restoration area.		Dunnigan Hills Reach	RM 17	
Martin	Potential upper terrace restoration project at Patterson property east of former pit. Need further exploration of opportunity and feasibility.		Dunnigan Hills Reach	RM 17.3	
Martin	Potential upper terrace restoration project at Patterson property east of former pit. Need further exploration of opportunity and feasibility.		Dunnigan Hills Reach	RM 17.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Potential upper terrace restoration project at Patterson property east of former pit. Need further exploration of opportunity and feasibility.		Dunnigan Hills Reach	RM 17.3	
Martin	Potential upper terrace restoration project at Patterson property east of former pit. Need further exploration of opportunity and feasibility.		Dunnigan Hills Reach	RM 17.3	
Martin	Potential upper terrace restoration project at Patterson property east of former pit. Need further exploration of opportunity and feasibility.		Dunnigan Hills Reach	RM 17.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Abundant surface water with excellent regeneration at mid to upper terraces with heavy tamarisk infestation largely eliminated on north bank.		Dunnigan Hills Reach	RM 17.3	
Martin	Abundant surface water with excellent regeneration at mid to upper terraces with heavy tamarisk infestation largely eliminated on north bank.		Dunnigan Hills Reach	RM 17.3	
Martin	Abundant surface water with excellent regeneration at mid to upper terraces with heavy tamarisk infestation largely eliminated on north bank.		Dunnigan Hills Reach	RM 17.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Abundant surface water with excellent regeneration at mid to upper terraces with heavy tamarisk infestation largely eliminated on north bank.		Dunnigan Hills Reach	RM 17.3	
Martin	Assumed natural revegetation in former extraction pit on south bank of Patterson property.		Dunnigan Hills Reach	RM 17.3	
Martin	Assumed natural revegetation in former extraction pit on south bank of Patterson property.		Dunnigan Hills Reach	RM 17.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Views of former Patterson pit with dense freshwater marsh vegetation.		Dunnigan Hills Reach	RM 17.5	
Martin	Views of former Patterson pit with dense freshwater marsh vegetation.		Dunnigan Hills Reach	RM 17.5	
Martin	Natural revegetation to freshwater marsh and willow scrub at Patterson pit.		Dunnigan Hills Reach	RM 17.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Natural revegetation to freshwater marsh and willow scrub at Patterson pit.		Dunnigan Hills Reach	RM 17.5	
Martin	Natural revegetation to freshwater marsh and willow scrub at Patterson pit.		Dunnigan Hills Reach	RM 17.5	
Martin	Former Patterson pit with natural revegetation. Mined in 1980s with south slope revegetated.		Dunnigan Hills Reach	RM 17.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Former Patterson pit with natural revegetation. Mined in 1980s with south slope revegetated.		Dunnigan Hills Reach	RM 17.6	
Larsen	Benefits of erosion	This is an example of a rather steep bank that has been allowed to naturally vegetate. This is what is not possible on area where cement and Kabul predominates.	Dunnigan Hills Reach	RM 17.8	
Larsen	#74b Audio notes on Moores siphon.	Moore siphon	Dunnigan Hills Reach	RM 18	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	#74b Audio notes on Moores siphon.	Moore siphon	Dunnigan Hills Reach	RM 18	
Martin	Moore Siphon crossing with beaver dam at crossing location.		Dunnigan Hills Reach	RM 18	
Martin	Moore Siphon crossing with beaver dam at crossing location.		Dunnigan Hills Reach	RM 18	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Instream habitat	Valuable instream habitat created by natural process of bank erosion. This is an area that would loose if you treat upstream from Morris siphon. We have agreed that this is an area that provides habitat Value in stream and off stream	Dunnigan Hills Reach	RM 18.1	
Larsen	More of the habitat created by erosion	In this area we saw the largest school of fish we have seen in the creek including a big largemouth bass. This underscores the value of this small area for habitat including the wood in the streem.	Dunnigan Hills Reach	RM 18.1	
Larsen	Swallow habitat created by erosion.	Looking upstream we see a vertically cut Bank on the northside a natural process of stream dynamics which we should acknowledge and encourage wherever it occurs. It provides habitat for swallows.	Dunnigan Hills Reach	RM 18.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Actively eroding banks taking out mature cottonwoods and other vegetation just upstream of Moore Siphon.		Dunnigan Hills Reach	RM 18.1	
Martin	Actively eroding banks taking out mature cottonwoods and other vegetation just upstream of Moore Siphon.		Dunnigan Hills Reach	RM 18.1	
Tompkins	Looking upstream mature riparian vegetation on both banks	Looking upstream at mature riparian vegetation on both banks.	Dunnigan Hills Reach	RM 18.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream towards Moores siphon. Some erosion of left Bank	Looking downstream towards Moore's siphon. Some erosion of left bank.	Dunnigan Hills Reach	RM 18.1	
Martin	Dense stand of tamarisk and arundo on north bank above vertical the space. Consider cooperative agreement to allow County to treat tamarisk and arundo at this location.		Dunnigan Hills Reach	RM 18.2	
Martin	Broad unvegetated channel bottom bordered by well-developed woody vegetation on both north and south banks with mid-level terrace.		Dunnigan Hills Reach	RM 18.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Broad unvegetated channel bottom bordered by well-developed woody vegetation on both north and south banks with mid-level terrace.		Dunnigan Hills Reach	RM 18.3	
Martin	Broad unvegetated channel bottom bordered by well-developed woody vegetation on both north and south banks with mid-level terrace.		Dunnigan Hills Reach	RM 18.3	
Martin	Broad unvegetated channel bottom bordered by well-developed woody vegetation on both north and south banks with mid-level terrace.		Dunnigan Hills Reach	RM 18.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking upstream note large mature cottonwood willow black walnut right thank and left Bank	Looking upstream. Note large mature cottonwood, willow, and black walnut on right bank and left bank.	Dunnigan Hills Reach	RM 18.3	
Tompkins	Looking downstream primary channel on the right bank adjacent to flat Terrace approximately 50 to 100 feet wide flanked by mature cottonwoods and Willow	Looking downstream at primary channel on the right bank adjacent to flat terrace approximately 50 to 100 feet wide flanked by mature cottonwoods and willow.	Dunnigan Hills Reach	RM 18.3	
Larsen	Spur dikes	The upstream photo of Southbank spur dikes. They influenced the channel so that it swings to the north bank downstream from the spur dilkes	Dunnigan Hills Reach	RM 18.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Spur dikes	The upstream photo of Southbank spur dikes. They influenced the channel so that it swings to the north bank downstream from the spur dilkes	Dunnigan Hills Reach	RM 18.5	
Martin	At least two pair of rough winged swallows nesting on vertical cliff of north bank.		Dunnigan Hills Reach	RM 18.5	
Tompkins	Looking downstream left bank erosion at bedrock toe	Looking downstream left bank erosion at bedrock toe.	Dunnigan Hills Reach	RM 18.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking upstream at right bank erosion of spur Dykes	Looking upstream at right bank erosion of spur dykes.	Dunnigan Hills Reach	RM 18.5	
Martin	Heavy beaver loss of cottonwood trees at outside edge of low flow channel in view upstream just downstream of Rincon spur dikes. View downstream of exposed bank with nesting swallows.		Dunnigan Hills Reach	RM 18.6	
Martin	Heavy beaver loss of cottonwood trees at outside edge of low flow channel in view upstream just downstream of Rincon spur dikes. View downstream of exposed bank with nesting swallows.		Dunnigan Hills Reach	RM 18.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Dike nose erosion	Exposed concrete rubble where erosion has moved into a former spur dike. This area has degraded habitat value. This is a good example of the degraded habitat that occurs with cement rubble is used to make spur dikes.	Dunnigan Hills Reach	RM 18.7	
Larsen	Dike nose erosion	Exposed concrete rubble where erosion has moved into a former spur dike. This area has degraded habitat value. This is a good example of the degraded habitat that occurs with cement rubble is used to make spur dikes.	Dunnigan Hills Reach	RM 18.7	
Tompkins	Right bank eroded spur dike note small relatively small concrete rubble eroding out of spur dike	Right bank eroded spur dike. Note relatively small concrete rubble eroding out of spur dike. This should be monitored after future high winter flows.	Dunnigan Hills Reach	RM 18.7	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Dike toe erosion	Photos of possible toes of dikes from pre-ordnance construction here.It would be possible to lessen the erosion pressure here by bar skimming	Dunnigan Hills Reach	RM 18.8	
Larsen	Dike toe erosion	Photos of possible toes of dikes from pre-ordnance construction here.It would be possible to lessen the erosion pressure here by bar skimming	Dunnigan Hills Reach	RM 18.8	
Larsen	Dike nose erosion dumping rubble into the creek	There is exposed concrete rubble in the tophus burdocks upstream from more siphon. Each of the Forsberg likes is a rodent. It is unsightly and his discharging cement Creek. JIm remarked that this concrete limits the habitat vlalue.	Dunnigan Hills Reach	RM 18.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Dike nose erosion dumping rubble into the creek	There is exposed concrete rubble in the tophus burdocks upstream from more siphon. Each of the Forsberg likes is a rodent. It is unsightly and his discharging cement Creek. JIm remarked that this concrete limits the habitat vlalue.	Dunnigan Hills Reach	RM 18.8	
Martin	Severe erosion on south bank of active channel at spur dikes installed in 1998. Possible future treatment area for bar skimming to relieve pressure at south bank.		Dunnigan Hills Reach	RM 18.8	
Martin	Concrete rubble at eroded spur dikes on Solano Concrete property at river mile 18.1. Concrete rubble limits habitat value and could be capped as part of future restoration.		Dunnigan Hills Reach	RM 18.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream towards the right bank where erosion scallops are present erosion was also present in 2012	Looking downstream towards the right bank where erosion scallops are present erosion was also present in 2012.	Dunnigan Hills Reach	RM 18.8	
Tompkins	Looking upstream towards left Bank with mature cottonwood trees	Looking upstream towards left bank with mature cottonwood trees.	Dunnigan Hills Reach	RM 18.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Depsotion occuring at fomer erosion spot	Fine deposition in an area downstream from the rock. This is an area of former erosion. It's possible that this deposition will continue to occur and protect the slump bank above it.	Rio Jesus Maria Reach	RM 11.6	
Larsen	Depsotion occuring at fomer erosion spot	Fine deposition in an area downstream from the rock. This is an area of former erosion. It's possible that this deposition will continue to occur and protect the slump bank above it.	Rio Jesus Maria Reach	RM 11.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream at huffs corner. Right thanks large riprap go. Possibly some fine sediment infill since 2012.	Looking downstream at Huffs Corner. Right bank large may have some fine sediment infill since 2012.	Rio Jesus Maria Reach	RM 11.6	
Tompkins	Looking upstream. House corner right bank. Fine sediment infill along large rock toe of slope.	Looking upstream. Huff's Corner right bank. Fine sediment infill along large rock toe of slope since 2012.	Rio Jesus Maria Reach	RM 11.6	
Tompkins	Right bank downstream end of huffs corner revetment. Looks like minor improvement with some new vegetation in scoured area downstream thanks protection.	Right bank downstream end of huffs corner revetment. Looks like minor improvement with some new vegetation in scoured area downstream thanks protection. Additional purposeful revegetation prior to next high flows could improve conditions in this location even further.	Rio Jesus Maria Reach	RM 11.6	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Larsen	Remove bar at Huff's corner	We recommend the removal of the bar on the inside (right) of Huffs corner in order to alleviate pressure on the outside (right) bank.	Rio Jesus Maria Reach	RM 11.7	
Martin	Deeply incised channel with heavy tamarisk removal evident. Very little replacement groundcover in the vicinity of removed tamarisk.		Rio Jesus Maria Reach	RM 11.8	
Martin	Deeply incised channel with heavy tamarisk removal evident. Very little replacement groundcover in the vicinity of removed tamarisk.		Rio Jesus Maria Reach	RM 11.8	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Martin	Deeply incised channel with heavy tamarisk removal evident. Very little replacement groundcover in the vicinity of removed tamarisk.		Rio Jesus Maria Reach	RM 11.8	
Martin	Deeply incised channel with heavy tamarisk removal evident. Very little replacement groundcover in the vicinity of removed tamarisk.		Rio Jesus Maria Reach	RM 11.8	
Tompkins	Looking upstream. Narrow confined reach. Right bank structure falling into Creek.	Looking upstream. Narrow confined reach. Right bank structure falling into creek.	Rio Jesus Maria Reach	RM 12.1	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking downstream. Narrow confined reach. Entering huffs corner.	Looking downstream. Narrow confined reach. Entering Huff's Corner.	Rio Jesus Maria Reach	RM 12.1	
Tompkins	Looking at right bank. Significant debris at whole of right bank slope structure at top of slope still cantilevered over top of bank. Similar to last year.	Looking at right bank. Significant debris at whole of right bank slope structure at top of slope still cantilevered over top of bank. Similar to last year.	Rio Jesus Maria Reach	RM 12.2	
Tompkins	Downstream. White building at top of right bank near to falling into the channel	Downstream. White building at top of right bank near to falling into the channel. Does note appear to have changed substantially since 2012 but should be monitored closely in future years.	Rio Jesus Maria Reach	RM 12.3	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking upstream. Large rock riprap Attoe of left Bank. Erosion along west bank.	Looking upstream. Large rock riprap at toe of left Bank. Erosion along west bank.	Rio Jesus Maria Reach	RM 12.4	
Tompkins	Looking downstream. Just upstream of tight ass band.	Looking downstream. Just upstream of tight meander bend.	Rio Jesus Maria Reach	RM 12.5	
Tompkins	Looking downstream. Continued transition from gravel sand. Extensive eradicated Arendo.	Looking downstream. Continued transition from gravel sand. Extensive eradicated Arendo.	Rio Jesus Maria Reach	RM 12.5	

Observer	Comments	Verbose Comments	River Reach	River Miles	Image
Tompkins	Looking upstream. Narrow confined reach. Beginning transition from gravel to sand.	Looking upstream. Narrow confined reach. Beginning transition from gravel to sand.	Rio Jesus Maria Reach	RM 12.6	

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
98-1	Develop a set of standardized conditions of approval for flood hazard permits within the CCRMP area.	Completed					
98-2	Create and over-the-counter permit to construct low-flow, temporary stream crossings.	Completed					
98-3	Create a standard hold harmless form for property owners on projects where the County is coordinating channel improvements. Liability issues have been a recurring issue on channel improvement projects that have resulted in lengthy delays.	Completed					
98-4	Obtain a general 401 Certification from the Regional Water Quality Control Board to reduce costs and streamline the permitting process.	Completed			Renewal Process		
98-5	Petition the State Mines and Geology Board for an exemption from SMARA for the CCRMP.	On-going	Completed				
98-6	Establish monitoring plots for vegetation in lieu of the 5-year biological survey.		Completed (2002)				

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
98-7	Change the water quality constituents to better reflect likely contaminants.	Completed					
98-8	Allow TAC to develop feasible alternatives to using peizometers to monitor groundwater levels.	On-going					N/A
98-9	Monitor previously approved projects within the CCRMP area to learn which methods of erosion control, stream stabilization, and revegetation are most successful.	On-going					
98-10	Install stream gauges at Capay and Madison with real-time telemetering capabilities.	On-going					
98-11	Capay Bridge Erosion Control: Remove gravel bar and use material to construct spurs on the north bank upstream of Capay Bridge (CR 85). Revegetate areas between spurs.	On-going					N/A
98-12	Channel stabilization upstream of I-505 bridge: relocate the low-flow channel, construct gravel spurs and concrete rip-rap. Regrade slopes and revegetate slopes and areas between spurs.	Completed					

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
98-13	Convert the Coors basin to seasonal wetlands. Expand existing shallow wetlands habitat, provide filtration and minor recharge of water from Gordon Slough.	Completed					
98-14	Remove stream banks that separate isolated areas from the main creek channel to provide additional flood capacity, create new expansion areas for riparian vegetation, and reduce velocities.	Completed					
98-15	Revegetate in appropriate areas.	Completed					
98-16	Erosion control upstream of Moore's Crossing (approx. halfway between I-505 and CR 94B)	Completed					
98-17	Clear tamarisk and giant reed in selected areas.	On-going	On-going	On-going	On-going	On-going	On-going
98-18	Obtain critical lands and/or easements from willing sellers to preserve riparian habitat for public enjoyment and to form areas of continuous protection.	Completed					

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
99-1	Acquire a portable water quality sampling machine		Completed				
99-2	Rezone the following properties to include an Open Space (OS) overlay zone: Millsap, CCNP, Correll, and Rodgers.						
99-3	Restrict incompatible materials from being used as riprap in the channel						
99-4	Survey and paint elevation marks on the abutments of County bridges to provide more accurate readings during flood events.						
99-5	Create a Cache Creek website that provides info on monitoring, studies, and restoration activities		Completed				
99-6	Digitize historic contour maps (from 1980-97)						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
99-7	Establish stream transects to monitor plant colonization and success, instead of test plots. (See No. 98-6)		Completed (2002)				
99-8	Develop and review HEC models for lower Cache Creek					In Progress	
99-9	Revegetate in appropriate areas: upstream of I-505 is a priority						
99-10	Obtain critical lands and/or easements from willing sellers to preserve riparian habitat for public enjoyment and to form areas of continuous protection.						
06-3.2-1	Implement a flood monitoring program, including monitoring and inspecting during flood events.				Complete		
06-3.4-1	Remove invasives in the Jesus Maria and Hoppin reaches to improve flood capacity.			On-going	On-going	On-going	On-going

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
06-3.5-1	Incorporate regulatory standards into Water Quality Monitoring as they become available.			On-going	On-going	On-going	On-going
06-3.5-2	Conduct further analysis of pH, ammonia nitrogen, nitrate nitrogen, total K nitrogen, total nitrogen, TPH (as diesel), and fecal coliform						
06-3.5-3	Refine water quality constituents to better reflect likely constituents					Completed	
06-3.5-4	Work with CVRWQCB to develop 20-year plan for reducing methyl mercury in fish tissue						
06-3.6-1	Investigate best management practices to reduce methylation of mercury in wetlands						
06-3.7-1	Mercury TDML: Add three turbidity monitoring sites to conform to new mercury TDML standards						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
06-3.7-2	Examine whether TSS monitoring can be replaced with turbidity monitoring. Turbidity monitoring is cheaper and easier but may/may not comply with CCAP standards						
06-4.1-1	Digital Terrain Model (DTM) - Use LiDAR data to create a 2006 DTM						
06-4.2-1	Use DTM data to conduct a quantitative assessment of significant volumetric changes in channel capacity and areas of excessive erosion between 1997 and 2006						
06-4.4-1	Channel morphology - survey transect locations to provide data necessary for calibration of a HEC-RAS model						
06-5.2-1	Conduct digital aerial photography and utilize LiDAR imagery to improve accuracy and detail		Completed	Completed	Completed		On-going
06-5.2-2	Set mapping guidelines: specific guidelines for vegetation mapping and riparian surveys to ensure consistency in data collection						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
06-5.3-1	Develop a standard method and process for monitoring human-assisted restoration projects that will allow for comparative analysis and provide guidance for future projects						
06-5-4.1	Use color aerial photography for tamarisk monitoring		Completed	Completed	Completed		
06-6.1-1	Resource agency coordination with landowners to promote and implement invasive species removal program						
06-6.1-2	Coordinate invasive species removal with riparian restoration projects						On-going
06-6.1-3	Use bioengineering methods for erosion control						
06-6.1-4	PG&E Palisades: coordinate a solution to exposed pipeline and concrete blanker conditions					Completed	

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
06-6.1-5	RM 26.6: Erosion on south bank - determine if it has the potential to endanger infrastructure. Coordinate erosional control project with landowner including mid-channel bar alterations						
06-6.1-6	Capay Bridge: Monitor aggradation at the Capay Bridge and work with PPW on channel reorientation and/or sediment removal to address adverse orientation of the low-flow channel. Explore habitat restoration opportunities up or downstream in conjunction with any erosion control project						
06-6.2-1	Erosion control: protect infrastructure by installing "hard points" such as spur dikes or protected banks. Ensure that future erosion control projects adjacent to the low-flow channel require reinforcement of the toe as regular maintenance.						
06-6.2-2	Human-Assisted Habitat Restoration: Assess soil conditions and water requirements for plant species specified in projects. Include soil amendments or topsoil when planting and ensure the presence of a water source						
06-6.2-3	Capay Open Space Park (RM 26.3): Complete park plan implementation including additional trails and handicap access to Cache Creek				Completed		
06-6.2-4	Granite Construction Bank Stabilization Project (RM 25.7): Monitor reconstruction of the bank toe along the Granite property to protect the upper bank		Completed				

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
06-6.2-5	Jensen Site (RM 25.4): Evaluate the cause of the projects failure with project designers and landowner. Establish guidelines for repair or replacement.						
06-3.2-6	Esparto Bridge (CR 87): Implement preventative erosion control measures to protect public infrastructure and evaluate habitat restoration opportunities						
06-6.3-1	Lower Madison habitat restoration: Look for habitat restoration and enhancement opportunities to connect existing riparian vegetation in the lower reach						
06-6.3.2	Grube-Payne Site (RM 22.3-22.1): Work with landowner to develop a restoration project on 20 ac or bank terrace to promote a vegetated corridor for both habitat value and erosion control			Completed			
06-6.3-3	Grube-Payne Site (RM 22.1): Monitor reconstruction of agricultural tailwater pipe to ensure compliance with specifications detailed in the original design & prevent further erosion						
06-6.3-4	Grube-Payne Site (RM 21.8): Work with landowner to develop a restoration project on 24 ac or bank terrace to promote a vegetated corridor for both habitat value and erosion control						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
06-6.3-5	Old Madison Bridge Site/Dunbar (RM 21.5): Erosion control project that deflects the energy of the channel meander located upstream of the Dunbar site and reform the existing spur dike at the Dunbar site to stabilize the north bank						
06-6.3-6	I-505 Bridge area (RM 21): Work with Syar and landowner to provide soil and plantings on upper portions of rip-rapped slopes. Improve habitat at spur dikes						
06-6.4-1	Bank stabilization in Guesisosi reach should include toe bank protection and vegetation. Lots of restoration opportunities with available groundwater.						
06-6.4-2	Guesisosi Reach-Upper South Bank: Assist property owner to develop a plan to address bank erosion and required mining setbacks.						
06-6.5-1	RM 18.6-18.1: Spur dikes have eroded significantly. Bank is vulnerable to erosion. Need to assess further stabilization of the bank to protect Moore's siphon.						
06-6.5-2	Moore's Siphon (RM 18): Assist YCFCWCD is developing a long-term solution to the Moore's siphon crossing						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
06-6.6-1	Stephen's Bridge (CR 94B / RM 15.9): Look at preventative measure to reduce erosion potential at bridge. Look at habitat restoration opportunities						
06-6.6-2	Correll Pond (RM 13.8): Address erosion of the embankment adjacent to the overflow structure						
06-6.6-3	Correll -Rodgers Habitat Restoration (RM 13.9-13.7): Develop a site plan that includes habitat enhancement and public access						
06-6.6-4	Harrison Site (RM 13.4): Revegetate lower bank areas. Use fencing or other barriers, instead of tubex tubes, for animal predation and protection from ATV's.						
06-6.7-1	Flood Control/Invasive Removal: Coordinate with landowners, DWR, and the CCC to promote and implement an invasive species removal program within the floodplain						
06-6.7-2	Huff's Corner (RM 11.6): Finalize design and present to TAC for comments any plans for improvements to CR 18 and/or levee protection at Huff's Corner			Completed			

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
06-7.3.1	Project Prioritization: Establish a protocol and prioritization method for determining how all projects (County proposed & privately proposed) will be reviewed, approved, and prioritized by County staff and the TAC. Projects should be reviewed for consistency with any requirements and recommendations in the CCRMP/CCIP, design, construction methods, monitoring requirements as necessary, and maintenance.			Completed			
06-7.3-2	Project Development Guidelines: Develop a project checklist for parties interested in developing projects in the CCRMP. Educate the public in permit requirements to improve public understanding of the CCRMP area project evaluation and implementation process.			???			
10-G-1	HEC-RAS modeling of the entire CCRMP should be completed and analyzed in 2011 to allow an analysis of the 100-year flood capacity.					On-going	
10-G-2	~~Adopt a protocol for bed material sampling and a description of how the data will be used.~~					Deleted	
10-G-3	Estimate the annual rate of channel bed aggradation over time using DTM data. DTM data from prior to 2006 should be added to the study. A frequency analysis of flows should be done to consider the relative influence of the 2006 data on the results.					On-going	
10-G-4	Continue to study the relationship between rates of aggradation and channel characteristics in various reaches of the creek. A frequency analysis of flows should be done to consider the relative influence of the 2006 data on the results.						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
10-G-5	Review the benefits of monitoring bed armoring and formulate a recommendation regarding future monitoring.					Completed	
10-G-6	Update reach descriptions using more accurate georeferenced length measurements for each of the reaches.					On-going	
10-G-7	Report on the flood potential directly upstream from Huff's Corner (Rio Jesus Maria) including location and magnitude of flow potential at this site.						
10-H-8	Work with County disaster relief personnel to maximize the technical expertise of the TAC during flood events.				Complete		
10-H-9	Upgrade turbidity monitoring methods to include continuous turbidity monitoring. This newer technology will allow better tracking of sediment and contaminant loads.						
10-H-10	Address high summer water temperatures by restoring native shrubs and trees in the riparian zone for shade.						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
10-H-11	Monitor levels of orthophosphates, diesel fuel, fecal coliform, and total coliform in creek water.						
10-H-12	Undertake required methylmercury monitoring and analysis. Consider additional partnerships to monitor and analyze methylmercury.						Completed
10-H-13	Use existing shallow wells near Cache Creek to identify groundwater patterns. Many of these wells (piezometers) were drilled on gravel company property to satisfy CCAP requirements.						Completed
10-B-14	Conduct surveys of the Andregg vegetation transects to develop baseline data to support vegetation monitoring						
10-B-15	Conduct a study of vegetation classes in the riparian zone based on the color aerial photos						
10-B-16	Assess and possibly update the CCRMP boundary to compensate for channel migration					On-going	

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
10-B-17	Review and modify the Andregg vegetation transects for changes caused by channel migration						
10-18	Monitor OHV impacts and work with YCSD to reduce illegal OHV activity in the creek. Work with CCC to respond to erosion and vegetation damage caused by OHV activity			On-Going			
10-CIP-1	Coordinate with YCFCWCD on reconstruction of the Moore's siphon (RM 18.1)						
10-CIP-2	Consider bank repair at RM 20.8 where the toe of the levee is eroded						
10-CIP-3	Repair minor erosion at the emergency bank stabilization sites (RM 20.8 - 19.8)						
2011.G.A1.1	HEC RAS modeling CCRMP reach completed and analyzed, and compared with 1996 conditions if possible.				In progress		

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
2011.G.A2.2	Estimate the annual rate of channel bed aggradation over time.						In progress
2011.G.A3.3	Annual aerial survey contract and scope of work should be amended			Complete	Complete		On-going
2011.G.A4.4	Continue to monitor actively migrating bends, and use a predictive model						
2011.H.A1.5	Complete review of hydrology and water quality objectives in CCRMP					Complete	
2011.H.A2.6	Review Cache Creek water quality data base and identify duplication of effort.					Complete	
2011.H.A3.7	Prioritize and/or eliminate constituent testing based on HA1 and HA2 above					Complete	

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
2011.H.A4.8	Continue to monitor contaminants of concern in creek water based on water quality database review and prioritization described above.					On-going	On-going
2011.H.A5.9	Continue groundwater monitoring near Cache Creek, incorporating data from mining sites					On-going	On-going
2011.B.A6.10	Complete methylmercury monitoring and analysis in the CCRMP study area. Consider additional partnerships to monitor and analyze methylmercury						On-going
2011.B.A1.11	Continue to work with County staff and the aerial contractor to further refine and classify vegetation						In progress
2011.B.A2.12	The CCRMP boundary should be updated					On-going	On-going
2011.B.A3.13	Coordinate with full TAC in 2012 to identify areas and sites best suited for natural regeneration of riparian and upland habitat conditions						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
2011.B.A4.14	Continue to participate in the Cache Creek Watershed Wide Invasive Management Plan						On-going
2011.G.A.15	Channel shifting patterns near RM 26.4 should be actively monitored						On-going
2011.G.A.16	Bank erosion at RM 26.9 on the south bank … continued engagement with PGE					On-going	On-going
2011.G.A.17	The bank retreat patterns near RM 25.4 -25.5, RM 22.0, and RM 20.6 for regeneration of riparian habitat. Site-specific small scale revegetation plantings explored.					In progress	In progress
2011.G.A.18	Active bank retreat near RM 21.6 (near the old Madison Bridge) should be monitored in 2012.					On-going	On-going
2011.G.A.19	Significant erosion at the I-505 crossing should be assessed. Vegetation should be removed in order to protect the bridge piers.						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
2011.G.A.20	Replace dead arundo and tamarisk in the Capay Reach with native plantings.						
2011.G.B1.1	Update reach descriptions using updated values for all channel characteristics. Standardize the reach endpoint descriptions.						
2011.H.B1.2	Continue to pursue partnerships to install continuous turbidity monitoring						
2011.B.B.3	Mapping protocols should be developed to define the procedure and schedule for mapping vegetative cover within the CCRMP study area						
2011.G.B.4	Complete HEC-RAS modeling of the Huff's corner area, and a comparison with the 1996 100-year flood capacity.						
2011.G.H.B.5	The flood conveyance at the I-505 bridge: Coordinate with CALTRANS and stakeholders, and complete hydraulic modeling to determine before- and after-skimming water surface elevations if the bar were skimmed.						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
2011.H.B.6	Implement water temperature monitoring by placing water temperature data loggers in each reach.						
~~2011.G.C1.1~~	~~Sampling the bed surface material~~					Deleted	
~~2011.G.C2.2~~	~~Develop a protocol and sampling schedule to measure bed armoring~~					Deleted	
2011.B.C.3	Undertake more detailed ancillary wildlife assessments in conjunction with field work.						
2011.G.C.4	Channel bank retreat upstream from Moore's Siphon near RM 18.1 should be monitored.						
2012.G.A.1	Assessment of bar skimming in the following locations: RM 26.1, 25.5, 21.6, and 20.3 - 20.5.						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
2012.G.A.2	Channel maintenance project on upper bank at Huff's Corner (RM 11.6) to prevent downstream unraveling of existing bank protection						
2012.G.A.3	Repair levee and bank erosion at RM 19.5						
2012.G, H, B.4	Create Creek Walk protocols						
2012.H.A.1	Increased mercury concentrations detected in 2012 surface water samples need to be communicated to on-going mercury studies in the watershed and evaluated in 2013						
2012.H.A.2	Update and maintain geo-spatially referenced photo log for use on Creek Walks and to document on-going changes and conditions on the Creek.					Complete	Complete
2012.H.B.1	Compile water Quality Impact Catalogue and associated source and contaminant potential assessment						

No.	RECOMMENDATION	STATUS					
		1999	2006	2010	2011	2012	2013
2012.G.B.3	Channel maintenance project on lower bank at Huff's Corner (RM 11.6) to prevent downstream unraveling of existing bank protection						
2012.G, H.B.2	Channel maintenance project at south bank RM 12.35 to prevent the recruitment of foreign material into the Creek						
2012.G.C.1	Establish a high-flow triggered bank stability monitoring plan for the I-505 bridge						
2012.G.C.2	Establish a high-flow triggered bank stability monitoring plan for the south bank at the Cemex Slope Protection project site (RM 20.6)						
2012.G.C.3	Remove berm/concrete barrier at Correll Rodgers (RM 13.8)						
2012.H.C.1	Historical analysis on movement/migration of the vehicle boneyard (south bank RM 26.6)						

SEDIMENT TRANSPORT ESTIMATES

In the 2010 annual report, sediment transport calculations were made based on sediment transport rating curves developed for Cache Creek based on pre-1996 data[1]. "Best-fit lines through USGS published suspended sediment loads plotted against discharge generated the following relationships:

$Q_s = 0.00018Q^{2.2}$ [Equation 1]

for flows less than 6,000 cfs. and

$Q_s = 0.2Q^{1.4}$ [Equation 2]

for flows greater than 6,000 cfs where Q_s =sediment discharge and Q = water discharge."

These equations were the basis of the suspended load sediment transport rating curve that was developed for Cache Creek.

Bedload measurements were also used to develop a relation between the suspended load and bedload[2]. The bedload was determined to be "*an average of 6 percent of the measured suspended load*." In the former study, they "*chose to calculate bedload as a fixed percentage of suspended load.*" In those studies they "*then applied the suspended and bedload transport functions to each mean daily flow for each annual runoff period and summed the annual totals*.[3]"

In order to estimate the sediment transport quantities for this annual report, a similar procedure was used to determine an estimate of the total sediment transport for the years 2005-2013, for which flow data were available. Flow values were taken for a water year from October 1 of the previous year to September 30 of the water year[4]. Mean daily flow values were taken from the USGS gage at Yolo (USGS 11452500 CACHE C at YOLO CA). The Yolo gage was used because it had the only complete flow record for this time period. Because this gage tends to record flows that are slightly lower than most of flows for the CCRMP study reach, it is expected that the estimates in this annual report are slightly less than what they might be for the study reach as a whole.

Based on these data and the empirical relationship in the suspended load rating curve, total sediment transport was calculated in tons

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[1] Technical Studies and Recommendations for the Lower Cache Creek Resources Management Plan, 1995. (Technical Studies)

[2] Technical Studies

[3] Technical Studies p. 3.3-24

[4] From Oct. 1. 2010 to Sept. 30, 2011 is called the 2011 water year.

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Landscape Architecture Program
July 26, 2013

University of California
One Shields Ave.

Fax: (530) 752-1392
Davis, CA 95616

TECHNICAL MEMORANDUM

To: Elisa Sabatini, Natural Resources Program Coordinator
From: Eric Larsen, Chair, Technical Advisory Committee
Subject: Yearly estimates of amount deposited within the channel
Date: July 26, 2013

BACKGROUND AND OVERVIEW

The Cache Creek Improvement Program (CCIP) encourages the use of “managed sand and gravel removal (bar skimming) to promote and maintain channel stability and flood capacity”. (CCIP p. 28) The Technical Advisory Committee (TAC) is charged with providing annual recommendations of Creek maintenance needs and priority projects. (CCIP p. 6) In the past the TAC has relied on data obtained from an annual aerial survey to estimate the annual deposition (how much new sand/gravel material has been deposited in the Creek).

In 2012 the TAC recommended that the aerial survey be conducted once every five (5) years, or after a significant storm occurs that results in peak flows of 25,000 cubic feet per second or more. (2012 Cache Creek Annual Report, p. 32) This reduction was instituted as a cost saving measure and because the TAC indicated that there were other methods of obtaining the data needed to estimate the annual deposition in Cache Creek. This memo is intended to memorialize other methods of estimating annual deposition that are under consideration by the TAC.

This memo discusses the possibility of using other existing or easy to obtain data to estimate aggregate deposition over time, methods of estimating current deposition, and suggests the criteria by which the TAC will evaluate future gravel skimming recommendations.

POSSIBLE ALTERNATE METHODS OF ESTIMATING ANNUAL DEPOSITION

ESTIMATING CURRENT CONDITIONS

1. A long term average of the observed changes can yield an estimate of annual deposition. This would require at least two different time periods for which we had similar-method measurements of the amount of sediment deposited. For example, if we have a reliable measurement via aerial survey in 2011 and another in 2016, we could take the average amount of deposition per year in that time interval. This would be a rough estimate, and the longer the time period, the more appropriate the estimate. However, it should be noted that a single extremely large flow event in one year could account for the vast majority of sediment deposited over a period of several years.

2. Each year’s sediment change can be estimated using sediment transport calculations. This method estimates the amount of sediment that would be deposited based on the observed flow record for the year. This method could be more accurately “calibrated” by looking at past volumetric data and checking our theoretical estimates with observed values.

The first method, the long-term average, is not ideal because it does not account for annual variability. The second method, using sediment transport estimates, relies on the data from actual observations, and assigns an amount per year based on the amount of flow documented in that year. Using the second method, the yearly deposition is likely to be more accurate for the previous year than the long term average method.

LONG TERM ESTIMATES

Based on the TAC’s 2012 recommendation, aerial photos will be obtained at least every five (5) years but more frequently if there is a significant high flow event. This means that the TAC will be able to perform cut and fill measurements (to establish aggradation levels in the Creek) at least every five (5) years, if not more frequently. These measurements can be used in the following ways:

1. If gravel skimming is recommended by the TAC as a channel maintenance activity to improve bank stability or maintain flood capacity, we can quantify how much sediment has been deposited since the last in-channel extraction, and use this to inform the recommendation. For example, if there has been no extraction for five years, and a recommendation is made to remove 500,000 tons, we can base our recommendation on the knowledge of how many tons have been deposited since the last quantification.

2. Using the periodic cut and fill calculations, we can assume that the amount deposited will be related to the total flow of the creek through sediment transport algorithms. In this way, we can develop (and calibrate) our sediment transport algorithms so that they can be used to calculate the amount of sediment carried in a given single year.

This method assumes that the amounts to be extracted on an annual basis are modest (less than 1,000,000 tons/year) and that they do not occur frequently (i.e. not every year.) Under these conditions, the total extraction is expected to be less than the sum of the annual deposits, and any possible errors in our methodology would not lead to over-extraction. (See Chapter 3.3 of the “Technical Studies and Recommendations for the Lower Cache Creek Resource Management Plan” for further information.)

CURRENT CONDITIONS

There has been little or no bar skimming in association with channel maintenance since the CCRMP was established in 1996. In addition, modeling is underway to estimate the total deposition since the initiation of the CCRMP, based on a cut and fill analysis. We expect that this analysis will result in an estimate of the total deposition between roughly 1997 and 2011. Once this modeling is complete, the TAC can re-evaluate areas of the Creek where bar skimming has been recommended in the past as a countermeasure to bank erosion, or to preserve flood capacity, and prioritize those recommendations based on current conditions.

RECOMMENDATIONS

In summary, the TAC has access to enough data to perform reasonable analyses that will allow us to make educated recommendations without using annual aerial photos.

CURRENT CONDITIONS

When recommendations for channel maintenance activities are under consideration by the TAC, we will compare the amount of proposed extraction with the amount that has deposited since roughly 1997.

LONG TERM

The amount of sediment deposited in each year can be based on calibrated sediment transport calculations using the annual flow of the year in question. The calibration will be based on the measurements that are periodically verified using aerial photos, which will be obtained no less frequently than every five (5) years.

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Landscape Architecture Program
July 29, 2013

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Fax: (530) 752-1392
Davis, CA 95616

TECHNICAL MEMORANDUM

To: Jeff Anderson, Associate Planner

From: Cache Creek Technical Advisory Committee (TAC)
Eric Larsen, Mark Tompkins, Jim Martin

Subject: CEMEX Gravel Bar Site - Bar Skimming

Date: July 29, 2013

SUMMARY

Based on observations made during the 2013 Creek Walk, bar skimming is recommended at the CEMEX site located between RM 20.8 and RM 20.3 (Figure 1, upper figure) on Cache Creek. The work would provide multiple benefits, but is not urgent for the integrity of the banks at this location or for the safety of the CEMEX plant. The recommended bar-skimming would provide the benefit of reduced pressure on the south bank. The south bank has experienced severe erosion in the past and has required corrective work by CEMEX to protect the conveyor system located near the top of the bank. Reducing pressure on the south bank could help to avoid further bank instability and severe erosion on the south bank in the future.

BACKGROUND AND OVERVIEW

The 2012 Cache Creek Annual Status Report states that "*there is evidence of a mid-channel bar that has deposited in the vicinity of the most upstream of the CEMEX repair sites (called site F). If the bar were removed, there would be less erosive pressure on the south bank. We recommend this location for 'bar-skimming,' with subsequent observations to help inform future management actions*.

Cut and fill maps between 2010 and 2011 (Figure 1, middle image) show that considerable deposition of sand and gravel has occurred in this area. Observations in both the 2012 and 2013 Creek Walks have suggested that there is continued deposition in this area. This deposition has occurred as the channel shifted in 2011 toward the south bank near RM 20.4, which resulted in bank repairs near this area performed by CEMEX in 2010.

RECOMMENDATIONS

The TAC recommends that bar skimming be performed in the vicinity of RM 20.5 to 20.3. To facilitate this, and to increase the probability that this extracted area not fill immediately following large peak flows, it is recommended that an area immediately upstream and in direct alignment with the depositional area of concern also be extracted (Figure 1, lower figure). The proposed area for extraction in the figure is a conceptual sketch and not meant to be used for design purposes. If bar skimming is determined to be feasible, the final design of the operation should include input from the TAC so that the skimming optimizes habitat enhancement and protection.

Further refinements to the limits of proposed gravel bar extraction may be necessary to ensure adequate avoidance of elderberry shrubs that may occur in the vicinity and are considered suitable habitat for Valley Elderberry Longhorn Beetle, a federally-listed “threatened” species. Other restrictions on the timing of in-channel extraction activities would be required to avoid construction during the nesting season of birds protected under the federal Migratory Bird Treaty Act and to prevent use and operation of construction equipment in wetted areas of the active low-flow channel. These restrictions should be addressed by timing the gravel bar extraction in the late summer after the bird nesting season has typically ended (after August 31st) and when creek flows are at their lowest levels and surface water should be absent in the proposed extraction area.

The TAC recommends that CEMEX Company do this work at their own expense, for which they would receive partial remuneration in the value of the extracted gravel and reduction in future risk to their operations from bank erosion along the south bank of Cache Creek.

Eric Larsen

For the Technical Advisory Committee
TAC Chair, Eric Larsen, Ph.D.

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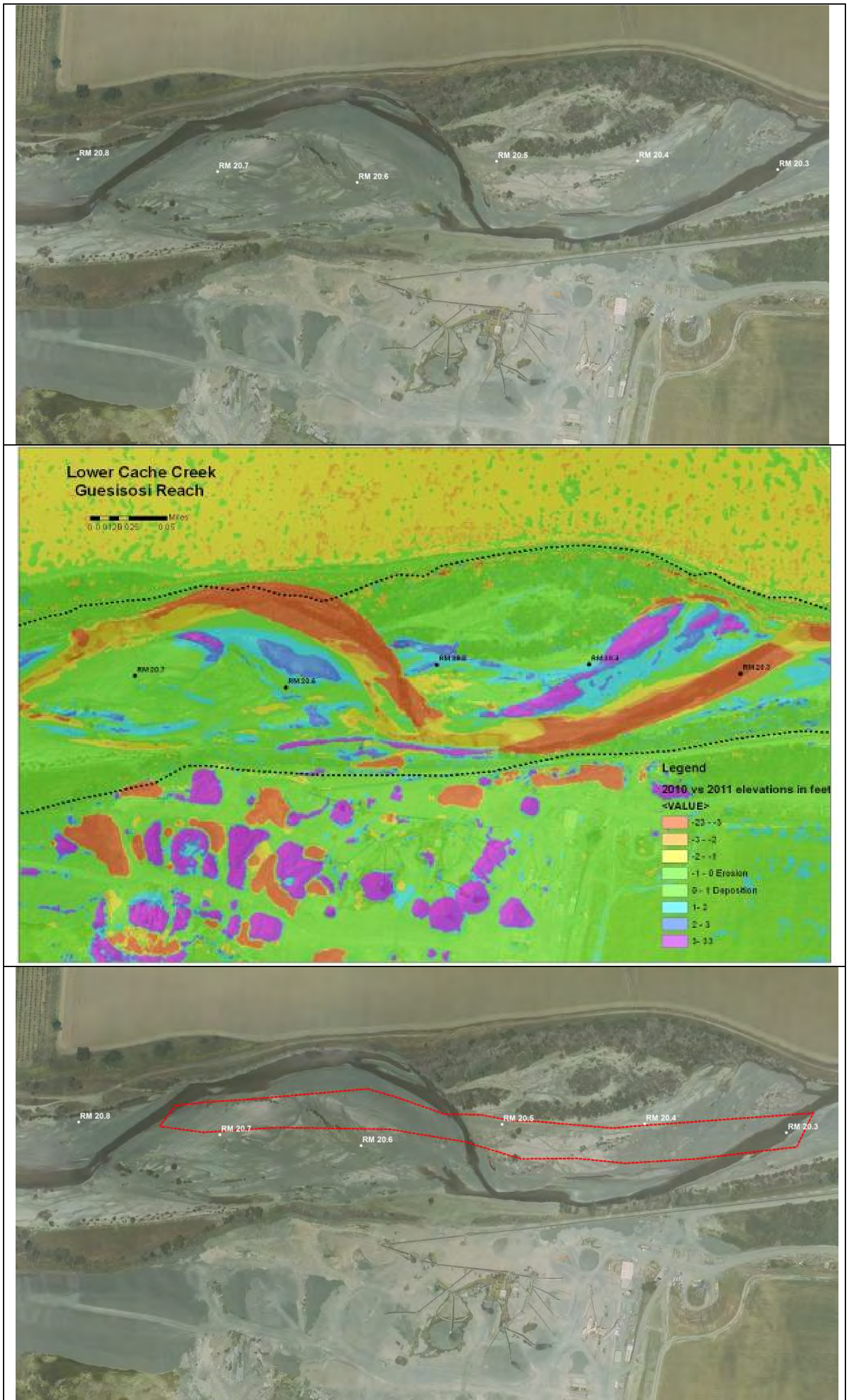

Figure 1 (Upper) site in 2012; (Middle) cut fill map 2010-2011; (Lower) conceptual area of bar skimming

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Landscape Architecture Program
July 29, 2013

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Davis, CA 95616

TECHNICAL MEMORANDUM

To: Jeff Anderson, Associate Planner

From: Cache Creek Technical Advisory Committee (TAC)
Eric Larsen, Mark Tompkins, Jim Martin

Subject: TEICHERT Gravel Bar Site – possible bar skimming

Date: July 29, 2013

SUMMARY

Based on observations made during the 2013 Creek Walk, the Cache Creek Technical Advisory Committee (TAC) determined that there is no apparent urgency for work in the vicinity of the Teichert Esparto levee erosion site (RM 23-22.8) (*Figure 1*). Although there is some on-going concern about erosion at this site and the potential for further erosion during larger peak flows than occurred in the winter of 2012/2013, no bar skimming or other bank stabilization activities are currently recommended at this site.

Figure 1. RM 23 - 22.8
Area of concern in on the north bank near RM 23 to 22.8

BACKGROUND AND OVERVIEW

Bank erosion initially occurred at this Teichert site after the floods of 2006. Peak flows in subsequent years have been lower, and therefore the erosion rate has slowed substantially since 2006. Several protection measures were implemented at this site, including rootwads, channel bank restoration, and coir erosion control fabric placed on the slope. Questa Engineering designed a series of cabled-together rootwads to redirect the flows, anchored to a continuous K-rail system that was originally buried under the reconstructed bank. Approximately 500 feet of cabled oak rootwads were installed as part of the bank stabilization project in 2006.

In 2007, the TAC noted that "*this project was designed and implemented by Teichert to protect approximately 2,200 linear feet of the north bank in the Madison Subreach. This project was progressively constructed and has been inspected during creekwalks over the last several years.*" The planform of the channel on the photos of high flows suggests that this will be an area where significant channel forces will be directed at the bank due to the natural processes of channel shift that are likely to occur here. This is an area that will likely continue to experience significant dynamic channel shifting.

BRIEF SUMMARY OF EROSION AND GRAVEL BAR DEPOSIT

In conjunction with the three most recent annual creek inspections ("Creek Walks"), the TAC has noted bank erosion where large woody debris was used to stabilize the toe of the slope in this area. As noted above, Questa Engineering did stabilization with large woody debris, cabled root-wads, and cement k-rails (Figure 2). In 2013 the TAC noted that the main channel had shifted away from the north bank, and that some deposition had occurred between the bank and the new channel, which provided a potential opportunity for bar skimming in this location. Comparison of field conditions encountered during the Creek Walk in 2013 to photographs of the site taken in 2012 do not indicate any changes in the condition of the bank at this location, nor are there indications that the entire berm is at risk of failure. Brandon Stauffer, the Teichert representative who met with the TAC during the 2013 Creek Walk, did not indicate that he felt that work needed to be performed this year to correct existing conditions.

Figure 2. 2013 image of exposed logs, scour holes, and k-rail where erosion is occurring at toe of bank

RECOMMENDATIONS

Although the TAC has some concern about the on-going erosion at this site, and the proximity of the erosion to the gravel mining operations, we do not think that there is a significant possibility of catastrophic bank failure, and we do not recommend any immediate action at this time. However, this area needs to be continuously monitored (especially during or immediately after high winter flows) by the property owner and by the TAC during future Creek Walks to confirm that erosion is not accelerating and complete loss of the remaining levee is not anticipated. Reconstruction of this entire north bank will be required in this reach when the Teichert Esparto site is reclaimed, if not earlier, due to future changes in bank stability.

Eric Larsen

For the Technical Advisory Committee
TAC Chair, Eric Larsen, Ph.D.

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FILED

DEC 05 2013

BY Lupita Ramirez
DEPUTY CLERK OF THE BOARD

ORDINANCE NO. 1437

AN ORDINANCE OF THE BOARD OF SUPERVISORS OF THE COUNTY OF YOLO AMENDING PORTIONS OF THE YOLO COUNTY CODE RELATING TO ANNUAL AGGREGATE MINING FEE ADJUSTMENTS

The Board of Supervisors of the County of Yolo hereby ordains as follows:

Section 1. Purpose. The purpose of this Ordinance is to implement a new fee schedule and related changes for the aggregate mining fees set forth in Section 8-11.01(a)(1)-(4) of the Yolo County Code. The fee schedule and other changes are to take effect on January 1, 2014, and shall apply to gravel sold during the 2013 calendar year (for which payments are made in 2014) and thereafter.

Section 2. Changes to Title 8, Chapter 11 of the Yolo County Code. Section 8-11.01(c) of Title 8, Chapter 11 of the Yolo County Code shall be amended to read as follows:

(c) The fees described in items (1) through (4) above shall be adjusted annually on January 1 as follows, distributed proportionally among the four fees based on the 2007 ratio. The fee described in item (5) shall remain a flat fee.

January 1, 2007	$0.450 cents per ton (beginning April 1 for 2007 only)
January 1, 2008	$0.468 cents per ton
January 1, 2009	$0.487 cents per ton
January 1, 2010	$0.506 cents per ton
January 1, 2011	$0.526 cents per ton
January 1, 2012	No adjustment (fees remain at $0.526 cents per ton)
January 1, 2013	$0.470 cents per ton

Commencing on January 1, 2014, and each year thereafter through and including a final adjustment on January 1, 2026, the fees applicable to gravel sold during that calendar year shall increase at a rate of four percent. For example, this means that the fees shall rise on January 1, 2014 by four percent to $0.489 cents per ton for gravel sold during the 2014 calendar year, and an additional four percent to $0.508 cents per ton on January 1, 2015 for gravel sold during the 2015 calendar year.

Section 3. Severability. If any section, sub-section, sentence, clause, or phrase of this ordinance or the attachment are held by a court of competent jurisdiction to be invalid, such decision shall not affect the remaining portions of this ordinance. The Board of Supervisors hereby declares that it would have passed this ordinance, and each section, sub-section, sentence, clause, and phrase hereof, irrespective of the fact that one or more sections, sub-sections, sentences, clauses, and phrases be declared invalid.

Section 4. Effectiveness. This ordinance shall take effect and be in force thirty (30) days after its passage, and prior to expiration of fifteen (15) days after its passage thereof, shall be published by title and summary only in the Daily Democrat together with the names of members of the Board of Supervisors voting for and against the same.

The foregoing ordinance was introduced before the Board of Supervisors of the County of Yolo, its first reading waived and, after a second reading, said Board adopted this ordinance on the 3rd day of December 2013, by the following vote:

AYES: **McGowan, Saylor, Rexroad, Provenza, Chamberlain.**
NOES: **None.**
ABSENT: **None.**
ABSTAIN: **None.**

Duane Chamberlain, Chairman
Yolo County Board of Supervisors

Attest:
Julie Dachtler, Deputy Clerk

By: Anita Ramirez
Deputy (Seal)

BOARD OF SUPERVISORS YOLO COUNTY, CAL.

Approved As To Form:
Robyn Truitt Drivon, County Counsel

By:
Philip J. Pogledich, Senior Deputy

County of Yolo

Office of the County Counsel
625 COURT STREET, ROOM 201 WOODLAND, CALIFORNIA 95695 TELEPHONE: (530) 666-8172
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ROBYN TRUITT DRIVON
COUNTY COUNSEL

Philip J. Pogledich, Senior Deputy

December 20, 2012

Michael Smith
Aggregate Resource and Government Relations Manager
Teichert Aggregates
3500 American River Drive
Sacramento, CA 95864

Re: Cache Creek Nature Size—Intensity of Use (Section 2.7 of Master Agreement)

Dear Michael:

Enclosed please find a short memorandum relating to the average size of visitor groups at the Cache Creek Nature Preserve, including whether the average group size is consistent with Section 2.7 of the Master Agreement (dated March 1, 1999) between the County and Teichert. The County would like to confirm that Teichert agrees with the basic conclusion expressed in that memorandum—i.e., that under the circumstances described therein, the increased intensity of use is consistent with Section 2.7 of the Master Agreement. If so, please sign in the space provided below and return the signed letter to me for our records.

Please give me a call at (530) 666-8275 or send me an e-mail (philip.pogledich@yolocounty.org) if you have any questions.

Very truly yours,

Robyn Truitt Drivon
County Counsel

Philip J. Pogledich
Senior Deputy County Counsel

Enclosure

Teichert concurs that under the circumstances described in the enclosed memorandum, the increased intensity of use at the Cache Creek Nature Preserve is consistent with Section 2.7 of the Master Agreement

Michael Smith ARD MANAGER
TEICHERT MATERIALS

County of Yolo

Office of the County Counsel

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ROBYN TRUITT DRIVON
COUNTY COUNSEL

TO: Cindy Tuttle, Manager of Natural Resources

FROM: Philip J. Pogledich, Senior Deputy County Counsel

DATE: December 20, 2012

SUBJECT: Master Agreement (Nature Preserve)—Intensity of Use

Recently, you asked me to review whether an average visitor group size of 37.75 at the Cache Creek Nature Preserve is consistent with Section 2.7 of the Master Agreement (dated March 1, 1999) between the County and Teichert governing the dedication and use of the property. Under the circumstances presented here, my opinion is that this level of visitor usage is consistent with Section 2.7.

Section 2.7 of the Master Agreement is entitled "Intensity of Use," and it states as follows:

> The Parties anticipate that public access to the Property will need to be limited and scheduled in order to achieve the primary objectives of this Master Agreement. The limitations required shall include that any public access to the Property will generally be scheduled so as, except for unique occasions, not to result in more than three days per week and not more than thirty (30) persons in any one tour group. In addition, the Parties do not intend that the Property shall ever be established as a County regional park. Except for an occasional deviation from the anticipated use, for good cause, any other increases to this intensity of use shall be consistent with this Master Agreement and the Conservation Easement and shall be subject to the approval of the County Board of Supervisors through a public hearing process at which all neighboring property owners have been given at least ten (10) days notice.

As I understand it, school field trips are the primary group visitors at the Nature Preserve. I further understand that in recent years the average classroom size in local schools (the typical group visitors at the Nature Preserve) has increased from the late 1990s, when the Master Agreement was drafted. This change is the reason for the small increase in the intensity of use relative to the 30-person level of anticipated use set forth in Section 2.7.

It is clear from Section 2.7 and other provisions of the Master Agreement that the 30-person level of anticipated use should not be interpreted to strictly prohibit all increases in the intensity of use. The plain language of Section 2.7 indicates that this restriction is not absolute. Rather, it applies only "generally" and "occasional deviations" from the 30-person level of anticipated use are acceptable. On this basis, a small increase in group size—even one that continues for an extended period of time, considering the perpetual duration of the Master Agreement—does not necessary violate Section 2.7. And finally, it is important to acknowledge that the recent increase in group size is not necessarily permanent, but may reverse over time as the average class size in local schools returns to levels of the past.

This reading of Section 2.7 is reinforced by Section 1.2 of the Master Agreement, which describes two primary objectives of the parties in establishing the Nature Preserve. The second primary objective is to make the Nature Preserve available to educational organizations, such as schools, ". . . so that children and adults can explore and discover the relationships between humans and the historical, natural, agricultural, and industrial use of the area in which the Property is located." A strict interpretation of Section 2.7 would therefore contravene this stated objective by reducing the ability of local schools to visit the Nature Preserve.

For at least these reasons, the increase in average group size does not violate Section 2.7 of the Master Agreement. This conclusion is confined to the circumstances presented here, relating primarily to increases in average classroom size. If the intensity of use later increases for other reasons not considered herein, I encourage you to contact this office for advice.

Cache Creek Conservancy
Annual Report for
YOLO COUNTY BOARD OF SUPERVISORS
December, 2013

The Cache Creek Conservancy (CCC) is a 501(c) (3) nonprofit organization founded in 1996. The organization is governed by a 15 member board of directors representing various interests including landowners, education, conservation, water, the aggregate industry, and the general public. The CCC operates with a staff of five; three full time and two part time employees, and several dedicated volunteers. The mission of the CCC is to preserve, restore, enhance, and promote the stewardship of lands within the Cache Creek watershed. This is a new mission statement adopted by the CCC Board of Directors in October, 2013, to reflect a broader geographic area. The CCC also revised the purposes delineated in the Articles of Incorporation for the same reason. The revised language has been sent to the CA Secretary of State for filing.

Current work of the CCC focuses on restoration, education, and outreach to the general public and includes management of the County-owned Cache Creek Nature Preserve. The CCC also contracts with Yolo County for three projects, the invasive weed control in the Cache Creek riparian corridor, maintenance of the Correll/Rodgers site, and new for 2013 weed control on the county-owned Millsap property.

Current restoration projects include:

- State Parks OHV restoration grant to restore damage and prevent trespass at three County-owned sites. This is a three-year project started in Sept., 2011.
- Invasive weed control work – treated the entire 15 miles of the CCRMP riparian area this year with funding from Yolo County.
- Continued maintenance activities at Correll/Rodgers area with funding from Yolo County.
- Began invasive weed control work on the Millsap property
- Completed work on Yolo Co. Flood Control & Water Conservation District mitigation site.
- Continued work on Granite Reiff site funded by Granite to comply with their reclamation requirements.
- With Yocha Dehe Wintun Nation, completed work on Tribal Wildlife Grant Phase II on tribal lands above Capay Dam, including restoration work adjacent to the golf course and at Sugarloaf Ranch.
- Work is being done under CCC's Fish & Game 1602 permit for work in the CCRMP area.

Cache Creek Nature Preserve: The Preserve is managed by the CCC under a license agreement with Yolo County. The Preserve provides controlled public access to a natural area along Cache Creek and is annually visited by approximately 2000 visitors in addition to the school groups participating in the education programs.

- Capital Improvements: Work was completed on the metal barn, including securing the building with new doors and fixing the roof. Funding was provided with a $12,000 grant from Water Resources Association matched with $6,000 from the CCC.
- A shade structure was purchased and installed next to the big barn and is being used for plant propagation and growing. Funding came from CCC and the Yocha Dehe Community Fund grant.
- Maintenance Activities: Ongoing maintenance included mowing, spraying, irrigating, and filling in the Memorial Grove and hedgerows with additional plants.
- Environmental Monitoring: Bird counts were done in February as part of the Great Backyard Bird Count.
- Tending & Gathering Garden program continues with regular maintenance of the Garden guided by the Steering Committee, and Steering Committee members provided special demonstrations of basket weaving at two events.

Education and Outreach

- The education program provided activities to approximately 2,500 elementary age students this year; presenting an on-site hands on outdoor learning experience at various teaching stations.
- The CCC staff also works with high school students through the Center for Land based Learning's SLEWS program.
- The CCC again hosted a winter quarter UCD ecology lab class with Professor Debbie Elliot-Fisk. Plans for 2014 are uncertain as Professor Elliot-Fisk has retired.
- Programs throughout the year were held for the public on our Open Saturdays, including birding in January, the bird count in February, a Tracking workshop in March, native plants in April, and Creek Cleanup in September. A spring workshops focusing on restoration was held with about 80 attendees.
- A new program for students was tried this summer called "Wild Wacky Wednesdays." Six different topics were presented, one each Wednesday, for children (and adults) on a drop in basis. The activities lasted for 2 hours in the morning and were well attended. Funding is being sought to continue and expand this program for the summer of 2014.
- The CCC awarded a scholarship to a high school senior with funding provided by the four gravel companies.
- Quarterly newsletter sent to 400 addresses in March, June, September, and December.

New Projects/Programs

- Board adopted CCNP Guidelines followed by adoption of CCNP Management Plan

- Policies relating to easements that the CCC may hold were adopted. These were part of the requirements as the CCC continues to pursue certification from CA Dept. of Fish and Wildlife to hold mitigation easements for Swainson hawk.
- Volunteer Program was formalized with a new volunteer handbook and a 3 hour orientation/training session for volunteers.

Funding Sources

- The four permitted gravel companies (CEMEX, Granite, Syar, and Teichert) provide an amount based on sales of gravel on a quarterly basis.
- Grant funding has provided funds for much of the restoration work and some of the education program.
- Contract work for Yolo County has provided for maintenance along the riparian corridor, Correll/Rodgers, and Millsap.
- A small percentage of overall funding comes from donations.
- The agreements for the Nature Preserve also provide for an endowment fund for the CCNP, funded by a portion (5%) of Teichert's annual contribution to the CCC. Half of Teichert's payment is directed to be used on the Nature Preserve.
- An annual budget is adopted at the CCC Annual Meeting in January of each year.

Staffing

- Three full time and two part time employees: full-time includes an executive director, habitat restoration manager, and administrative coordinator/bookkeeper; part-time includes the education coordinator and the invasive species project manager.
- Approximately thirty dedicated volunteers

Attachments

- Report on County Contract for 2013 (Invasive Plant Removal, Correll/Rodgers Maintenance, and Millsap Invasive Weed Removal)
- 2013 Annual Report and Quarterly Reports: Executive Director
- 2013 Quarterly Reports: Habitat Restoration Manager
- 2013 Quarterly Reports: Education/Outreach Staff
- CCNP Management Plan

Cache Creek Conservancy
2013 Report: Invasive Weed Control within the CCRMP Area
Yolo County Contract 10-74

Invasive weed control for 2013 within the CCRMP area started on August 30th and was completed on October 10th. A total of 22 days was spent on the spraying operation. Wind was a factor this year, and the crew was not able to work on some days. The spray crews concentrated on three major invasive weeds, tamarisk *(Tamarisk parviflora*), arundo *(Arundo donax),* and Ravenna grass *(Saccharum ravennae*). Crews were also trained to identify and spray purple loosestrife *(Lythrum salicaria*) and yellow flag iris *(Iris pseudacorum)*. This year these two weeds were not seen, which indicates that they have been well controlled. However, the possibility of re-infestation from further upstream sources still exists.

A mixture of 1 percent Polaris (imazapyr), 2.5 percent glyphosate, 1 percent surfactant (Competitor), and blue dye was used to treat the invasive weeds. Also, if the spray crew found any Ravenna grass plants that were bolting, they cut off the seed heads, put them in bags, and later burned them. In areas where only arundo and/or Ravenna grass were the invasive species present, only glyphosate and blue dye were used in the spray mixture.

There is a high incidence of Ravenna grass between the Capay Dam and one mile downstream of County Road 85. Another area with a high number of Ravenna plants is from ½ mile downstream of I-505 to County Road 94B. More Ravenna grass was seen this year than in the past. Conditions within the CCRMP riparian corridor appear ideal for this invasive to thrive. Upstream of the Capay Dam there are large populations of tamarisk, arundo and Ravenna grass, and both seeds and plant parts continue to wash downstream, take hold, and sprout. In 2014, the recommendation is to spray for Ravenna grass in late June from Capay Dam to east of County Road 85 and also the stretch from I-505 to County Road 94B.

There were two sections along the creek that could not be sprayed this year. One is by the CEMEX mining site just east of the plant along the south bank. Water is deep here and the bank is too steep to access from above. This is approximately a ½ to ¾ mile stretch. The other area is east of Road 94B on the north side where the old road used to go through the creek. Access is very difficult due to blackberry growth.

At RM 17.5 on the north side of the creek bank (upper area), there are some tamarisk plants that we continue to not spray due to landowner concerns.

Pepper weed or white top *(Lepidium latifolium)* continues to be a major problem within the CCRMP area. This species can se seen almost everywhere along the riparian corridor and populations continue to increase.

Tamarisk Leaf Beetle

The Cache Creek Conservancy continued to monitor the tamarisk leaf beetle (*Diorhabda elongata)* during the spring and summer months. Results were very disappointing. During the first survey in June, no beetle activity was detected at any of the five monitoring sites: Guinda Bridge, Scheuring, Lowrey, and County Park locations. A second survey was conducted on July 9th at the same locations. Two egg masses were seen at the Guinda Bridge, but no larvae or adult beetles. At the Scheuring site, one adult beetle was seen, but no eggs or larvae. Nothing was seen at the other three locations. No specific reasons could be attributed to this dramatic decline. This program was originally funded and supported by USDA-Ag Research Service, but has not been funded for at least two years now. The CCC will continue to monitor beetle activity in 2014 perhaps with volunteer support.

Our recommendation is to continue with an annual maintenance spray along the riparian corridor for the three targeted invasive plants. If funding is available, Ravenna grass should be sprayed in late June to destroy plants before they get too large, and/or the seed heads bolt.

Cache Creek Conservancy
2013 Report: Correll/Rodgers Area Maintenance
Yolo County Contract 10-74

The Cache Creek Conservancy completed another successful year of management for Yolo County of the Correll and Rodgers properties located along Cache Creek. The Correll and Rodgers properties are former gravel mine pits that have been actively and passively restored by multiple organizations over several years. The CCC is honored that Yolo County entrusts the organization to manage the property in accordance with the CCAP and CCRMP planning goals. We look forward to continuing this relationship in the future in order to maximize the habitat value of the site and minimize the financial cost to the County.

Figure 1 CA native grasses and shrubs

In the Rodgers' pit, the west and north facing berms are beautiful examples of mature CA native grasslands. These areas have been cleared of broadleaf weeds and several species of native grasses are present, including; Creeping Wild Rye, Blue Wild Rye, Purple Needle Grass, Slender Wheat Grass, California Barley and even some native Onion Grass.

The primary focus of our management at Correll/Rodgers in 2013 was eradication of broadleaf weeds and annual grasses in the areas previously seeded and panted with native species. To achieve this goal we first spot sprayed the area with triclopyr 3A herbicide by backpack. Using a high label rate we were able to kill tough short-pod mustard plants, even at the flowering stage. To kill patches of perennial pepperweed located toward the bottom of the berms we used a high rate of glyphosate herbicide. The chemical was applied in early fall by backpack, just before the plant entered dormancy. The timing ensures the chemical will be trans-located to the roots where it will kill the entire plant, not just the top. To control for annual grasses we used weedeaters to chop up the unwanted patches before seed set. We also hand pulled annual grasses and broadleaf weeds whenever possible before seeding to prevent new infestations. We completed broadleaf weed control along the top edge of the Correll pit in an effort to keep thistle and mustard weeds from impacting the neighboring walnut orchard. We sprayed the herbicide Capstone in the Correll pit to control for broadleaf weeds. This chemical has a pre-emergent characteristic that will continue to provide control this winter.

Figure 2 after August burn

The Rodgers pit was the site of another unexpected event this year, but instead of unwanted water, this year we had to deal with unwanted fire. A prescribed burn was conducted on the east and south facing berms without our knowledge. The fire cleared the berms of vegetation, but no follow up work was done and the berms now pose an erosion threat. We are working to stabilize the berms with a native grass erosion control mix and will respond to any large washouts with appropriate measures.

In 2013 we expanded our weed control efforts into the bottom of the Rodgers pit to prevent weeds from re-establishing on the berms, and to get a better idea of how water flows through the bottom of the pit. We mowed the pit floor twice during the year, once in spring and again in late summer to control weeds and clean up the site. The Rodgers pit floor was contoured at one point to promote the establishment of different native plant communities around a possible wetland feature. Working this summer, we uncovered the contours that were hidden by years of weed growth and now have a better understanding of how to continue to improve the site. Working with several project partners, we applied for a grant from the NAWCA Small Grants Program in November to complete major restoration on the site. If we receive the money, we will work to establish a wetland feature in the pit that will support migratory waterfowl and other bird species during the winter months. We are very thankful to Yolo County for offering a significant amount of matching funds to the project, as well as generally supporting our attempts to improve the site.

Figure 3 view of Rodgers pit after weed control

Cache Creek Conservancy
2013 Report: Millsap Property
Yolo County Contract 10-74

Figure 1 - mature Tamarisk in the old creek channel

We are excited to report the progress on our newest project along the Creek; invasive species removal on the Yolo County – owned Millsap property. The 17 acre parcel was purchased by Yolo County several years ago and has served as valuable open space habitat along Cache Creek. This parcel has no buildings or other development, but is currently the site of a large Tamarisk infestation in a remnant section of creek channel. Due to our extensive experience with this type of work, the CCC was asked to perform invasive species control to eradicate the Tamarisk from the property. The purpose for eradication is to reduce the amount of viable Tamarisk seed and vegetative material in the CCRMP. This project directly compliments the ongoing Creek Maintenance Spray effort we conduct each summer to control invasive species in the CCRMP.

Figure 2 - excavator with special attachment chopping Tamarisk

We started our control efforts in August by chopping the unwanted Tamarisk (and some Arundo) with a large excavator. The equipment was fitted with a large chopping head that was used to grind the shrubs down to the ground. Our reason for grinding the shrubs was to reduce their physical stature and make the site more accessible for future chemical treatments. This same technique was used successfully by the Conservancy on past projects

Figure 3 - same view as above after chopping

in the CCRMP with tremendous success.

After grinding, the Tamarisk biomass was allowed to dry in place. The drying time was an important part of the control effort because it prevented the chopped bits of Tamarisk from re-infesting the site or other parts of the creek. Tamarisk has the ability to re-sprout from small pieces of vegetation and this characteristic is one reason the species has been so hard to control. By allowing the pieces to dry, we prevented them from being another vector for Tamarisk infestations off site.

The next step in the control process will be to burn the unwanted biomass on site. The purpose for burning will be to further reduce the size of the Tamarisk stands and allow for access. We had hoped to complete the burn during the fall of 2013 but the dry, windy weather prevented this action for safety reasons. We plan to conduct the burn in early 2014, weather permitting. Following the burn, we will allow the plants to send up new growth for the spring and summer months of 2014. Late next summer we will begin chemical control of the Tamarisk with one of two possible herbicides, Capstone or Polaris, labeled for the species. We anticipate it will take three years of successive chemical control to fully kill the existing Tamarisk shrubs on site. Beyond that, we hope to continue long term maintenance of the site in order to prevent new infestations and help support re-vegetation by native species.

Figure 4 - chopped Tamarisk with native species left intact

Executive Director's Report
Lynnel Pollock
2013 SUMMARY OF ACTIVITIES

Brief Highlights and Events of the Year:

- Revitalized and updated the Volunteer Program. Recruited new volunteers, developed a Volunteer Handbook, and held a volunteer training session. A Volunteer Appreciation reception was held in April.
- Worked on becoming certified by CA Dept. of Fish & Wildlife to hold mitigation easements.
- A new mission statement was adopted by the Board of Directors along with revising the Articles of Incorporation to meet definitions for the mitigation certification.
- Held all of our regular ongoing programs including Duck Days participation in Feb., restoration workshop in April, scholarship award, fair booth, creek cleanup, and Autumn Fest.

Restoration Work:

- Invasive weed control work – treated the entire 15 miles of the riparian area this year with funding from Yolo County.
- Continued maintenance of the Correll/Rodgers area under contract with Yolo County
- Contracted with Yolo County for tamarisk removal on the County-owned Millsap property
- With Yocha Dehe, continued implementation of Phase II of Tribal Wildlife Grant, completing the project October 31, 2013.
- Continued with mitigation restoration work for Yolo County Flood Control & Water and Conservation District for their Capay Dam Improvement Project; finished this project in December, 2013.
- Continued working on CA State Parks OHV grant for restoration work addressing OHV damage.
- Continued with restoration work on Granite Reiff Pit, including weed control, erosion repair, and grass seed planting.
- CCC staff participated in County TAC meetings and annual creek monitoring walk.
- Submitted grants for restoration work including NFWF "Pulling Together" grant (did not receive), USFWS Tribal Wildlife Grant (Phase III), and NAWCA Small Grants for wetland establishment at Correll/Rodgers.

CCNP Improvements:

- CCNP Management Plan adopted by CCC Board of Directors in July; annual work plan being implemented.
- Continued to implement Yocha Dehe Community Fund grant for the Tending & Gathering Garden upkeep and associated programming.
- Ongoing maintenance including mowing, spraying, irrigating, and filling in the Memorial Grove and hedgerows with additional plants.
- Received grant for $12,000 from Water Resources Association for repairs and improvements to metal barn, the "Harvester Shed"
- Volunteers painted the outside of the Visitor Center building
- Installed a shade structure next to the big barn for plant propagation

Education/Outreach:

- Continued education program with Education Specialist Fred Vanderwold and core group of dedicated volunteers
- Held various programs on open Saturdays and a night time walk in November
- Started a summer program for children called "Wild Wacky Wednesdays"
- Awarded scholarship to high school senior majoring in environmental science
- Held Volunteer Recognition Event in April
- Hosted American Indian Summer Institute program in June
- Hosted Native American cultural diversity event in October
- Held Autumn Fest event in October
- Submitted grant to Teichert Foundation for support for expanded educational program.
- Submitted grant to Glide Foundation for education program support
- We made available our Nature Preserve site for others including UC Davis Wildlife Ecology class, Dept. of Fish & Game, TGG visits by interested groups, and other programs.

Administrative Activities:

- Continued to implement the CCC Strategic Plan and the policies and procedures from the 2011 governance review.
- With Board approval, moved the CCNP Endowment Fund and some of the reserve funds to accounts with Yolo Community Fund.
- Supported work of the board and its committees and represented CCC at various meetings.
- Met with Steve Combs whose family used to farm the CCNP site; received photos and other documentation. Named existing buildings on site with their "farm" names; i.e. the "Harvester Shed" and the "Blacksmith Shop."
- Continued working with Yolo County natural resources staff members on common concerns

Staffing:

- Full-time staff includes Lynnel Pollock, executive director, Gina Martin, administrative coordinator/bookkeeper, and Christopher Gardner, habitat restoration manager.
- Education program was staffed at a part-time level by education specialist Fred Vanderwold with the help of several dedicated volunteers.
- John Watson continued the invasive weed program and helped with other projects on a part-time basis.

Executive Director's Report
Lynnel Pollock
July-September, 2013

Grants/Contracts Update:

- Tribal Wildlife Grant, OHV State Parks Grant, Yolo Co. Flood Control Mitigation Project & TGG grant—work continues
- New grants submitted: Tribal Wildlife Grant Phase III, Glide Foundation, Teichert Foundation and National Fish & Wildlife Foundation. Working on NAWCA grant and other opportunities for funding.
- Contract for work:
  - ✓ Yolo County—invasive spray program for 2013 almost completed, and maintenance of Correll/Rodgers area continues. Work started on Millsap property, new area for invasive control project.
  - ✓ Reiff Pit/Granite—work in progress

Current General Activities:

- Work completed on metal barn, roof repaired, new doors, and general stabilization. CEMEX & Teichert donated gravel for floor; Syar donated concrete. Project partially funded with $12,000 grant from Water Resources Assoc.
- Purchased John Deere Utility Vehicle, 625i.
- Worked with CCC staff on developing a volunteer program, including a Volunteer Handbook, orientation/training session, and safety protocols.
- Met with Steve Combs on site to discuss family/farming here. His family farmed this site for many years prior to mining operations.
- Preparation for Autumn Fest including music, silent auction, invitations, etc.
- Programs, meetings & events at CCNP: CA Fish & Wildlife Dept. meeting on mitigation, Calif. Indian Basket Weavers visit, Fish & Wildlife use of Visitor Center
- Creek Cleanup resolution at Board of Supervisors
- Provided staff support to CCC committee meetings
- Attend meetings representing CCC such as Woodland Chamber of Commerce Water Committee, Board of Supervisors, TAC, Yolo County Natural Heritage Program, IRWMP, and WRA.

Steve Combs presents Lynnel with an original fence picket and watering wand from the tomato planter used on the farm

Staffing:

- Fred Vanderwold continues working part time with the education program
- John Watson working part time on invasives program

Executive Director's Report
Lynnel Pollock
January-March, 2013

Grants/Contracts Update:

- Funding currently coming from Tribal Wildlife Grant, Glide Foundation, OHV State Parks Grant, Yolo Co. Flood Control Mitigation Project, New Belgium Brewery, Granite/Reiff Contract, Teichert Foundation, & TGG grant. Work continues on the various projects.
- Requested extension on current Tribal Wildlife Grant
- New grants submitted for consideration:
  - ✓ Tribal Wildlife Grant and Teichert Foundation—waiting for results
  - ✓ Continue seeking new grant opportunities
- Contract for work with Yolo County: invasive spray program and maintenance of Correll/Rodgers area planned for 2013, and submitted Scope of Work for invasive removal on Millsap Property

Current General Activities:

- Restore/Restory project: finalizing longer term procedures for website hosting and maintenance.
- Implemented accounts with Yolo Community Foundation/Sacramento Regional Community Foundation for endowment and reserve funds
- Continued working on mitigation easement certification from CA Fish & Wildlife Dept.
- Communicate often with County Resources staff;
- Attend meetings representing CCC such as Woodland Chamber of Commerce Water Committee, Board of Supervisors, TAC, Yolo County Natural Heritage Program, IRWMP, and WRA.
- Held a TGG Steering Committee meeting in January; planning for major workshop on June Open Day
- Planning for spring events: Open Days, Restoration workshop, and Volunteer Appreciation event
- Provided staff support to CCC committee meetings
- Attended training workshops on labor issues and healthcare coverage

Staffing:

- Christopher Gardner and Gina Martin working full time
- Fred Vanderwold continues working part time with the education program
- John Watson will begin work in April on a limited basis
- Lynnel working 4 days/week
- Staff training in Feb. for CPR and First Aid

Habitat Restoration
Christopher Gardner
January – March 2013

Restoration activities on Cache Creek have been in full swing since January. In total we have planted over 500 individual pants and seeded about 10 new acres with native grasses on six different sites along the Creek.

We are excited to report that the current TWG grant period has been extended until the end of October, 2013. This will allow us to conduct one more year of invasive species removal along a significant stretch of the upper watershed, as well as irrigate the hundreds of plants installed near the golf course for another season. Several hundred plants and trees were added to the site by students from Esparto High School during two SLEWS days funded by the grant. Students helped with revegetation of the erosion control project by planting several trays of willow plugs behind the rock structure, as well as creeping Snowberries on the upper bank. Native grasses have established well on this site and several acres that were re-seeded after the erosion control project last fall have really come to life with a healthy new crop of mostly Blue Wild rye. Although invasive weed control has been a priority since the start of the grant, these species still exist in small numbers throughout the site. We will work to control spring, summer and early fall weeds until the end of the grant period is reached in order to best prepare the site for natural succession.

Our next project downstream from the TWG is all the way down here at the Wild Wings site owned by Yolo County. Work on this site is for our grant from the CA State Parks OHV Division. This project is to mitigate for damage caused by OHV use along the Creek and we have done that by installing over 200 plants and trees on roughly three acres. The planting site covers two tiers of old floodplain and is interwoven with existing trails used by the public for all kinds of recreation. The project has been a challenge from a logistical standpoint because it is essentially a public site that we are trying to conduct restoration in the middle of, but also because of the nature of the grant. The grant outlines a project that requires significant matching resources from the Conservancy to complete. I am excited to report that we have been able to complete much of the work on the grant at little cost to the organization through the use of some dedicated restoration volunteers! The entire site was planted and has so far been maintained by our volunteers and they are excited to continue working on the project.

Heading east down an old mining haul road from Wild Wings you will run into our small Flood Control mitigation site. Many people follow this road on OHV's and even trucks, and some vehicles have damaged this site in the past. This is one of the challenges of working on the Creek, but the restoration of even a small area is worth the grief. Working mostly in my spare time and with limited, but well timed contract labor support, we have planted several trees and shrubs, seeded about three acres with native grasses and worked to control several species of invasive weeds. These efforts have had mixed success, but the natural recruitment of native species on the site has been much more impressive. Native Creeping Wild rye grass, Mulefat shrubs and Willows have emerged this spring from areas that were previously sprayed, ripped or burned. I intend to continue maintenance of the site when my time becomes available and with funds received from the New Belgium Brewery.

Possible badger hole on CCNP grounds

Restoration efforts on the CCNP this spring have focused on our hedgerows and native grasslands. In order to fulfill another aspect of our OHV grant, we are installing new plants in our front hedgerow to help prevent illegal trespass onto the Nature Preserve by OHV's from CR 94B. The existing hedgerow has worked well for this purpose and we want to continue this feature along as much CCNP fence line as possible. This work helps us meet our matching requirements for the grant, helps protect the Nature Preserve and has been completed largely by volunteers, as well. We had an especially fun time just a couple weeks ago when I ordered water from the Flood Control District to the Nature Preserve for the first time. Our volunteers and faithful crew from the Muller Ranch helped me set up the ditch and the irrigation system I designed to water the hedgerow. The new setup will reduce our watering costs by about 1/3 for the hedgerow. The system was already on and running when we planted several dozen new plants that day, extending the hedgerow to the corner with CR 20. Work in the native grasslands has consisted of targeted mowing and weed eating to reduce invasive annual grasses. By mowing these species early, we can reduce the amount of viable seeds produced. By targeting the mowing to areas with mostly weeds, we can maximize the seed production of existing native grasses to help with establishment.

Downstream from the CCNP we are working on the Reiff property for Granite Construction and managing the Correll/Rodgers area for Yolo County. On the north side of the creek, the Reiff property was sprayed with a broad spectrum herbicide to control invasive weeds on almost 30 acres of future native grassland. We are working the ground mechanically and with herbicide to reduce invasive weed numbers before seeding this fall with native grasses. The sloped areas of the Reiff pit were seeded with fast germinating native grass seed this past fall to prevent erosion. The Correll/Rodgers area is across the Creek from Reiff and contains older restoration efforts we maintain for the County. So far this spring we have conducted extensive broadleaf weed control in areas of native grasses and shrubs. We will continue invasive species control throughout the year and irrigate existing plantings as needed.

Habitat Restoration
Christopher Gardner
April – June 2013

We are half way through the year on Cache Creek and it's HOT. The sun is high, the creek is low and the workdays are long. The creek side restoration site at the Yocha Dehe site is in its final summer of irrigation and weed maintenance under the current grant. We are working hard to eradicate as many weeds this year as possible before we leave the site this fall. Overall, we have had great success controlling broadleaf weeds and the native grasses have really taken off. We will continue to irrigate and maintain the site on a weekly basis through the rest of the summer.

We have had a busy spring and summer so far on the CCNP and maintenance of the grounds has kept me busy. Trail maintenance and weed control for public access is always a concern in pate spring and we have spent a lot of time keeping the ground safe and useable for everyone. We also worked extensively in the TGG to prepare the garden for our Native American Open Day. Weed control in the hedgerows in Memorial Grove is a constant chore but we make it a priority in order to keep the grounds looking good and to highlight the various native plant species. Irrigation is also a constant in these areas and I spend a good amount of my time these days making sure everyone has enough water. With the help of our friends at Muller and Sons, I installed a garden this year at the end of the resource model. I hope to share whatever is left over after the deer and rabbits go through it.

At the Wild Wings site we are working hard to keep the plants irrigated and our equipment safe from vandalism. Unfortunately, each time we water we are force to move a significant amount of irrigation line on and off site to prevent vandalism. This effort takes time away from the work we need to do on site and drives up the cost of the project. Fortunately, the plants are responding well and getting established on the site.

Downstream from the CCNP, summer weed control continues at the Correll/Rodgers and Reiff properties. We have achieved excellent broadleaf weed control in the native grass stands at Correll/Rodgers. At the Reiff pit, we are spraying and mowing to control weeds before planting with native grasses this fall. We also identified some erosion along the slopes at Reiff that will need to be fixed this summer. Muller and Sons will do the work and we are waiting for the final go ahead from Granite to begin the fix.

At the Flood Control mitigation site, irrigation is also the main focus. This project is in its second full summer of watering and has proved challenging from the start. We have seen a high rate of mortality with the planted trees and shrubs because of the gravely conditions on site. To get these plants established everywhere on site would take more watering cycles than the project can afford. We have some trees and shrubs that are happy and significant stands of native grasses, both remnant and planted. We will continue to irrigate as allowed by the budget and work to protect the plants that are growing on site.

I would also like to thank Don, Ken and Frank for their help building the shade structure. We worked over a couple very hot days last month and got it all put together. I'm excited to have some potted plants in there already and am looking forward to growing many more.

Habitat Restoration
Christopher Gardner
July - September 2013

It's fall on the Creek, a transition time for the plants, animals and people that call Cache Creek home. For the restoration program, fall is a time of transition as well. Now is the time when we transition from the daily grind of summer maintenance to the ever gratifying work of seeding and planting. So, it's time to put away the pumps and the weedeaters and break out the seeders and shovels because we have a lot of work to do this year.

Our restoration project with the Yocha Dehe tribe is coming to an end on October 31, but we will work right up to that date. Taking advantage of the remaining funds, we will seed and re-seed areas throughout the site. We are also on a full-court press against the weeds on site, with a fourth and final spray for Arundo, Tamarisk and Ravenna Grass along several thousand feet of stream bank. To ensure the best chance of establishment, we are putting protective cages around the young oak trees to prevent herbivory from deer. The grant has been a great opportunity for me to work with and build relationships with the Tribe. I look forward to working with their ranch and environmental staff to ensure the success we have made are maintained and built upon by the Tribe.

The end of summer/beginning of fall is also the time for our annual invasive species removal program for Yolo County. Starting at the Capay Dam, we work down the creek looking for Arundo, Tamarisk and Ravenna Grass to treat. Depending on the situation, we use herbicide or manual efforts to remove plants and viable seed from the watershed. This year we were able to add a significant piece of property to our treatment area. The Millsap property, owned by Yolo County, was the site of a large stand of mature Tamarisk. In August we went in and chopped the Tamarisk with an excavator to reduce the stand size

and increase access. We will follow this effort up with a burn to reduce weedy biomass sometime this month. We also have our fingers crossed for some grant funding to come through and help pay for future chemical treatments on this site.

Our project sites around the CCNP will see a lot of work completed this fall and winter. The Wild Wings site will be re-planted as needed and weed maintenance will continue. The Granite Reiff site is in a critical point right now as we plan to seed 30 acres with native grasses this fall. We are also dealing with some erosion issues on the site. This summer we repaired some significant rilling on the berms and planted a buffer strip of sterile grass along the top. The work will help prevent more erosion this winter as the native grasses become established. Once good cover exists, the erosion problem should be removed. The Correll/Rodgers pits are looking good this year and I am proud of the weed control we have achieved on site. There is a strong stand of native grasses on two berms, along with some good tree and shrub cover. I am excited to be writing a grant to expand on the previous work at C/R. I hope to secure funding through NAWCA for the establishment of seasonal wetlands in the Rodgers pit to provide habitat for migratory waterfowl and other wildlife.

Summer on the CCNP was long, hot and dry. We spent a significant amount of time making sure all our young plants were irrigated, especially along the CR 94B hedgerow. I am very pleased with how the front is looking and plan to continue our plantings out there this winter. I am also planning to do some burning in our native grass stands this fall. I am excited to see how the grasses respond to a burn and look forward to introducing more forbs to the area. I also plan to do some burning in the riparian corridor this fall or winter. Last year we piled brush and biomass in several areas and this year we treated several patches of invasive blackberry along the trails. WE will go through and burn these areas to clean them up and hopefully release more native plants at the same time. Finally, this fall and winter will see more activity in the TGG. Currently I am working to grow out several species of native plants in our shade house to plant in the Garden. Specifically, I will work to introduce new stands of willow and sedge with easy access for gatherers.

Habitat Restoration
Christopher Gardner
October-December 2013

Winter is quickly becoming my favorite season on Cache Creek because the use of the Nature Preserve by its residents is so obvious. Tracks in the soft ground, nests unhidden by falling leaves and seasonal visitors in the wetlands are all evidence of a thriving community we mostly don't see. Other than the foliage and the temperature, migratory birds are the most obvious change when winter comes to the CCNP. I was excited to see a brilliant white swan in the wetlands for the first time one morning, surrounded by a pack of Canada Geese.

This winter is the first for me on Cache Creek without major work to do upstream on the Tribal sites. I have really come to appreciate the differences in landscape between the upper and lower watershed and I will miss my project sites on that more rugged and remote terrain. Overall, I am very happy with what I accomplished on the project, especially with our re-vegetation efforts along the golf course. There I was able to successfully install almost 200 individual plants, seed almost 7 acres of new ground with native grasses, enhance 12 existing acres of native grasses, control invasive weeds and install hundreds of willow cuttings as an erosion control measure. I have tried to guard these successes by working to protect young trees and shrubs from the heavy herbivory on site with cages. We have also left the irrigation system installed to help keep young plants well irrigated if signs of stress develop next summer. I will continue to work with the Tribe on a plan for the site's long term management, as well as to look for other funding and project opportunities.

We also completed our funded work on the Yolo Flood Control mitigation project this fall. I seeded and planted about 2.5 acres over the course of the project with mixed results. I encountered some significant vandalism over the course off the project and I also learned a lot about working along the Creek. The soil on the upper part of the site proved unable to support a large amount of installed plants due to the gravely content and inability to hold water. Irrigation for all of our sites is expensive and the budget for this project did not allow for constant watering that would have been needed to establish more plants. Native grasses have been also been slow to establish on the upper bench, with large areas of ground remaining virtually bare for the first year after planting. Broadleaf weeds are not prevalent on the site due to extensive spraying and one burn in the fall of 2011. The lower bench was cleaned up and biomass burned or piled and the native riparian section responded well. Large patches of native Creeping Wildrye grass are mixed with mugwort and goldenrod grows thick in areas along the

channel. The irrigation is still on site if I feel we need it next year to prevent any more losses. My goal is to find funding to keep building off of this site and continue the work upstream along the south bank.

The OHV grant project has entered its final year and I still have some significant work to do. We have had good success with our plantings at Wildwings and along the 94B hedgerow on the CCNP and will continue those plantings again this winter. The final part of the project is to place signage and deny access to some more sensitive areas at Wild Wings and the Rodgers Pit. Any attempt to deny access will most likely be met with resistance, so I am really trying to be strategic and only try and work with the natural flow of traffic out on the Creek.

Work on our Yolo County sites included a Burn at the Millsap property and ongoing maintenance at Correll/Rodgers. The Millsap site was treated mechanically for Tamarisk back in August and we are waiting for an opportunity this winter to burn the unwanted biomass on site. The burn will allow better access for the crew to spray new Tamarisk growth next year in order to kill the plants and permanently remove them from the site. Unfortunately a grant that would have paid for the herbicide application was denied. Over at the Correll/Rodgers pits we have achieved great control of thistle and other broadleaf weeds in areas previously planted with natives. The grasses are very healthy and I can see them slowly spreading out into other areas of the properties. I have high hopes for a grant we submitted in November to establish a wetland in the bottom of the Rodgers pit to provide winter habitat for migratory birds. The project will also restore the other two berms not already planted with native species. The thing I am most excited about, however, is the multiple partnerships we formed to get the proposal together. I am especially excited to be working with the Sacramento Tree Foundation to help us get community volunteers recruited and out working on restoration. I think this could be a successful new model for restoration along Cache Creek.

Around the Nature Preserve I am busy with trail maintenance, weed control and some planting around the grounds. IN the TGG I have been working to establish a more useable area for sedge root gathering. To do this I have planted sedge in a new area with the sedge planted in furrows. The soil was amended to reduce compaction and allow the sedge roots to run long and straight. We will also be working with Steering Committee members to try and reclaim the original sedge bed with a technique that should help open up that ground and allow for better collecting.

Finally, we completed a major piece of work last fall on the Granite project by drill seeding the 30 acre site with a native grass mix. I have high expectations for this project because we were able to get such good control on annual grass weeds before we planted.

Education/Outreach Report
Gina Martin / Fred Vanderwold / Lynnel Pollock
January – March 2013

January

- Jan. 19th – Open Saturday – "Birds on the Creek" – 52 different species of birds. 30+visitors to the CCNP.
- Jan. 30th – Beth Rose Middleton, UCD brought 10 students out and met with Chris to tour the TGG.

The Open Day set up has encouraged the use of the Restore/Restory Audio Tour. In January 3 of the devices were checked out and February 7 devices checked out.

February

- Feb. 6th – First Aid training for staff and volunteers
- Feb. 16th – Open Saturday – "Great Backyard Bird Count" – 49 species spotted and reported to ebird.org, 10 visitors helped Don Hallberg with the count. 35+ visitors to the CCNP.
- Feb. 23rd – Duck Days at the Yolo Basin Foundation, Fred and Don represented the CCC/CCNP

March

- March 14th – WACHE Home school group, 37 students + 8 adults
- March 16th – Open Saturday – "Tracking Workshop" – 30+visitors, workshop lead by Rob, Sally, Jeanette and Fred.
- March 18th – Southport, West Sac – 28 4th graders +adults
- March 19th – Southport, West Sac – 53 4th graders + adults
- March 21st – Dingle, Woodland, 24 6th graders + adults
- March 28th – Dingle, Woodland, 28 6th graders + adults
- March 23rd – "Native Plants on the Preserve" – 10+ visitors, workshop led by, Chris, Sally, Rob, Jeanette.

Thank you, Fred, Michael, Ken and Don for giving up 2 of your Sundays to paint the Visitor Center!!
It looks Marvelous!!!

Education/Outreach Report
Gina Martin / Fred Vanderwold / Lynnel Pollock
April – June 2013

April

- April 1st – Spring Break at CCNP – Mammals & Tracks – 12 children plus adults
- April 3rd – Spring Break at CCNP – Rocks & Minerals – 50+ children & adults

- April 5th – Spring Break at CCNP – Bugs in the Creek – 30+ visitors

April continued

- April 10th – Met with Michael Smith and American River Parkway Foundation
- April 11th – Home Study – 12 students + adults
- April 13th – Open Saturday – "Fire and Water" – 40+ visitors
- April 15th – Home Spun – 30 students
- April 17th – Restoration Workshop
- April 20th – Open Saturday – 20 visitors + many visitors from Bike Race being conducted on County Rd 20, bikers were allowed to park inside first gate to NP
- April 22nd – Girl Scout afternoon walk about with Lynnel – 10 scouts & adults
- April 25th – Volunteer Appreciation Reception
- April 27th – YMCA Healthy Kids Day – Fred & Gina, 250 kids
- April 30th – Woodland Parent Nursery School – 30 kids & parents

May

- May 3rd – Main Ave Elementary – 50 First Graders
- May 6th – Esparto High School – Seniors Scavenger Hunt – 60 students & adults
- May 7th – Zamora Elementary – 33 Third Graders
- May 8th – Wagoner Farm Day at Winters – Fred Vanderwold – saw over 200 + students
- May 9th – Zamora Elementary – 33 Third Graders
- May 13th – Cesar Chavez Elementary – 31 Third Graders
- May 14th – Cesar Chavez Elementary – 31 Third Graders
- May 16th – Cesar Chavez Elementary – 30 Third Graders
- May 17th – WACHE Home School Group – 15 mixed level students
- May 18th – Open Saturday – "Mothers Day in the Wild" – 20 visitors
- May 21st – Orchard Vacaville – 62 Third Graders
- May 22nd – Tafoya Elementary – 32 First/Second Graders
- May 23rd – Tafoya Elementary – 64 Fourth Graders
- May 29th – Beamer Elementary – 27 Third Graders
- May 30th – Tafoya Elementary – 64 Fourth Graders

June

- June 15th – Open Saturday – "Native American Cultural Day" – 50+visitors
- June 18th – FFIG SBC Garden Club – 15, 13-17 yr old student with adults, (This was a new group from Fred's long list of past acquaintances)
- June 19th – 1st Wacky Wilderness Wednesday – "NA Exploration" 12 students + adults

- June 25th – American Indian Summer Institute – 25 visitors

- June 26th – 2nd Wacky Wilderness Wednesday – "Rocks & Minerals" – 55 + visitors

Publicity: Press Releases sent to Daily Democrat, Davis Enterprise, Winters Express, events are posted on CCC web site and Face Book page. Wacky Wednesday's have been submitted to "Macaroni Kid" an email distribution list to interested parties looking for something to do in the community. Also emails are being sent out to visitors from past events.

Education/Outreach Report
Gina Martin / Fred Vanderwold / Lynnel Pollock
July - September 2013

July

- **July 12th –** Robert's Family Development Center – 1st & 3rd graders (25)
- **July 17th – Wacky Wednesday –** Bugs in the Creek – 77+
- **July 19th –** Robert's Family Development Center – 4th & 5th graders (20)
- **July 20th – Open Saturday –** Explorit Spider Spotters – (25+)
- **July 24th – Wacky Wednesday –** Creative Writing & Art – (22+)
- **July 31st – Wacky Wednesday –** Water Exploration – (35+)

August

- **August 7th – Wacky Wednesday –** Fun & Games – (20)
- **August 14th-18th** – Yolo County Fair – received 2nd place on fair booth

September

- **September 3rd – Volunteer Training Session –** Met with 12 volunteers, and presented with new Environmental Education Handbook.
- **September 21st – 11th Annual Creek Cleanup –** Over 60 volunteers showed up for the first cleanup in the rain.
- **September 23rd – Waggoner School 2nd graders (29)**
- **September 24th – Waggoner School 2nd graders (29)**
- **September 26th – Waggoner School 2nd graders (30)**
- **September 27th – Waggoner School 2nd graders (29)**

Education/Outreach Report
Gina Martin / Fred Vanderwold / Lynnel Pollock
October - December 2013

October

- **Oct. 1st – North Davis Elementary –** 3rd – (28)
- **Oct 3rd – Granite Bay Montessori –** 4th & 5th – (20)
- **Oct 4th – North Davis Elementary** – 3rd - (28)
- **Oct 8th – Arbuckle Elementary –** 4th – (50) – Bussing $$
- **Oct 10th – Arbuckle Elementary –** 4th – (50) – Bussing $$
- **Oct 11th – North Davis Elementary –** 3rd – (28)
- **Oct 15th – Native American Environmental Workshop**
- **Oct 17th – Autumn Fest**
- **Oct 19th – Open Saturday** – Spider Spotters - (31)
- **Oct 19th** – **Girl Scout Troop** 760 – K-1 – 10 girls + 10 adults
- **Oct 21st – Homespun Homeschoolers –** (20)
- **Oct 22nd – Sci Tech Academy**, Knights Landing – 2nd – (40) – Bussing $$
- **Oct 23rd – Plainfield Kindergarten –** (45)
- **Oct 24th – Freeman Elementary** – 4th – (30) – Bussing $$
- **Oct 29th** – **Freeman Elementary** – 4th – (30) – Bussing $$

The Highlighted days are new groups that have not previously visited the Nature Preserve. Also please not we were finally able to convince Arbuckle to split into two groups. We provided bussing dollars to 5 of the groups.

November

- **Nov 14th – Full Moon Night Walk – (40**) – This was the first time this program was offered. It was a great success with over 40 people of all ages showing up, for a guided tour of the Nature Preserve with Fred & Don. We received many requests to have this program again.
- **Nov 16th – Open Saturday** – No program scheduled. (25) – New Environmental Club from Pioneer High School worked with Chris. A biology class from UCD showed up as well and was greeted and welcomed by our volunteer Jeanette Wrysinski. Chris, Fred and volunteers also worked to gather tule for future programming.
- **Nov 21st – Homespun** – Part of the original Homespun group showed up and worked with Fred and Chris to collect tule for a future project they are working on.

December

- **Dec 4th – Patwin Elementary** – 4th – (30).
- **Dec 11th – Tuleyome/Yolo Family Resource/Winters Rise – Middle School – (30)**

Cache Creek Conservancy

Cache Creek Nature Preserve Land Management Plan

Prepared for the Cache Creek Conservancy

By

Christopher Gardner

Habitat Restoration Manager

July 2, 2013

Adopted by CCC Board of Directors on 7/11/2013

CACHE CREEK NATURE PRESERVE MANAGEMENT PLAN

Purpose

The purpose of this management plan is to help guide the management of the Cache Creek Nature Preserve (CCNP), a 130 acre nature preserve in Woodland, CA. The CCNP is owned by Yolo County and managed by the Cache Creek Conservancy. This document was developed to help implement specific management goals. These specific management goals are derived from three guiding documents; the mission statement of the CCC, the original agreements between Yolo County and Teichert Aggregates regarding use of the property and the conservation easement placed on the property. All goals and tasks laid out in this plan are designed to help the CCC manage the Nature Preserve in a way that honors these documents.

This plan is divided into three main elements – biological, public use and facilities maintenance. Goals are expressed that support either the mission of the CCC or the requirements of the other guiding documents. Specific tasks are then outlined that, if completed, will help reach the stated goal. Due to the nature of this property, many of the goals involve the continued maintenance and upkeep of the CCNP. This is because the CCNP is a rather mature site regarding habitat and facilities. Few significant new projects are identified simply because they are not necessary to support the mission and guiding documents. Instead, grounds maintenance, safe access and habitat protection are the primary focus of the preserve manager.

It is intended, however, that this plan be a living document that can be updated or revised as priorities change or new methods become available.

Background Information

The Cache Creek Nature Preserve (CCNP) was established in 1999 by action of the Yolo County Board of Supervisors. Originally called Teichert Meadows, the preserve was gifted to Yolo County to serve as a wildlife preserve/nature center with several goals and objectives. The Cache Creek Conservancy (CCC), a non-profit agency, oversees the management of the preserve as well as restoration activities along the Creek.

In 1999 the Conservancy entered into an agreement with Yolo County to restore and manage the newly acquired Cache Creek Nature Preserve site. This 130 acre site, donated to Yolo County by Teichert Land Co., is located on the north side of Cache Creek at Road 94B, and contains wetlands, oak woodlands, and native grasslands, in addition to the stream-side riparian habitat. It also serves as the center for an extensive environmental education program and includes the Jan T. Lowrey Memorial Grove and the Tending and Gathering Garden.

The first phase, March 1999 through May 2000, was to ready the property for public use and included building fences, rebuilding the entry bridge, stabilizing and refurbishing the redwood barn, constructing the Salisbury Spill overlook, the wetlands overlook, the boardwalk and overlook, stairway on the levee, the inlet structure from Gordon Slough to the wetlands and the outlet structure from the wetlands to Cache Creek, and design and install interpretive signs. This culminated in a magnificent Grand Opening of the CCNP in May, 2000.

The second phase, June 2000 to June 2001, was to complete visitor and staff amenities. The Conservancy office was moved to the site with the installation of the first modular building and the building of the accompanying deck and shade structure. The entry road, parking lot and some trails were chip-sealed, other trails were developed and many covered with wood chips, and native trees and shrubs were planted along with the necessary irrigation systems.

The third phase, 2001 to the present, is the continuation of the physical improvements at the Nature Preserve and the continual evaluation and expansion of programs. Some of the major components include the Tending and Gathering Garden, the Jan T. Lowrey Memorial Grove (dedicated to Jan following his untimely death in January, 2006), a second modular office/meeting building, the ramada, trail improvements and a footbridge over lower Gordon Slough, grassland restoration, and habitat improvements in the lower Gordon Slough area. In addition, the highly regarded environmental education program continues to expand and reach over 2000 students per year. Yearly events have included a Fun Run in the spring, Creek Cleanup in September, and an annual event in October.

Cache Creek Nature Preserve Property Description

The CCNP is located at the corner of County Road 94B and County Road 20 about five miles west of Woodland, CA. The 130 acres were donated by Teichert Land Co. to Yolo County. The Preserve lies at the base of the southernmost tip of the Dunnigan Hills.

A. Geographical Setting: The Cache Creek Nature Preserve is located in North West Yolo County, approximately 5 miles west of the City of Woodland. The Nature Preserve sits on the north bank of Cache Creek, immediately west of Steven's Bridge (County Road 94B). The physical address of the Nature Preserve is 34199 County Road 20, Woodland, CA. The nearest cross street is County Road 94B. Highway 16, a major traffic artery through western Yolo County, is one mile south of the Preserve.

B. Property Boundaries and Adjacent Land Use: The CCNP is located in a rural setting and is surrounded by two primary land uses; agriculture and gravel mining. The Nature Preserve property itself is the site of a former gravel mine, and before that it was a working farm and ranch. Teichert Aggregates owns land to the east, south and west of the property. This ground is a combination of active mining sites, reclaimed mine sites and agriculture. Three private landowners border the property on the north side. Two of these parcels are part of large scale agricultural operations and the third is the site of a horse stable and riding facility. County Road 20 defines the north boundary of the property, County Road 94B defines the east boundary, a fence line defines the west boundary, and Cache Creek the south boundary.

C. Site Geology, Soil Types, Climate and Hydrology: The CCNP sits on the historic flood plain of Cache Creek, a waterway that flows southeast from Clear Lake in the Coast Range to the Yolo Bypass. The site, as well as the geology of the entire lower watershed, has evolved over time through the deposition of gravel, sand and silt by Cache Creek. The gravel, in particular, is of the highest quality and has been mined in and along the creek for decades. The CCNP is the site of a former gravel mine and the current geology is in part a result of mining. The other geologic feature of note in the area is the Dunnigan Hills, located just to the north of the Preserve.

The dominant soil type on the CCNP is a loam that varies from silty to gravely, depending on proximity to the creek channel. An NRCS soil survey map is included as appendix E. It is important to understand that the current soil composition of the CCNP is a result of the various land uses of the site over time and not the result of natural processes. The different areas of the Preserve have very different soil types, ranging from pure gravel to highly amended. The soil quality varies to such a degree that it is impossible to summarize soil types in this report beyond a vast generalization. However, the soil conditions of the site are extremely important when considering restoration efforts and each project area should be surveyed individually. Amendments have been used successfully in the past to aid in re-vegetation efforts and should be considered whenever feasible.

The hydrology of the Preserve is unique and provides ample opportunity for continued habitat enhancement on the property. Major water features on the property include the seasonal West Adams Canal and Gordon Slough, the permanent wetlands and Cache Creek. The creek itself is quite dynamic and was a seasonal waterway prior to the installation of several dams. Today, at this site, the creek flows year – round at levels that fluctuate based on rainfall and consumer demand for irrigation water. Gordon Slough and the West Adams Canal are part of the Yolo County Flood Control and Water Conservation District water delivery system. These channels are full of irrigation water from late spring through September. These canals are unlined and a good source of ground water replenishment for the Preserve. Water also moves from Gordon Slough underground into the wetlands feature on the west end of the property. The wetlands are the site of a former gravel mine pit that has been restored to provide habitat and public access trails. The water level in the wetlands can be actively managed using the inlet and outlet structures. There are also two wells, one domestic and one agricultural, on the property. The domestic well currently supplies all water for the operations of the CCNP. The agricultural well is operational and could be used for irrigation purposes if needed.

The Biological Elements

The various distinct habitat types found on the preserve have been delineated and named previous to this plan. These habitat areas are the basis for the biological elements outlined below. Each element is identified and a brief description is given of the current conditions and dominant features. The biological elements, goals and tasks are focused on maintaining and improving the habitat value of the site as a nature preserve. These are distinct from the public use elements that are presented later, though some physical areas may overlap. The following goals and tasks are presented as the best known management practices at the time of adoption of this plan. These best practices and the specific tasks outlined here are guided by two higher level documents that this plan supports. The first document that all management tasks must adhere to is the Conservation Easement that overlies the Cache Creek Nature preserve. The CCC holds this easement and is responsible for meeting the guidelines outlined therein. The second document that this plan must adhere to is the Cache Creek Resources Management Plan. That plan has been adopted by Yolo County and its contents guide the reclamation/restoration of lands within the plan boundary. The CCNP falls within this boundary. Appendix E contains the biological resources language relevant to this management plan.

The Wetlands

The Wetlands feature of the CCNP is the site of a former gravel mine pit. The pit was originally reclaimed to agriculture by Teichert; however this was unsuccessful due to the poor drainage of the area. Instead, Teichert re-contoured the bottom of the pit to include various island and high ground features in what would now be a permanent water feature for wildlife. The term wetland can be used only loosely to describe the feature. In reality, the front, or east, end of the wetlands is a 3 -5 foot deep pond that supports bird species such as Canada Geese, Grebes, Coots, and even Cormorants. This part of the wetlands is also the site of significant riparian mammal activity from river otters, beavers and raccoons. The back, or west, side of the wetlands is more marsh – like and significantly shallower. This end of the wetlands has a large stand of willow trees and lots of tule and cattail growth for cover. There is also no available public access on the west end.

Goal 1 – Promote the growth of native grasses on the islands and around the wetlands to improve nesting habitat for Canadian Geese and foraging habitat for raptors.

Task 1.1 – Control broadleaf weeds with herbicide and hand removal. See Appendix A for herbicide timing and rates.

Task 1.2 – Control annual grasses in areas previously planted with native species using mechanical and manual techniques. See Appendix B for mechanical weed control methods and timing.

Task 1.3 – Burn islands and slope areas as needed to promote native grass growth and remove weedy biomass. Burning can be used to help with general maintenance and as a first step in active grassland restoration.

Task 1.4 – Maintain a high water level in wetlands to promote vegetative growth on islands and throughout the feature. High water levels also make access to islands easier for geese by reducing the slope.

Goal 2 – Increase upland plant diversity along trails and on slopes surrounding wetlands in order to better represent biodiversity of the Cache Creek Watershed.

Task 2.1 – Collect native seed and vegetative stock from watershed, especially from successful plants found in existing reclamation areas near CCNP. Propagate and maintain plants on site at CCNP.

Task 2.2 - Using CCRMP planning guidelines for species type and density, continue planting bare areas each winter.

Task 2.3 – Ensure ability to irrigate all plantings for at least three years. See Appendix C for watering options and schedules.

Goal 3 – Maintain trails and infrastructure for safe use by visitors of all ages and abilities.

Task 3.1 – Keep all trails clear of vegetation using chemical or mechanical methods as appropriate.

Task 3.2 – Monitor condition of boardwalk and Ramada periodically to look for beaver damage or decay.

Task 3.3 – Clean bird droppings and dust from boardwalk and Ramada as needed (usually early summer).

Task 3.4 – Monitor Ramada for poison oak and remove as needed.

The Riparian Forest

The Riparian forest makes up approximately 44 acres of the Nature Preserve along the lower bench bordering Cache Creek. The feature has been actively and passively restored over the time since the property was dedicated to Yolo County. Like most areas of Cache Creek prior to invasive species removal by the CCC, the riparian forest was once covered in arundo and tamarisk. Invasive species removal on the site has allowed for a re-emergence of many native riparian species. A healthy overstory now exists and is comprised of Cottonwoods, Willows and Valley Oak.

Goal 4 – Eradicate Himalayan Blackberry from Riparian Forest.

Task 4.1 – Produce Blackberry management plan with budget in order to quantify goals and build a reasonable timeline

Task 4.2 – Working in sections, use equipment and labor to clear Blackberry biomass and pile for burning

Task 4.3 – Again working in sections, conduct late summer glyphosate (Round-Up) applications on new growth emerged since clearing. This step will need to be repeated for several consecutive years to fully eradicate large stands

Task 4.4 – Prevent establishment of other invasive weeds in Blackberry removal plots with a native ground cover or other weed suppression technique. See Appendix A and B for weed abatement techniques.

Goal 5 – Promote continued re-establishment of Riparian Forest in all 44 acres.

Task 5.1 – Physically divide area into smaller sections using GPS marking and survey for invasive species

Task5.2 – Control invasive broadleaf and annual grass weeds in riparian understory with chemical and mechanical means

Task 5.3 – Promote natural succession of riparian species by identifying native "Volunteers" and working to protect with tubes, cages, wire wrap, etc.

Task 5.4 – Use prescribed burning to reduce woody debris and weedy biomass in understory and promote passive restoration

The Native Grasslands

The CCNP Native Grasslands are a restored native grass feature that covers approximately 30 acres on the east end of the property. Seeded in 2007 with a mix of native grass species, the feature is diverse in soil type and composition. Dominant native species are Creeping Wildrye and Purple Needlegrass. Several invasive annual grasses exist throughout the feature, primarily Wild Oat and Ripgut Brome. The grassland feature is a very important aspect of the CCNP as it shows our ability to establish and manage a healthy grassland ecosystem. California grassland ecosystems are highly degraded and grassland restoration is a focus of many land management programs.

Goal 6 – Control invasive broadleaf and annual grass species from establishing in the grasslands.

Task 6.1 – Burn grass plots on a 3 – 4 year interval to remove thatch, promote growth and sterilize unwanted seed.

Task 6.2 – Control broadleaf weeds with herbicide or by hand removal as necessary. See Appendix A for herbicide application.

Task 6.3 – Control annual grasses with hand removal and targeted mowing to prevent viable seed production. See Appendix B for IPM techniques.

Task 6.3 – Maintain established fire breaks by mowing as needed in spring and summer. See Appendix D for fire management map.

Task 6.4 – Monitor grasslands for outbreaks of invasive species and respond Accordingly.

Goal 7 – Establish appropriate native forbs in grasslands to improve biodiversity and increase forage for local bees.

Task 7.1 – Produce appropriate plant palette for central valley native grassland forb mix.
Task 7.2 – Work with local researchers to set up experimental design for data collection over time.
Task 7.3 – Perform general maintenance of forbs and forb biomass in grassland to include mowing, "carcass" removal and burning
Task 7.4 – Herbicide program must take into account future establishment of native forbs.

Valley Oak Savannah

The oak savannah element of the Preserve features several large heritage Valley Oak trees with an understory of native grasses. There are no shrubs, forbs or other significant vegetation. The savannah features a wood-chipped trail, called the "Oak Flat Trail," that runs east/west from the main driveway to the edge of the valley grassland feature. The savannah is an important feature because it represents a habitat type that once dominated the Valley. The age, health and spacing of the trees are just as could be found in the area before modern land uses changed the landscape. This feature provides a wonderful transitional habitat between the grasslands and the more heavily wooded Gordon Slough area.

Goal 8 – Control broadleaf weeds and invasive annual grasses.

Task 8.1 – Burn grass plots on a 3 – 4 year interval to remove thatch, promote growth and sterilize unwanted seed.
Task 8.2 – Control broadleaf weeds with herbicide or by hand removal as necessary. See Appendix A for herbicide application.
Task 8.3 – Control annual grasses with hand removal and targeted mowing to prevent viable seed production. See Appendix B IPM techniques.
Task 8.4 – Maintain established fire breaks by mowing as needed in spring and summer. See Appendix D for fire abatement map.
Task 8.5 – Monitor grasslands for flora and fauna, watch for outbreaks of invasives.

Goal 9 – Promote establishment of young oak trees for succession.

Task 9.1 – Identify potential volunteer oak saplings and mark/flag/record gps location.
Task 9.2 – Establish exclusion areas around saplings with fencing to protect from herbivory and to prevent burning.
Task 9.3 – Monitor establishment of young trees and thin as necessary to prevent overpopulation.

Task 9.4 – Collect acorns and transplants when possible to preserve the genetic stock of the existing trees.

Goal 10 – Manage existing trees for health and visitor safety.

Task 10.1 – Monitor tree conditions on a periodic basis (monthly, quarterly?) and after high winds.
Task 10.2 – Immediately cut and pile broken limbs or branches that pose a risk to trail users.
Task 10.3 – In consultation with an arborist, monitor tree health and take measures as necessary to improve.

West Adams Canal

The West Adams canal runs northeast from the driveway to the pipe gate feature on CR 20. The YFCWCD canal goes north under the road at that point, but a canal feature continues east along the road on CCNP property. This feature is included in the West Adams Canal feature. The canal is used by the water district to convey irrigation water and is maintained by the district for this purpose. The canal banks and adjoining upland are part of the CCNP and should be maintained by the CCC. The feature provides habitat for wildlife and a source of surface water for irrigation when needed.

Goal 11 – Control invasive weeds along canal corridor.

Task 11.1 – Monitor corridor for weed outbreaks, with a priority placed on identifying tamarisk, arundo and Ravenna grass outbreaks.
Task 11.2 – Treat weeds as necessary with appropriate methods and timing for target species. See Appendix A for herbicide application timing and rates.
Task 11.3 – Control Poison Oak for safer access to this area.
Task 11.4 – Work with Water District to coordinate control efforts when possible.

Goal 12 – Establish native riparian understory along canal banks to improve habitat value.

Task 12.1 – Divide corridor into sections in order to manage restoration efforts and spread out costs over time.
Task 12.2 – Identify appropriate species and begin seed/veg stock collection for propagation.
Task 12.3 – Time planting efforts in winter, when water conveyance system is dry and easily accessed.
Task 12.4 – Plan irrigation system needs in advance.

Gordon Slough

Gordon Slough is a surface water feature and riparian corridor that carries excess irrigation water during spring and summer months and stormwater in the winter. The slough is the lowest end of the Hungry Hollow watershed that runs southeast out of the Coast Mountains into the valley and discharges into Cache Creek. Gordon Slough on the CCNP is lined with large Valley Oak trees and other assorted native riparian species. It provides excellent habitat for wildlife of all kinds as it runs through the Preserve grounds and connects with the creek. The slough is also a source of sediment contamination to the creek as it carries turbid surface and runoff water directly to the creek channel.

Goal 13 – Set up year – round wildlife monitoring program.

Task 13.1 – Collect monitoring equipment including cameras, traps, nets, and observation scopes.
Task 13.2 – Work with local researchers to establish best practices for monitoring techniques and data management.
Task 13.3 – Establish volunteer corps to assist with field monitoring and data collection.

Goal 14 – Manage invasive weed species in Gordon Slough

Task 14.1 – Monitor Slough on a periodic basis for invasive species with a priority on Tamarisk, Arundo and Ravenna Grass.
Task 14.2 – Treat outbreaks with appropriate IPM technique for location and time of year. See Appendix B IPM information.
Task 14.3 – Re-vegetate treated areas as soon as possible after invasive biomass is removed to prevent new infestations.

Goal 15 – Improve biofiltering capability of Gordon Slough on the CCNP

Task 15.1 – Produce a project plan that outlines best practices for biofiltering and sediment removal in Gordon Slough.
Task 15.2 – Work with local agencies and Yolo County TAC to get buy-in and support for project
Task 15.3 – Implement planting and grading as necessary in winter months when water delivery system is off-line.
Task 15.4 – Look for grant funding to offset project costs.

The Urban Area

The Urban Area of the Preserve is home to the offices, Visitor’s Center, parking lot, metal barn, Resource Model, two pollinator hedgerows, the Memorial Grove and two historic redwood barns. These features are used by staff, volunteers, and visitors on a regular basis and need to be managed primarily for human use. The area is, however, at the center of the Nature Preserve and provides habitat value for many plants and animals other than humans. The following goals and tasks provide guidance for the management of the Urban Area as habitat. A later section will focus on the public use of this area.

Goal 16 – Improve biodiversity of open areas between buildings and Memorial Grove.

Task 16.1 – Continue planting native trees and shrubs in areas around buildings, in hedgerows and in open areas.
Task 16.2 – Plant replacement trees in urban area for succession when older, unhealthy trees are removed.
Task 16.3 – Plant native grasses and forbs, whenever possible, in specific areas to increase prevalence of these species around the grounds and provide examples for visitors.

Goal 17 – Maintain hedgerows, Memorial Grove and Resource Model.

Task 17.1 – Control weeds and unwanted plants with herbicide or mechanically to keep native plants well displayed.
Task 17.2 – Prune unwanted plants and dead woody debris from trees and shrubs as needed.
Task 17.3 – Cage or tube young plants to prevent herbivory from deer and rabbits during establishment.
Task 17.4 – Allow for herbivory of established plants during winter months to improve forage for deer.
Task 17.5 – Use natural or man-made items to provide habitat for native bees and invertebrates.

Goal 18 – Maintain and improve roosting opportunities for raptors and bats.

Task 18.1 – Maintain existing owl and bat boxes to provide clean, safe areas for species to roost.
Task 18.2 – Identify ideal locations for addition owl, bat and raptor roosting structures to be installed on the grounds
Task 18.3 – Work with local researchers, Boy Scouts and neighbors to build and install boxes in pre-selected locations.
Task 18.4 – Monitor wildlife activity in all boxes.

The Tending and Gathering Garden

The Tending and Gathering Garden is the most unique feature on the CCNP grounds and is a living source of materials for traditional artists. The Garden was designed, and is used for the collection of Native American traditional cultural material. Native plants are tended and collected for use in basket weaving, traditional art, medicine and teaching. The TGG is managed for human consumption, so no herbicide use is allowed. Whenever possible, traditional management practices are used to keep the area free of weeds and native plants healthy.

Goal 19 – Maintain existing stands of native grasses, forbs and sedges

Task 19.1 – Continually monitor Garden for outbreaks of broadleaf and annual grass weeds.
Task 19.2 – Remove broadleaf and annual grass weeds manually or mechanically as soon as possible after ID to prevent spread.
Task 19.3 – Burn grasses and sedges on a 2 – 3 year interval to remove thatch and promote new growth.

Wildlife Corridor

The Wildlife Corridor is a piece of the Nature Preserve that is reserved exclusively for the use of wildlife. This area is located on the west end of the property and does not include any trails, signage or access for visitors. The corridor was created to serve as a link between Cache Creek and Gordon Slough that wildlife of all kinds could use undisturbed. This marsh area is much shallower than the open water found in the wetlands and is covered by a thick stand of willows. Tule, cattails and other marsh vegetation make up the understory. This area is currently not actively managed, with the exception of invasive species outbreaks. Ravenna Grass, in particular, has been found and treated in this area of the Preserve.

Goal 20 – Set up year – round wildlife monitoring program.

Task 20.1 – Collect monitoring equipment including cameras, traps, nets and observation scopes.
Task 20.2 – Work with local researchers to establish best practices for monitoring techniques and data management.
Task 20.3 – Establish volunteer corps to assist with field monitoring and data collection.

The Public Use Element

Public use of the Cache Creek Nature Preserve is a very important consideration in the management of the property. Each year we host several thousand visitors of all ages and abilities. The safety and security of each visitor is the responsibility of the Cache Creek Conservancy as managers of the CCNP. This section will outline management goals that were chosen to help provide a safe and fun experience for everyone. These goals are separate from the biological goals presented above. Unlike the biological section, the public use goals will be presented by feature type, rather than the habitat areas used before. Management of trails, buildings, amenities and other public access areas will be discussed in the following section. Generally, the biological goals and public use goals are compatible and beneficial to both people and wildlife. However, when public use goals interfere with biological goals, public use goals will take priority for management purposes. We cannot perform tasks that benefit wildlife at the expense of visitor safety.

The Trails – The CCNP is home to almost two miles of a connected trail system that runs through all parts of the Preserve. The trails are the most heavily used public access element on the grounds. The composition, width and difficulty of the trails vary. Trails are paved, graveled, wood-chipped and hard packed dirt. Trail maintenance is important to provide safe public access for visitors, particularly school children. Vegetative cover on the trails is especially undesirable, as it could hide rattle snakes and trip/fall hazards.

The Redwood Barns – There are two redwood barns located on the CCNP in the Urban Area. The larger barn is a historic structure that represents the culture and history of Yolo County. The barn is approximately 130 years old and is used extensively by the CCC. This barn houses several pieces of antique farm equipment, including a restored Holt harvester. It is also used by the CCC staff and visitors as an event space and classroom. Several large picnic tables are kept in the barn for public use and the entire space is open to the public. The barn has electrical outlets and flood lighting. Working hose bibs are located on three sides. The large doors do not work but the small windows on the north and south sides have covers that can be installed to block wind. The smaller barn is in a more deteriorated condition and is not used by the public. The small barn houses a shipping container that is used for tool and equipment storage by CCC staff.

The Boardwalk, Overlook and Ramada – The boardwalk, ramada and overlook are three permanent structures located on the CCNP grounds. These structures are used extensively by visitors and as part of the education program. The overlook and boardwalk are located in the Wetlands habitat area. The ramada is located in the Tending and Gathering Garden.

Amenities – Additional amenities located on the grounds include benches, picnic tables, a sandbox and two portable toilets. These items are used heavily by visitors and the education program throughout the year. All items are located in the Urban Area

Goal 21 – Keep trails clear of vegetation and debris

Task 21.1 – Mow, weedeat and spray all vegetation on the trails as it emerges year-round for access. See Appendix C for general CCNP maintenance schedule. See Appendix A for herbicide rates and timing for control of various species.

Task 21.2 – In spring and summer, and after high winds, prune and cut back branches, vines and broken limbs to keep trails clear of overhead vegetation. See Appendix A for general CCNP maintenance schedule.

Task 21.3 – Remove woody debris from lower trails after high water events in winter and spring.

Task 21.4 – Remove aluminum bridge over Gordon Slough in winter and replace in late spring, after high water events.

Goal 22 – Maintain all structures and amenities for safe access by staff and visitors

Task 22.1 – Empty garbage and recycling from outside cans, including barns, on a regular basis to keep a clean appearance and prevent garbage being spread around the grounds. Maintain a small buffer around cans clear of vegetation for safety.

Task 22.2 – Maintain a buffer of ground clear from vegetation around portable toilets for safety. Inspect toilet and wash bin condition regularly and report problems to rental company.

Facility Maintenance Element

The CCNP contains several buildings and pieces of equipment that need to be maintained in order to properly support the activities of the Cache Creek Conservancy. These items include the utilities, tool storage, hazardous materials storage, condition of structures and equipment, roads and vehicular access, office hours and staffing requirements. All of the above items and features are used by CCC staff and volunteers to perform the day to day tasks of running the CCNP. Facilities maintenance is especially important at the CCNP because the rural setting and high usage exacts a large toll on the existing infrastructure. Additionally, the CCC manages, but does not own the CCNP and its permanent structures. Yolo County entrusts our organization to keep its property in good, working condition as part of the management agreement.

Goal 23 – Maintain all permanent and portable structures located on the grounds

Task 23.1 – Routinely check the physical condition of the three barns; including posts, beams, doors and roofs. Look for crack, holes, insect damage and loose pieces. Repair as needed to maintain structural integrity.

Task 23.2 – Routinely check the physical condition of the modular buildings including; siding, paint, roofs, side skirts and open areas under buildings. Look for cracking, peeling, warping and sagging Repair as needed.

Task 23.3 – Routinely check overlook, boardwalk, ramada and benches for beaver damage. Use chicken wire or heavier gauge cage material to prevent further damage.

Task 23.4 – Control insect and vertebrate pests around the exterior of all buildings with bait, traps or spray to prevent damage or infestation.

Goal 24 – Maintain all water and electrical hookups and lines located in the Urban Area

Task 24.1 – Routinely check well, pressure tank, guage, fittings, hose bibs and connections on water system. Look for cracks, drips, puddles, pressure loss or damp ground along water lines. Repair as needed.

Task 24.2 – Routinely check all outdoor electrical boxes, switches, cords, conduit and lighting in and around buildings. Look for cracks, exposed wire, scorching or vandalism. Repair as needed.

Goal 25 – Maintain all tools and equipment for use by staff and volunteers

Task 25.1 – Perform tool and equipment inventory and catalogue all useable items. Throw away or donate any items not used.

Task 25.2 – Keep hand tools and small power equipment clean and accessible in metal barn or containers

Appendix A – Herbicide Application Chart

Herbicide	Active Ingredient	Target Species	Timing - Growth Stage Of Plant	Timing Of Application - Time Of Year	OZ Of Product In 3gal Backpack	OZ Of Product In 20 Gal ATV Tank
Round Up Pro	Glyphosate	annual grasses	shortly after germination	winter - early spring	6oz	40oz
		short pod mustard	rosette stage	year round, as weeds emerge	8oz	
		Italian/Milk Thistle	any time up to flowering	winter - early spring	6oz	40oz
		Star Thistle	rosette stage	late spring - early summer	6oz	40oz
		Arundo	before dormancy	late summer		
		pepperweed	before dormancy	late summer - fall	6-9oz depending on size, vigor	
		poison oak	before dormancy	late summer - fall	6-9oz depending on size, vigor	
Garlon 3A	triclopyr	short pod mustard	any time before flowering	year round, as weeds emerge	6-10oz depending on size, vigor of plants	
		cocklebur	any time before flowering	summer	6-10oz depending on size, vigor of plants	
		unwanted brush	any time before flowering	year round, as weeds emerge	6-10oz depending on size, vigor of plants	
		poison oak	any time before dormancy	late summer	6-10oz depending on size, vigor of plants	
				`		
Transline		Italian/Milk Thistle	any time before flowering	late winter - spring	1-2oz depending on size, vigor of plants	
		StarThistle	any time before flowering	summer	1-2oz depending on size, vigor of plants	
		Vetch	any time before flowering	spring	1oz	
Polaris	Imazipyr	Tamarisk	before dormancy	late summer	3oz	
Aquamaster	glophosate	Tamarisk, Arundo, Ravenna Grass, Pepperweed	before dormancy	late summer, fall	6 - 12 oz	

Appendix B – Integrated Pest Management Techniques

IPM Technique	Target Weeds	Timing	Equipment
Burning	Annual grasses	late spring after grasses dry, fall after first rain	drip torch, fuel, shovels, McCleods, water tender, volunteer fire crews
	Broad leaf weeds	fall after first rain	
	Tamarisk	after mulching, dead bushes	
	Arundo	after mulching, dead bushes	
Mowing	annual grasses	in spring after flowers emerge	tractor with flail mower, atv with mower, walk behind mower, weedeaters
	early thistle	in spring after flowers emerge	
Mulching	Tamarisk	summer before dormancy	excavator with mulching head
	Arundo	summer before dormancy	
Tilling	annual grassses	early and late spring as grasses emerge	tractor with spring tooth harrow, disc, shovel, hoe
	broad leaf weeds	early and late spring as weeds emerge, through summer as needed for late weeds	
Hand Pulling	all weeds	any time before seed falls off plants	volunteers

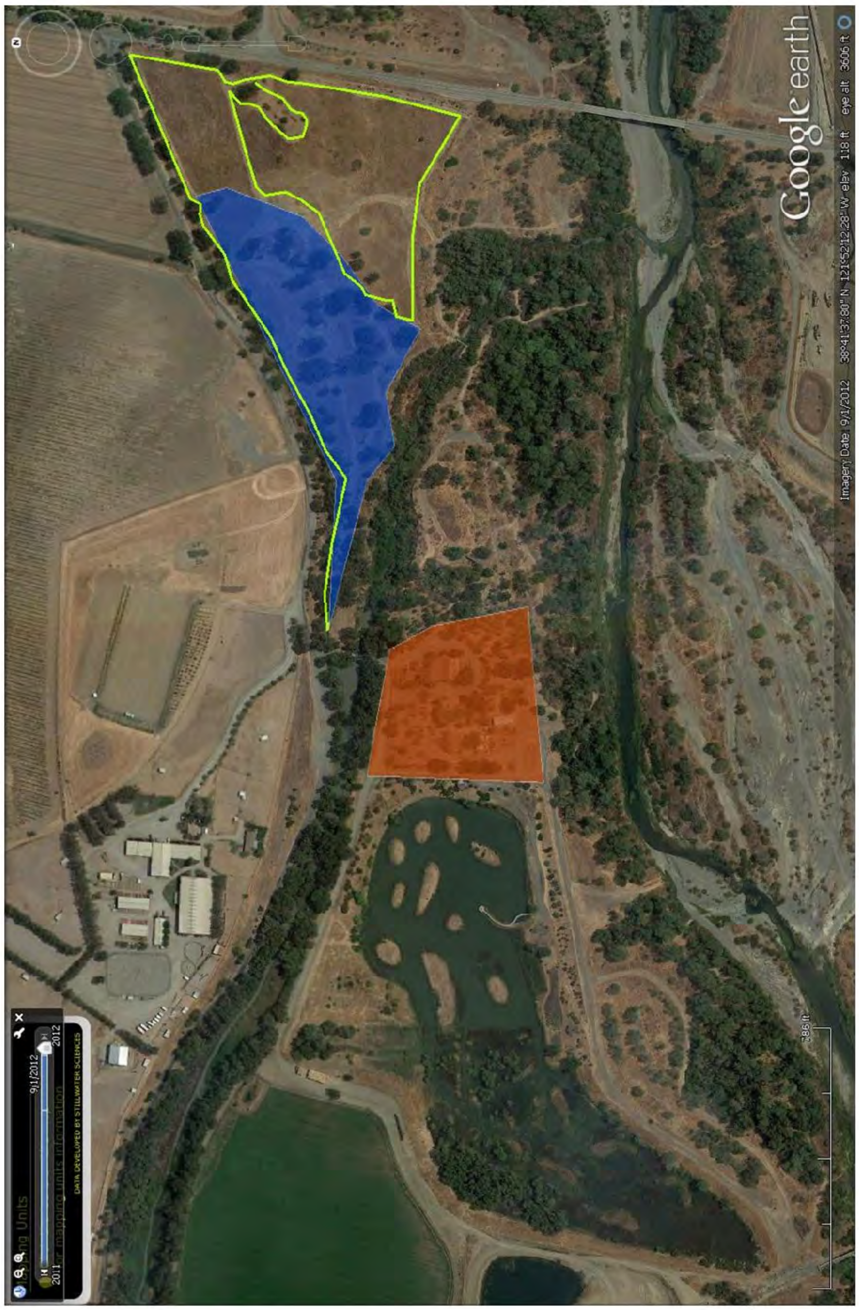
Appendix C – General CCNP Maintenance Schedule

	Location	Activity	Timing	Equipment	Herbicide
January	All CCNP	Re-vegetation	in winter when ground is wet	shovels, plants, tubes, stakes, dibble sticks	
February	Urban Area, Wetlands, areas with young plants	Vertebrate pest control - control ground squirrels and gophers	in early spring for ground squirrels when using poison, year-round with traps	pesticide and applicator, traps	zinc phosphide
	All CCNP	Invasive species control - thistle, mustard, filaree	early in growth stage	backpack, atv sprayer, weedeater, mower, shovel	transline, garlon 3A, round up, capstone
March	all CCNP trails	Clear trails for access - remove dead branches, debris, prune trees/shrubs/vines, mow and spray weeds, mow chipped trails	in early spring after high water, in late spring after winds, early summer to remove weeds	mower, chainsaw, pole saw, tractor, loppers pruners, ATV sprayer, backpacks	round up, Garlon 3A,
	All CCNP	Invasive species control - thistle, mustard, filaree, annual grasses	early in growth stage	backpack, atv sprayer, weedeater, mower, shovel	transline, garlon 3A, round up, capstone
April	Wetlands, Urban Area	Mow south side of wetlands, islands, urban area	as needed to control annual grasses and keep areas clean	mower, weedeaters	
	Urban Area, along driveway, along trails, in TGG, in MG	Event Prep - clean barns and equipment, empty all garbage, check barn lights, resource model cleanup, clear weeds from gravel areas, put away all tools and equip	at least twice per year - in March/April before workshop and October before Autumn Fest	mower, chainsaw, pole saw, loppers pruners, weedeaters, pressure washer	
	All CCNP	Invasive species control - mustard, lambs ear, hemlock, annual grasses	early in growth stage	backpack, atv sprayer, weedeater, mower, shovel	transline, garlon 3A, round up, capstone
May	Wetlands, Urban Area	Mow south side of wetlands, islands, urban area	as needed to control annual grasses and keep areas clean	mower, weedeaters	

June	all CCNP trails	Clear trails for access - remove dead branches, debris, prune trees/shrubs/vines, mow and spray weeds, mow chipped trails	in early spring after high water, in late spring after winds, early summer to remove weeds	mower, chainsaw, pole saw, tractor, loppers pruners, ATV sprayer, backpacks	round up, Garlon 3A,
July	All CCNP	invasive species control - control for summer weeds around grounds as needed	before flowering if possible, bag seed heads by hand is necessary	backpack, atv, shovels, hoes	roundup, Garlon 3A
August	CCNP with a focus on Riparian Forest and Wetlands	Invasive Species Control - control for Arundo, Tamartisk and Ravenna Grass on the CCNP grounds	Late summer, August and September	Tractor, ATV, backpacks, shovels, loppers	Polaris, Aquamaster, Capstone
September	CCNP with a focus on Riparian Forest and Wetlands	Invasive Species Control - control for Arundo, Tamartisk and Ravenna Grass on the CCNP grounds	Late summer, August and Spetember	Tractor, ATV, backpacks	Polaris, Aquamaster, Capstone
October	Urban Area, along driveway, along trails, in TGG, in MG	Prune trees, shrubs - clear all branches below 7 ft, prune back along trails and around barns		pole saw, chainsaw, loppers, pruners, truck w/ trailer	round up as needed for stump cut treatments
	Urban Area, along driveway, along trails, in TGG, in MG	Event Prep - clean barns and equipment, empty all garbage, check barn lights, resource model cleanup, clear weeds from gravel areas, put away all tools and equip	at least twice per year - in March/April before workshop and October before Autumn Fest	mower, chainsaw, pole saw, loppers pruners, weedeaters, pressure washer	
November	All CCNP	Seed native grasses - drill or broadcast seed in desired areas	early fall, after the first rains	seed, belly grinder, ATV broadcast seeder, tractor seeder, drill seeder,	
	TGG, Grasslands, Oak Savannah	Burn native grasses - burning grassed areas to reduce thatch, sterilize weed seeds, promote new growth on natives	early fall, after the first rains	dip torch, fuel, water truck, fire crews as needed	
December	All CCNP	Re-vegetation - planting and irrigation set-up as needed around grounds	after rains when ground is wet	shovels, pick, auger, dibble, plants, tubes, stakes	

Appendix D – Fire Abatement Map

CCNP Fire Management Map



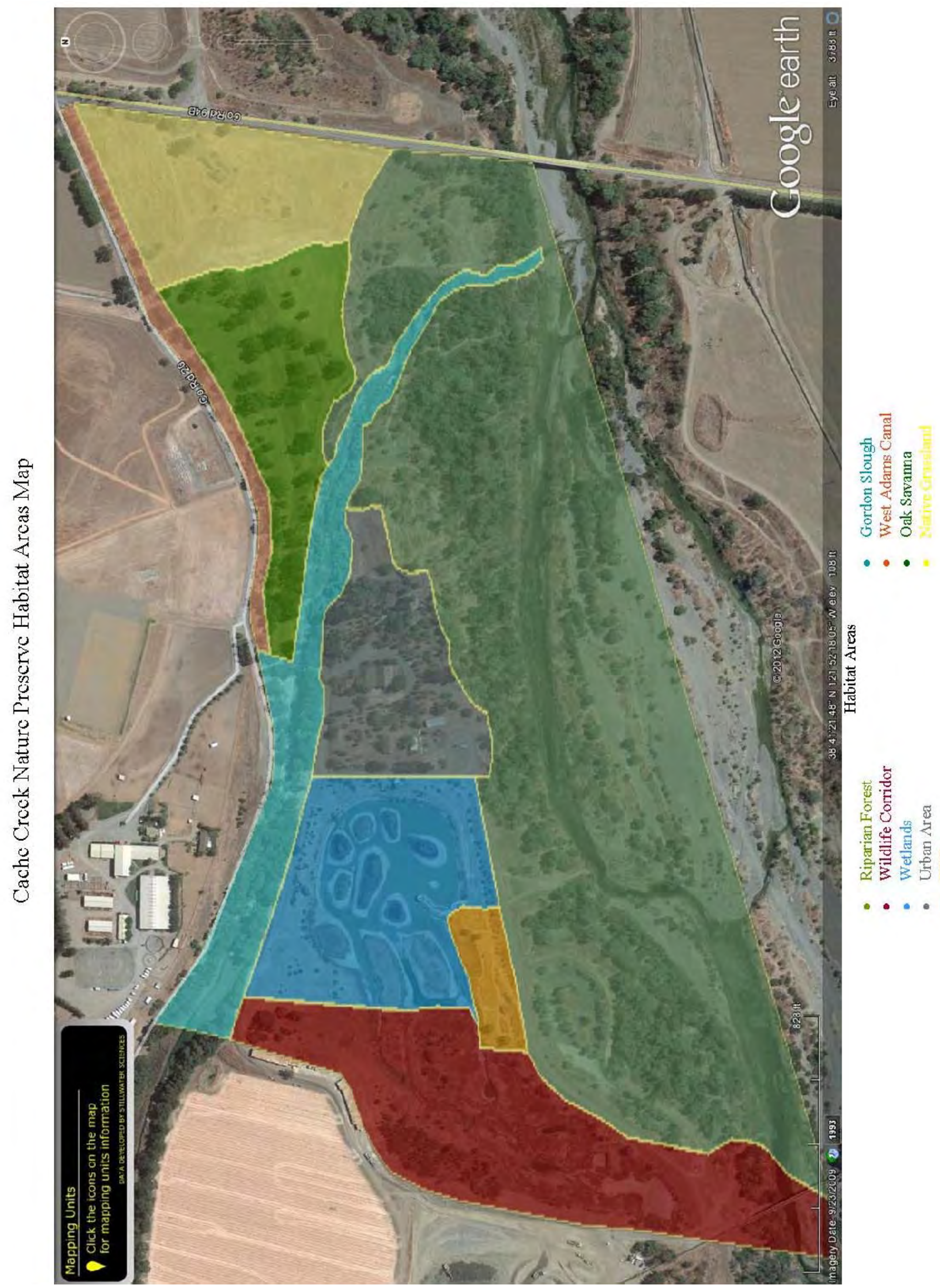
Urban Area Fire Management Area—Mow and Weedeat all open areas, around buildings and trees

Heritage Oak Fire Management Area—Mow and Weedeat around the base of all large oak trees

Fire Break—Mow path along edges of grassed areas

CCNP Aerial Photograph – Current Google Earth View as of 5/29/2013

CCNP Habitat Areas Map



CCNP Soils Map

Soils:
The soils on the preserve vary from gravelly to high clay to silt loam. The preserve’s four soil types were identified in the June 1972 Soil Survey of Yolo County, California issue. The soils are listed north to south and generally parallel the creek.

ctD2: Corning gravelly loam, 2 to 15% slopes, eroded; (southern tip of Dunnigan Hills) thin strip parallels south of County Road 20
Ya: Yolo silt loam, alluvial soils at less than 1% slope; upland portion of oak woodlands
Lm: Loamy alluvial land; highly variable varying from sand to silt loam from 24 to 40 inches deep underlain by sand and gravel, 0-2% slope, supports willows, cottonwoods and grasses; parallels creek bed supports western riparian forest, urban area to oak woodland
Rh: Riverwash; creek bed gravelly and cobbly, rapid permeability.

California Natural Diversity Database Rare Species List from Woodland and Madison Quads

QUADNAME	SCINAME	COMNAME	FEDSTATUS	CALSTATUS	DFGSTATUS
Madison	*Nycticorax nycticorax*	black-crowned night heron	None	None	
Both	*Buteo swainsoni*	Swainson's hawk	None	Threatened	
Madison	*Charadrius montanus*	mountain plover	None	None	SSC
Madison	*Athene cunicularia*	burrowing owl	None	None	SSC
Madison	*Riparia riparia*	bank swallow	None	Threatened	
Madison	*Agelaius tricolor*	tricolored blackbird	None	None	SSC
Woodland	*Lasionycteris noctivagans*	silver-haired bat	None	None	
QUADNAME	SCINAME	COMNAME	FEDSTATUS	CALSTATUS	DFGSTATUS
Woodland	*Lasiurus cinereus*	hoary bat	None	None	
Woodland	*Antrozous pallidus*	pallid bat	None	None	SSC
Woodland	*Taxidea taxus*	American badger	None	None	SSC
Woodland	*Valley Oak Woodland*	Valley Oak Woodland	None	None	
Woodland	*Desmocerus californicus dimorphus*	Valley elderberry longhorn beetle	Threatened	None	

CCNP Visitor Protocols

CACHE CREEK CONSERVANCY
JAN T. LOWREY CACHE CREEK NATURE PRESERVE

We want our visitors to enjoy their time at the Nature Preserve. We ask that you follow these guidelines for your safety and for the safety and protection of the habitat.

Please stay on the trails
No smoking and no fires allowed on the grounds
No dogs or horses allowed
No firearms on the premises
No recreational games such as paintball games, air guns, etc.
No fishing, swimming or boating in the wetlands
No feeding of any animals by the public
No OHV’s, bicycles, motorcycles, etc. outside of the parking lot
No overnight camping
No gathering of any materials without prior approval (seeds, cuttings, wood, etc.)
Special functions by outside groups or individuals must be approved by the executive director
The grounds and buildings are not available for rental purposes

Cache Creek Resources Management Plan Biological Resources Standards

4.5-13 The following guidelines shall be followed when developing wetland habitat areas:

(a) Limit dense stands of aquatic vegetation in shallow areas to lower mosquito harborage and enhance wave action. This will also serve as substrate for mosquito predators.
(b) The banks of areas that retain water after June 1 (the beginning of the optimal mosquito breeding season) shall be steep enough to prevent isolated pooling as the water level recedes, to allow for wave action and to provide access by mosquito predators. Shorelines shall be configured so as not to isolate small channels or shallow ponding areas from the main body of water, to provide continuous access by predators, especially mosquito fish.
(c) Seasonal marshes shall be designed to have at least four months of soil saturation or shallow inundation. Water depths shall not exceed two (2) feet of water.
(d) Marsh species shall be planted every six (6) feet, using plugs salvaged from marshes in the immediate vicinity or obtained from a nursery. Transplanting shall take place within twelve (12) hours after salvage and the root masses shall be kept continuously inundated from the time of transplanting.
(e) Wetland areas shall cover a minimum of one (1) acre. Side slopes shall be no steeper than 3:1 (horizontal:vertical). Small islands and complex shorelines shall be provided to create a diverse environment. Wetland designs shall include provisions for the wetlands to be partially drained periodically, in order to allow for the reseeding of aquatic plants and to promote the decay of built up organic debris.
(f) Pit bottoms should be recontoured to create areas for waterfowl nesting and depressions to provide a more permanent water feature. Islands should generally be located on the upwind side of the water body to minimize exposure to the prevailing winds. Island slops above the water level should be no steeper than 2:1 (horizontal:vertical). Emergent vegetation shall be placed around the edges of islands to reduce wave-related erosion. Shrubs shall be widely spaced. Trees and tall shrubs shall not be planted on the islands, since predators perch in them to prey on waterfowl.
(g) Appropriate species and densities for marsh restoration may include the following:

Species (common name) Density (plugs per acre)

Creeping spikerush 200
Baltic rush 100
Tule 100
Bulrush 100
Three-square 10
Beaked sedge 5
Scouring rush 5
Buttonbush 5

4.5-14 The following guidelines shall be followed when developing riparian woodland habitat areas:

(a) Riparian woodland shall be established only where there are coarse slopes containing soil types such as cobbly loam, gravelly loam, or other loamy textures. Where slopes contain significant clay layers, open woodland s or grasslands shall be restored instead.

(b) Trees and shrubs shall be planted in clusters to create alternate patterns of open and enclosed spaces.
(c) Appropriate species and densities for riparian woodland restoration may include the following:
Species (common name) Density (number or pounds/acre)

Wild rose 36
Valley oak 33
Fremont cottonwood 26
Black willow 23
Red willow 23
Arroyo willow 23
Sandbar willow 23
Goodings willow 23
Native blackberry 19
Box elder 18
Wild grape 16
Dogwood 16
Oregon ash 16
Western sycamore 16
Blue elderberry 12
Mugwort 10
Mule fat 6
Creeping wildrye 16 pounds

4.5-15 The following guidelines shall be followed when developing oak woodland habitat areas:

(a) Trees and shrubs shall be planted in clusters of six (6) to seven (7) individuals, typically consisting of a single species. Some mixed groupings, such as valley oak and elderberry may occur where appropriate. Gray pine, however, shall be planted singly (not in clusters) at the higher elevations of the site. Clusters of trees and shrubs shall be planted from twenty-five (25) to fifty (50) feet apart, with native grasses in-between.
(b) Appropriate species and densities for oak woodland restoration may include the following:

Species (common name) Density (number or pounds/acre)

Valley oak 20
Wild rose 15
Blue elderberry 10
Coyote bush 10
Toyon 10
Redbud 10
Coffeeberry 10
Native blackberry 8
Interior live oak 6
California buckeye 5
Gray pine 3
Creeping wildrye 16 pounds, California barley 5 pounds, California brome 10 pounds
Pina bluegrass 5 pounds, Purple needlegrass 5 pounds