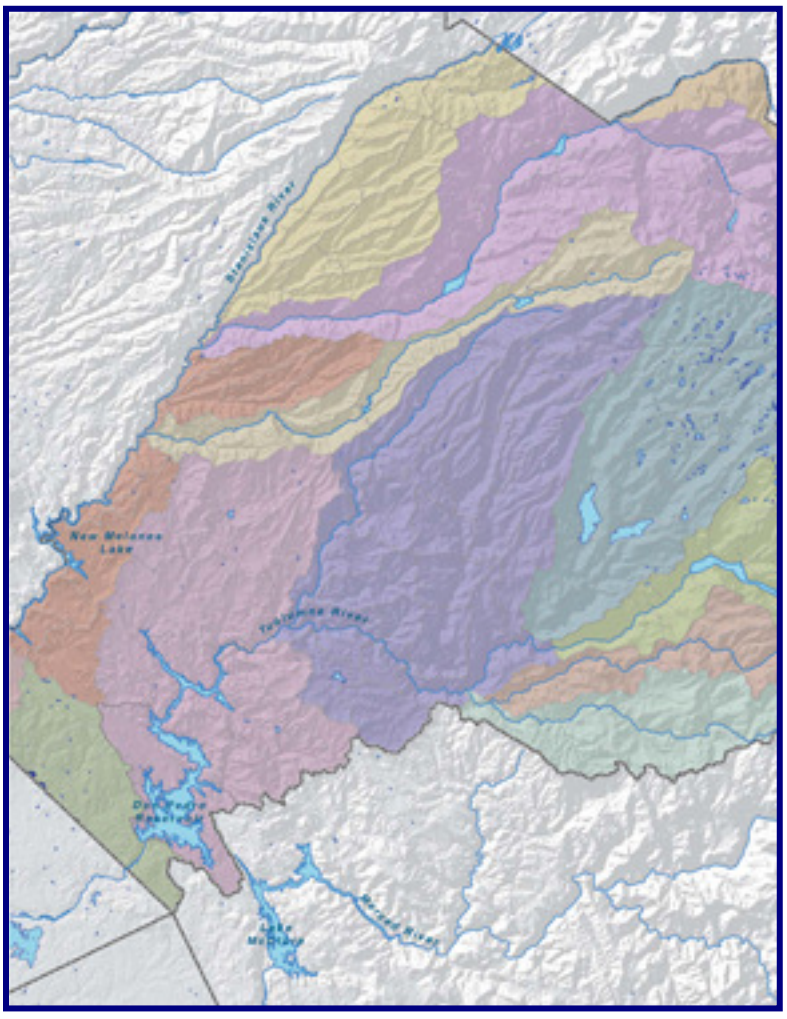
Final Report

Tuolumne County

Water Quality Plan



March 26, 2007

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Appendices

Executive Summary

The Tuolumne County Water Quality Plan Project (Project) was identified as a need by County staff to address storm water runoff and nonpoint source pollution impacts on water quality within Tuolumne County's watersheds. The Tuolumne County Board of Supervisors adopted the Water Resources Section of the Conservation and Open Space Element (4.L) of the Tuolumne County General Plan in 1996 and amended the Chapter in 1998, with the goal of protecting water quality in the County from cumulative impacts to water quality. Urban development projects, grading, failing septic systems, marina operations, mine site runoff, certain agricultural and forestry practices, and public works projects all have cumulative effects on water quality in Tuolumne County. A Water Quality Plan (WQP), with conditions or mitigating measures, best management practices, and monitoring programs was developed as part of this Project as a first step in addressing cumulative impacts to water quality.

A fundamental goal of this Project was to support CALFED drinking water quality objectives by assessing source water quality within the County and developing a planning framework that responds to the assessed conditions. In addition, to meet CALFED's and the County's objectives for local stakeholder involvement, the County conducted extensive outreach through mailing, public notices, and public presentations.
Funding allocated from 2000 Water Bond requires that Projects include a broad-based non-point source component; capable of sustaining water quality benefits for a period of 20 years. In response to this requirement, the WQP was developed to not only implement best management practices, but to include a program to monitor their effectiveness over the next 20-years. The WQP incorporates a two-pronged approach to controlling non-point sources of pollution though a broad-based regulatory and watershed stewardship program that incorporate the six program elements of the U.S. Environmental Protection Agency's (USEPA) Phase II National Pollution Discharge Elimination System (NPDES) Program. The adoption of the WQP must be viewed as a first step to a more focused implementation program. Although several new programs were adopted, their subsequent implementation will be contingent on new funding sources. In addition, without a stable funding source, the implementation of the WQP and associated improvement projects will ultimately be grant driven. In this context, the County's continued active pursuit of grant funding will be critical to the success of the WQP and achieving longer-term goals in the Project Assessment and Evaluation Plan (PAEP).

SECTION 1

PROBLEM STATEMENT & RELEVANT ISSUES

Similar to many foothill watersheds within the Sierra Nevada, little information in terms of hydrology and surface water quality is available for smaller hydrologic areas that drain into the larger, well-known river systems, including the Tuolumne and Stanislaus Rivers. By virtue of the fact that water supply, hydroelectric, timber, and recreational interests are more prevalent in the upper reaches of the these two watersheds, much of the hydrologic and water quality information available from these watersheds is limited to these areas. More recently, with growth in the Central Valley spilling into foothill communities to the east, including those within the County, the cumulative effects to water resources is manifested in various forms, such as algal blooms, high turbidity, odors, and, in some instances, levels of bacteria that are unsafe for water-contact recreation. This trend has prompted the need for a better understanding of foothill watershed dynamics and how continued urbanization will affect the structure and functionality of foothill watersheds in addition to corresponding implications to surface water quality within the larger hydrologic unit.

Alternations to the County's hydrology and water chemistry are a consequence of the region's unique history, which has occurred on at least four fronts. First, the area was part of the gold mining industry of the region, which at the time used invasive techniques to mine gold (i.e., placer, hydraulic, sluice and dredging). Logging, which began around the turn of the 20th century and agriculture and ranching (beginning around the 1920s) led to the development of an extensive roadway and rail system, much of which exists today and forms the base of the expanded road network. With a corresponding increase in state-wide water demand following the 1940s, both watersheds have been tapped by regional water interests, resulting in an extensive network of water diversion canals, dam impoundments, and pipelines, which have significantly altered natural hydrology at a basin-wide scale. Finally, continuing build out of urban and rural forms of development within the foothill region has further altered natural drainage patterns and contributed various forms of non point source of pollutants to local waterways.

Based on these circumstances, the County determined that a baseline investigation is warranted to provide initial insight as to how various land use activities occurring within its jurisdiction affect watershed function. Just as important is the need to develop a planning framework that is able to respond to existing and future quality regulations as they are applied in the County based on the conditions present. Given that the County could spend an enormous amount of time and money studying all the various watershed components, it became clear that it was necessary to identify and prioritize a few characteristics that are critical to evaluating relative watershed health. For this Project, the watershed component of interest is surface water quality and those factors influencing it.

SECTION 2

PROJECT GOALS

The primary goal of this Project is to support the CALFED drinking water quality objectives by assessing source water quality within the County and developing a planning framework that responds to the assessed conditions. In this context, the Project is comprised of several components designed to develop a better understanding of water quality conditions within the foothill region of Tuolumne County and prepare a planning document that responds to those conditions. The specific project objectives are as follows:

1. Identify a primary study area (PSA) and characterize current water quality conditions within associated waterways in terms of cumulative loadings by identifying the level of monitoring necessary to assess the level of impacts from non-point sources and where should sampling occur;

2. Identify the various factors and processes limiting the quality of local surface waters, in general, and, more importantly, identify those portions of the PSA that are most impacted;

3. Attempt to answer the question of whether foothill portions of the two watersheds are experiencing accelerated erosion and sedimentation;

4. Develop a Water Quality Plan (WQP) that identifies best management practices (BMPs) that minimize or avoid the discharge of water quality pollutants identified and a way to evaluate their effectiveness, consistent with CALFED and SWRCB objectives;

5. Maximize community involvement and education during the process;

6. Prioritize sub-watershed areas in terms of potential water quality risks to enable for the cost-effective allocation of limited funding for water quality improvement projects; and

7. Revise codes, land use designations, and management practices used by the County as necessary to minimize cumulative impacts from non-point sources of pollution.

In the context of the above-identified goals, the Project includes both investigative and responsive components, whereby the WQP as the Project cornerstone, responds to the resource-specific investigations conducted as part of component of the Project. The subsequent section describes these Project components.

SECTION 3
PROJECT DESCRIPTION

This Project was identified and proposed in response to the need to acquire baseline water quality data for watershed tributaries within the County's jurisdiction that are most impacted by urban and rural development and historic resource management activities (e.g. timber harvesting). The Tuolumne County Board of Supervisors (Board) authorized the financial commitment and inter-departmental cooperation for the Project by Resolution 8-02, adopted on January 22, 2002, to support CALFED's objective for long-range management. The California State Water Resources Control Board (SWRCB) and CALFED provided funding for this Project through a Proposition 13 grant (Agreement No. 39 - Costa-Machado Water Act of 20001). Funding allocated from the 2000 Water Bond requires that projects include a broad-based NPS component; capable of sustaining water quality benefits for a period of 20 years. Appendix 1 identifies the final allocation of funding for the project.

To achieve these objectives, the County hired a professional consultant, Environmental Science Associates, to prepare a Foothill Watershed Assessment (Assessment) and a supporting water quality monitoring and reporting plan (MRP) to obtain baseline water quality data for local watersheds. To determine the appropriate scales of analysis, geographic information systems (GIS) was used to complete a jurisdictional overlay to eliminate watershed areas outside the County's jurisdiction. Five planning watershed areas were identified based on watershed units delineated in the 1999 California Interagency Watershed Map (CalWater Version 2.2.1) for the reconnaissance-level scale of the Assessment and MRP. These include the Sullivan Creek, Woods Creek, North Don Pedro, and Big Creek watersheds, which are located along the foothill margin of the County.

Prior to the preparation of the Assessment and WQP and in order to support CALFED's objective for a scientific basis for water quality determinations, the County submitted a Quality Assurance Project Plan (QAPP) to the SWRCB and CALFED consistent with State watershed goals. The MRP and QAPP were prepared in accordance with USEPA requirements for QAPPs developed for Environmental Data Operations and were approved by the Central Valley Regional Water Quality Control Board's (CVRWQCB) Quality Assurance Officer prior to the implementation of baseline monitoring activities in support of the Assessment. Additionally, the QAPP and MRP were prepared under the oversight of a Water Quality Committee (WQC), which consists of County staff from individual departments and representation from the University of California (UC) Cooperative Extension.

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[1] In March 2000, California voters approved Proposition 13, the Costa-Machado Water Act of 2000 (2000 Water Bond), authorizing the state to sell $1.97 billion in general obligation bonds to support safe drinking water, flood protection, and water reliability projects throughout the State.

The Assessment report provides a synthesis of the findings of ESA's reconnaissance-level field investigations, historic research and literature review, geomorphic assessment and sediment transport study, and the acquired monitoring data. Monitoring data collected in support of the Assessment included pH, total suspended solids (TSS), specific conductance, oil and grease, temperature, hardness, priority pollutant metals , turbidity, and nitrate + nitrite as N, EPA 8151A herbicides, EPA 8260B volatile organics, and total and fecal coliform bacteria. In addition water quality monitoring, ESA developed a coarse sediment budget to broadly quantify the volume and extent of hillslope and streamside erosion and rate of sediment delivery occurring in the Sullivan Creek watershed. This information was then used in estimating the controllable or preventable proportion of sediment delivery from erosion. Based on ESA's principle findings and with use of GIS, the Assessment includes a ranking or prioritization of smaller watershed catchments within the County's jurisdiction based on identified risks.

The WQP was developed to respond to those identified risks through a combination of new regulatory and non-regulatory programs. The regulatory component of the WQP builds upon many existing environmental programs and activities implemented by various County departments and focuses on land development activities subject to the County's permitting requirements and on County public works projects. The non-regulatory stewardship component of the WQP encourages voluntary community participation in maintaining and improving the County's water quality. The WQP was prepared to address the six program elements of the U.S. Environmental Protection Agency's (USEPA) Phase II National Pollution Discharge Elimination System (NPDES) Program, which includes the following:

- Illicit Discharge Detection and Elimination
- Construction and Post-Construction Activities
- New Development and Planning
- County Operations
- Public Outreach and Education; and
- Community Involvement and County Stewardship Priorities

Below is a summary of specific task deliverables completed in conjunction with the WQP Project:

Task 3.1	**Quality Assurance Project Plan**
Task 3.2	**Monitoring Plan**
Task 4.1	**Project Assessments and Evaluation Plan**
Task 5.3	**Priority List and Map of Sampling Sites**
Task 5.5 & 5.6	**Draft and Final Watershed Baseline Assessment Report** incorporating findings of Geomorphic Assessment and Sediment Transport Study and including Appendix with Draft Hillslope and Channel Geomorphic Units and Sediment Delivery Calculations
Task 6.4 & 6.7	**Draft and Final Water Quality Plan**
Task 7.1	**Technical Memorandum for Proposed Draft of County Ordinance Code Changes**
Task 8.2	**Phase 1 Monitoring Results Report**
Task 9.2 & 9.3	**Draft and Final Project Report**

SECTION 4
PUBLIC OUTREACH

To meet CALFED's and the County's objectives for local stakeholder involvement, the County sent mailings out to all 50,000 plus residents within the County in addition to 98 regulatory agencies, local agencies, and organizations notifying them of the Project. Public notices were also published in the Union Democrat and announced on the radio to encourage all stakeholders to participate in public meetings during the Project. Prior to the preparation of the MRP, three public scoping sessions were held in early to mid-2005 to solicit public and agency input on current water quality problems within the County, their spatial occurrence, and the constituents observed to be a concern (e.g., sediment). Information obtained during these meetings was then used to identify the seven monitoring locations sampled during Phase 1 of the MRP.
Following the completion of Phase 1 of the MRP, the analytical results and initial findings of the Assessment were shared with interested members of the community at three additional public information meetings in early 2006. At the same time, the County has been actively soliciting community members to participate in its citizen water quality monitoring program in order to implement Phase 2 of the MRP.

In addition to these activities, the County recently circulated a public informational survey through several different venues (e.g., Home & Garden Shows, schools, etc.) to seek further input from the community regarding the County's water resources. The survey sought input regarding the current conditions of the County surface water resources, significant threats to water quality, strategies for protecting and improving water quality, and ways to encourage public participation. Based on the results of the survey, 65 percent of those who participated thought that water quality will get worse in the future. Over half of those who participated thought that the most significant threats to water quality were from stormwater runoff from urban uses, septic systems, contaminated sites, and soil erosion. In responding to these threats, those surveyed (75 percent) overwhelmingly indicated that a mix of voluntary and mandatory approaches were necessary to improve water quality. For those surveyed, the most popular strategies for protecting water quality included improving educational opportunities, increasing enforcement actions, expanding the implementation of BMPs, reducing the application of chemicals, and improving water quality monitoring.

Citizen groups, organizations, and individuals representing the Master Gardner's, Columbia Community College, local high schools, the California Native Plant Society, Phoenix Lake Golf Course and Phoenix Lake County Club Estates Homeowners Association already have volunteered to assist in the WQP's citizen water quality monitoring program. Citizen monitoring was initiated in December 2006.

Programs aimed at increasing public education and participation throughout the County are identified and described in Chapter 4, Community and Voluntary Watershed Stewardship Programs of the WQP. Public information related to the implementation of the Project will be distributed through the following media sources:

- The water quality link(s) on the County's website are provided at the following address: http://portal.co.tuolumne.ca.us/psp/ps/TUP_PUBLIC_WORKS/ENTP/c/TU_DEPT_MENU.TUOCM_HTML_COMP.GBL?action=U&CONTENT_PNM=EMPLOYEE&CATGID=1359;
- Local newspapers;
- Contacts with local civic organizations;
- Local radio stations;
- Participation at County events (e.g., Home and Garden Show); and
- Other mechanisms, as appropriate.

SECTION 5
PROJECT CONCLUSIONS

Consistent with the overall objective of the Project, the County Board of Supervisors (Board) adopted the Final Water Quality Plan on February 13, 2007 to establish a watershed-based planning framework as directed by Policy 4.L.a of the County's General Plan. This planning framework includes several programs, preferred best management practices, and planning priorities intended to improve the quality of the County's water resources over the 20-year planning horizon. In several instances, the County already implements several of these programs, e. g. solid waste diversion programs, contractor notifications, etc., of which the WQP simply identifies these programs' roles within the overall planning framework. Many others programs outlined in the regulatory and non-regulatory components of the WQP are new and, in many instances, their implementation is anticipated to be constrained by an absence of funding.

The principal findings of the Foothill Watershed Assessment suggest that the County focus on addressing three principal non-point sources of water pollution. These principal non-point sources of water pollution water quality concerns include (1) pathogens and nutrients, (2) urban contaminants (e.g. leaking USTs, disposal practices, pH uncertainties, etc.), and (3) erosion and sedimentation. The Foothill Watershed Assessment identifies a series of recommendations in responses to these findings, many of which are carried forward in the WQP. One of the primary recommendations carried forward is the concept of watershed scale planning through the systematic prioritization of smaller watershed catchments within the Primary Study Area (PSA).

Funding allocated from 2000 Water Bond requires that Projects include a broad-based non-point source component; capable of sustaining water quality benefits for a period of 20 years. In response to this requirement, the WQP was developed to not only implement best management practices, but to include a program to monitor their effectiveness over the next 20-years. The WQP incorporates a two-pronged approach to controlling non-point sources of pollution though a broad-based regulatory and watershed stewardship program that incorporate the six program elements of the U.S. Environmental Protection Agency's (USEPA) Phase II National Pollution Discharge Elimination System (NPDES) Program.

From an overall perspective, the Project was a success in improving long-term water quality. However, the adoption of the WQP must be viewed as a first step to a more focused implementation program. Several subsequent actions will occur as a direct result immediately following the WQP's adoption while others will be contingent on new funding sources. For example, the WQP directs the County to adopt revisions to Titles 11 and 12 of the Tuolumne County Ordinance Code (TCOC) by the end of 2007 and evaluate the adoption of a Stormwater Control Ordinance. The initial ordinance updates will require grading permit for Projects that disturb greater than 50 cubic yards, increased the minimum

storm drain pipe diameter to 18 inches, and prescribe a greater variety of erosion/sediment control methods. In addition, Project resulted in the formation of a citizen monitoring group, which is actively implementing Phase 2 of the MRP; a non-regulatory component of the WQP. Citizen monitoring will continue though 2009, at minimum, and will utilize field sampling equipment purchased with Project funding.

With the Project successes also comes several disappointments. Although several new programs were adopted many were not and some of those that were are contingent on new, unidentified sources of funding. Without local political support for some of the recommended programs, a comprehensive framework still does not exist. For example, by virtue of the importance of riparian systems and their ability to filter and assimilate non-point source pollutants prior to reaching local waterways, the rejection of the Riparian Overlay General Plan Designation by the Board, which was proposed in the Draft WQP, is disappointing. In addition, without a stable funding source, the implementation of the WQP and associated improvement projects will ultimately be grant driven. This situation is problematic, in that it creates an inconsistent and disconnected implementation process, due to an inability to efficiently allocate staff time to identify, prioritize, and budget potential water quality improvement projects.

An initial evaluation of the Project's progress to date in relation to the measurable goals outlined in the Project Assessment and Evaluation Plan (PAEP) is provided in Appendix 2. The Project's main component or deliverable, the WQP, will be implemented over the 20-year planning horizon and will periodically continue to evaluate the WQP's success at meeting or exceeding the measurable goals identified in the PAEP. New goals will be set for implementation project, but will to the extent feasible, attempt to address those goals un-met by the current Project.

Moving forward, based on the expansive geographic area under consideration as part of this Project (e. g. + 229 square mile PSA) in conjunction with limits on available funding and staff time to acquire baseline information, the prioritization of watershed individual catchments will be critical. In addition, the continued of acquisition of water quality data will be critical in helping to facilitate this prioritization process in light of limited existing baseline data, which is restricted to less than one year of field inventory (note: existing baseline data is contained in Appendix B of the Final Foothill Watershed Assessment). Field data acquisition under Phase 2 of the MRP is currently limited in scope to general field parameters including flow, specific conductance, temperature, and turbidity. As a consequence, trends in other constituents (e.g., heavy metals) will be difficult to assess over the long-term without additional funding to enable expanded analytical and, if necessary, toxicity or benthic macro-invertebrate testing. Based on these circumstances, the continued active pursuit of grant funding will be critical to the success of the WQP and achieving long-term goals prescribed in the PAEP.

Appendix 1: Funding Summary: Tuolumne County Water Quality Plan SWRCB Grant Agreement No. 03-240-555-1

Grant Funds

Invoice #	Project Admin	CEQA	QAPP/MRP	PAEP	Baseline	WQP	Code	Citizen Monitors	Project Reports	Total
1	3,727.97	0	3,190.38	1,955.39	20,783.33	0	0	0	0	29,657.07
2	4,320.38	0	1,709.62	44.61	4,488.05	5,268.46	0	0	0	15,831.12
3	597.09	0	0	0	27,303.06	146.78	0	5,229.88	0	33,276.81
4	1,749.56	0	0	0	20,813.53	342.70	0	0	0	22,905.79
5	0	0	0	0	24,512.03	16,152.00	0	0	0	40,664.03
6	0	0	0	0	0	18,315.35	1,345.65	3,915.76	0.00	23,576.76
7	0	0	0	0	0	1,936.30	566.50	0	0	2,502.80
8	0	0	0	0	0	5761.04	981.08	2454.36	2722.39	11,918.87
9	0	0	0	0	0	177.37	1206.77	0	1,277.61	2,661.75
Total	10,395	0	4,900	2,000	97,900	48,100	4,100	11,600	4,000	182,995

Match Funds

Invoice #	Project Admin	CEQA	QAPP/MRP	PAEP	Baseline	WQP	Code	Citizen Monitors	Project Reports	Total
1	10,552.00	0	0	0	0	2,473.41	0	0	0	13,025.41
2	0	0	615.02	1,847.00	0	0	0	985.00	0	3,447.02
3	0	0	484.98	0	0	0	0	4,152.52	0	4,637.50
4	0	0	0	0	0	273.95	0	0	0	273.95
5	0	0	0	0	0	3,148.56	0	1,565.33	0	4,713.89
6	0	0	0	0	2,000.00	3,057.10	0	0	0	5,057.10
7	0	0	0	0	0	758.32	1,548.16	0	0	2,306.48
8	0	0	0	0	0	4,088.66	2,681.69	0	0	6770.35
9	0	0	0	0	0	5.00	2,420.15	1,557.24/a/	2000.00	5982.39
Total	10,552	0	1100	1,847	2,000	13,805	6,650	8,260.09	2000	46,214.09

/a/Overmatch for citizen monitors: 1,557.24 (+ additional equipment)

Appendix 2 – Project Assessment and Evaluation Plan

Table 1: Evaluation of Desired Outcomes of Calfed Watershed Program Performance Indicators Applicable to the Tuolumne County Water Quality Plan

Calfed Indicator and Metric	Tuolumne County WQP Objective	Tuolumne County WQP Desired Outcome and Metric (& Comments)	Initial Performance Evaluation for January 2007
Indicator = Agency and other organization participation in Program Plan implementation Metric = Increase/decrease in number of active partnerships working to execute the Program Implementation Plan	Involve general public in partnership with county to improve water quality Improve coordination and assistance between County and local water agencies (e.g., Tuolumne Utilities District, Groveland Community Services District)	Involve general public in partnership with county through implementation of citizen water quality monitoring program Metric: Involve up to 12 citizen monitors in monitoring program and retain at least 6 monitors through at least 2009 Encourage exchange of water quality data between County and local water agencies and coordinate ongoing water quality monitoring activities to better understand water quality issues applicable to Tuolumne County Metric: Collect water quality information from the Tuolumne Utilities District/Groveland Community Services District on an annual basis (if available) through (at least) 2009	8 citizen monitors have been trained for phase two monitoring activities initiated at approximately 22 sampling locations. Monthly monitoring activities commenced in December, 2006. Source Water Quality Assessments were reviewed as part of the Assessment Report. TUD is now cooperating in the collection of Phase 2 monitoring data.
Indicator = County planning efforts that improve watershed health Metric = Number of County General Plans that significantly address watershed health	Identify best management practices applicable to new development that may reduce impacts to water quality	Amend the Tuolumne County Ordinance Code to include updated and improved best management practices aimed at reducing impacts to water quality of new development thereby improving watershed health Metric: Adopt up to four new best	Amendments to Titles 11 and 12 are being presented to the Board in February 2007 and slated for adoption by the end of 2007. The County is in the process of finalizing

Table 1: Evaluation of Desired Outcomes of Calfed Watershed Program Performance Indicators Applicable to the Tuolumne County Water Quality Plan			
Calfed Indicator and Metric	**Tuolumne County WQP Objective**	**Tuolumne County WQP Desired Outcome and Metric (& Comments)**	**Initial Performance Evaluation for January 2007**
		management practices and amend at least two sections of the Tuolumne County Ordinance Code (related to water quality)	amendments to its Grading Ordinance (Title 12). Appendix A of the Water Quality Plan includes over 20 County-recommended BMPs.
Indicator = Increased inter-agency partnerships in local watershed management Metric = Number of new projects that involve multiple agency participation	Involve other agencies in a partnership for ongoing watershed management projects	Establish a partnership with the University of California Cooperative Extension and/or Tuolumne County Resources Conservation District (if formed) to oversee a citizen water quality monitoring program. Metric: Adoption of the Citizen Water Quality Monitoring Program by the Tuolumne County Resource Conservation District by December, 2006 with ongoing oversight through at least 2009	Citizen water quality monitoring group actively collecting samples as of December 2006 within an expanded monitoring network.
Indicator = Presence and currency of an accurate tracking model and monitoring plan to inform Program management decisions Metric = Completeness of data deemed necessary to make effective Program management decisions	Adopt current and accurate protocols for monitoring water quality to evaluate success of the WQP through ongoing data collection.	Adopt monitoring protocols for both a Phase 1 baseline water quality assessment. Adopt monitoring protocols for a Phase II citizen water quality monitoring program including methods for adaptive management in response to data trends collected over time (e.g., refining the Tuolumne County Ordinance Code to improve sediment control if turbidity readings continue to increase and can reasonably be linked to activities permitted by Tuolumne County). Implement adaptive management strategies where data indicates program failures (see preceding paragraph)	

Table 1: Evaluation of Desired Outcomes of Calfed Watershed Program Performance Indicators Applicable to the Tuolumne County Water Quality Plan			
Calfed Indicator and Metric	**Tuolumne County WQP Objective**	**Tuolumne County WQP Desired Outcome and Metric (& Comments)**	**Initial Performance Evaluation for January 2007**
		Metric: Implementation of the Phase I MRP by Spring, 2006 and Ongoing implementation of Phase II of the MRP (Citizen Monitoring) through at least 2009 in accordance with protocols adopted in the approved QAPP and MRP NOTE: The project QAPP and MRP provide additional detail relative to the presence, currency and accuracy of the monitoring program. In addition, the county anticipates involvement of the State Water Resources Control Board Clean Water Team Citizen Monitoring Program to provide at least one training session in support of current monitoring protocols.	Implementation of the Phase I MRP finished January 2006. Ongoing implementation of Phase II of the MRP (Citizen Monitoring) through at least 2009 can not be verified until such time. Implementation is currently occurring with more than 8 active members.
Indicator = Watersheds with active watershed management efforts Metric = Percent of Solution Area with active watershed management efforts.	Adopt and implement a plan for reducing the impacts of new development on water quality on private land under the regulatory jurisdiction of Tuolumne County.	Track pollutant removal efficiency of best management practices for specific forms of development following development of the WQP and correlate improvements to surface water quality. Metric: Commence implementing best management practices (via implementation of an amended Tuolumne County Ordinance Code) by January, 2007 and ongoing thereafter. Goal: Implement or condition new	Water Quality Plan adopted February 2007 with prescribed BMPs, construction checklist, and evaluation program.

Table 1: Evaluation of Desired Outcomes of Calfed Watershed Program Performance Indicators Applicable to the Tuolumne County Water Quality Plan			
Calfed Indicator and Metric	**Tuolumne County WQP Objective**	**Tuolumne County WQP Desired Outcome and Metric (& Comments)**	**Initial Performance Evaluation for January 2007**
		projects to require implementation of, at minimum, 2 newly adopted best management practices and track their effectiveness for new development projects by December, 2008	Unable to confirm this goal by the conclusion of the Project reporting period. However, ordinance revisions are in draft form and being presented to the Board for consideration.
Indicator = Wide use of compatible and comparable monitoring methods and metrics Metric = Percent of monitoring data generated from Program supported projects that is useful when complied at a regional an/or state level	Adopt monitoring protocols compatible and comparable to state-wide monitoring methods and metrics	Implement monitoring protocols compatible and comparable to state-wide monitoring methods and metrics to improve relevancy of data collected and allow for successful implementation of similar programs in other jurisdictions Metric: Implementation of the Phase I MRP by Spring, 2006 and Ongoing implementation of Phase II of the MRP (Citizen Monitoring) through at least 2009 in accordance with protocols adopted in the approved QAPP and MRP	Unable to confirm this metric by the conclusion of the Project reporting period. However, current levels of participation are favorable for achieving this goal.
Indicator = Accurate and effective Program adjustments based on monitoring information Metric = Improvement in overall performance assessment resulting from Program adjustments	Provide a method for adjusting or improving best management practices applicable to new development should ongoing monitoring indicate that existing practices are ineffective	Adopt adaptive management strategies (e.g., identifying additional or alternative best management practices to be adopted and applied to new development pursuant to the Tuolumne County Ordinance Code should monitoring data indicate that existing practices are ineffective) Metric: Identify and adopt (including refining, deleting or adding) at least 2 changes to best management practices adopted	Unable to confirm this goal by the conclusion of the Project reporting period.

Table 1: Evaluation of Desired Outcomes of Calfed Watershed Program Performance Indicators Applicable to the Tuolumne County Water Quality Plan			
Calfed Indicator and Metric	**Tuolumne County WQP Objective**	**Tuolumne County WQP Desired Outcome and Metric (& Comments)**	**Initial Performance Evaluation for January 2007**
		pursuant to the Tuolumne County Ordinance Code relative to water quality and/or refine at least 1 parameter (or the mechanism or protocol for measuring the parameters) pursuant to the Phase II Monitoring Plan by December, 2010	
Indicator = Level of awareness of general public of presence, purpose and progress of the CALFED Bay-Delta Watershed Program Metric = Percent of general public with medium to high knowledge of the Watershed Program	Encourage public participation in the program and raise awareness for watershed health	Establishment of an ongoing citizen monitoring program Metric: Involve up to 12 citizen monitors in a water quality monitoring program to commence in Spring, 2006 and ongoing thereafter with oversight from the Tuolumne County Resource Conservation District (through at least 2009). Goal: To retain at least 6 citizen monitors through 2009	Current levels of participation meet this goal. Unable to confirm participation through 2009 due to the conclusion of the Project reporting period.
Indicator = Increase in the scope of active participation in implementing the Watershed Program Plan Metric = Number of proposals received in response to Program Solicitations for Proposals	Ongoing water quality monitoring and improvement program	Future proposals to continue and expand water quality monitoring and the implementation of best management practices as a model for other counties Metric: Submit at least one proposal to Calfed (or equivalent source) in support of a continued water quality monitoring program by 2009 (if available funding through the program exists). Alternatively, provide up to two other jurisdictions with the county's WQP	Unable to confirm this goal by the conclusion of the Project reporting period.

Table 1: Evaluation of Desired Outcomes of Calfed Watershed Program Performance Indicators Applicable to the Tuolumne County Water Quality Plan			
Calfed Indicator and Metric	**Tuolumne County WQP Objective**	**Tuolumne County WQP Desired Outcome and Metric (& Comments)**	**Initial Performance Evaluation for January 2007**
		to be used as a model for those jurisdictions	
Indicator = Quality and pertinence of Program supported training and education. Metric = Ratings received from participants in Program supported training and education workshops	Obtain quality training in support of ongoing monitoring activities	Hold at least one State Water Resources Control Board Clean Water Team Citizen Monitoring Program training session in Tuolumne County to train leaders of the Citizen Monitoring Program and ensure current monitoring protocols. Metric: See preceding paragraph	Workshop held in September 2006.
Indicator = Higher level of watershed education programs available in local K-12 curricula Metric = Percent of school systems in the Bay-Delta watershed with watershed education programs in place	Involve local schools in ongoing citizen water quality monitoring program.	Involve at least one high school in ongoing citizen water quality monitoring program. Metric: See preceding paragraph (Goal: involve Summerville Union High School, Sonora High School and/or Tioga High School)	Summerville Union High School's Ecology Club has undertaken monitoring under the guidance of Robert Hohn, SUHS instructor and trained citizen water quality monitor.
Indicator = Sufficient funding to meet the needs of local watershed management Metric = Percent of requests for funding met annually	Maintain sufficient funding in support of ongoing water quality monitoring	Future proposals to Calfed and other agencies in support of a continued water quality monitoring program and effectiveness evaluation of best management practices Metric: Submit at least one proposal to Calfed (or equivalent source) in support of a continued water quality monitoring program and/or development of a best management	Unable to confirm this goal by the conclusion of the Project reporting period.

Table 1: Evaluation of Desired Outcomes of Calfed Watershed Program Performance Indicators Applicable to the Tuolumne County Water Quality Plan			
Calfed Indicator and Metric	**Tuolumne County WQP Objective**	**Tuolumne County WQP Desired Outcome and Metric (& Comments)**	**Initial Performance Evaluation for January 2007**
		practice effectiveness evaluation program by 2009 (if available funding through the program exists)	
Indicator = Local expertise in watershed management issues Metric = Number of tribal, city and county governments with resident expertise in watershed management science and technology	Identify local citizens with expertise in watershed management issues through public outreach	Identify at least two individuals with expertise in watershed management issues in the Tuolumne – Calaveras- Amador – Stanislaus County area Metric: See preceding paragraph	Five technical consulting firms participated in the Project.
Indicator = Positive changes in characteristics of tributary hydrographs Metric = Hydrograph adjustments towards selected "minimal disturbance" reference hydrographs in watersheds where Program-supported activities take place.	Identify best management practices that will reduce impacts to water quality associated with new development on private lands under the jurisdiction of Tuolumne County	Require new development to implement best management practices to reduce impacts to water quality thereby improving water quality Metric: Adopt up to four new best management practices and amend at least two sections of the Tuolumne County Ordinance Code (related to water quality). Commence implementing best management practices (via implementation of an amended Tuolumne County Ordinance Code) by January, 2007 and ongoing thereafter	Attachment A of the Water Quality Plan, adopted February 2007, includes a comprehensive list of BMPs (greater than 10).
Indicator = Water quality improvement throughout the Bay-Delta watershed	Improve general water quality in the Upper Stanislaus and Upper Tuolumne River watersheds (that	Improve general water quality in the Upper Stanislaus and Upper Tuolumne River watersheds through implementation of best	

Table 1: Evaluation of Desired Outcomes of Calfed Watershed Program Performance Indicators Applicable to the Tuolumne County Water Quality Plan			
Calfed Indicator and Metric	**Tuolumne County WQP Objective**	**Tuolumne County WQP Desired Outcome and Metric (& Comments)**	**Initial Performance Evaluation for January 2007**
Metric = Number of tributary watershed with unimpaired beneficial uses of water	affect the Bay-Delta)	management practices Metric: Adopt up to six new best management practices and amend at least four sections of the Tuolumne County Ordinance Code (related to water quality). Commence implementing best management practices (via implementation of an amended Tuolumne County Ordinance Code) by January, 2007 and ongoing thereafter. Goal: A measurable decrease in turbidity (or other measurable parameter identified in the QAPP or MRP) in at least one of the monitoring locations included in the MRP within five years of WQP adoption and implementation.	Attachment A of the Water Quality Plan, adopted February 2007, includes a comprehensive list of BMPs (greater than 10). Insufficient data sets to confirm this goal by the conclusion of the Project reporting period.
Indicator = Wildlife habitat continuity and extent Metric = Spatial distribution and contiguity of wildlife habitat in watershed tributaries to the Bay and Delta	To identify additional methods for evaluating and/or improving water quality	Seek future funding to expand the citizen water quality monitoring program to include bioassessment Metric: Submit at least one proposal to Calfed (or equivalent source) in support of expanding the water quality monitoring program to include bioassessment by 2009 (if available funding through the program exists). Alternatively, hold at least one bioassessment training session to be taught by a qualified professional for the citizen monitors by	Unable to confirm this goal by the conclusion of the Project reporting period.

Table 1: Evaluation of Desired Outcomes of Calfed Watershed Program Performance Indicators Applicable to the Tuolumne County Water Quality Plan

Calfed Indicator and Metric	Tuolumne County WQP Objective	Tuolumne County WQP Desired Outcome and Metric (& Comments)	Initial Performance Evaluation for January 2007
		December, 2009	
Indicator = Watershed management based on scientifically sound watershed management plans Metric = Percent of Bay-Delta watershed implementing science based management plans	To identify and implement scientifically sound practices in the context of a water quality plan	To improve water quality in Tuolumne County Metric: A measurable decrease in turbidity (or other measurable parameter identified in the QAPP or MRP) in at least one of the monitoring locations included in the MRP within five years of WQP adoption and implementation. NOTE: The Tuolumne County Water Quality Plan will be prepared by watershed planning experts relying on current and anticipated future practices that have been endorsed by state and federal water quality regulatory agencies /a/	Insufficient datasets available to confirm this goal by the conclusion of the Project reporting period.

/a/ Representative resources are expected to include, but are not limited to:

Bunte, K., and S.R. Abt., 2001. Sampling Surface and Subsurface Particle-Size Distributions in Wadable Gravel and Cobble-Bed Streams for Analyses in Sediment Transport, Hydraulics, and Streambed Monitoring, pp. 428, USDA, Forest Service, Rocky Mountain Research Station, Fort Collins, Colorado.

California Laboratory Services, 2005. Sample California Toxics Rule/Priority Pollutants Report.

Central Valley Regional Water Quality Control Board (CVRWQCB). 1998. Water Quality Control Plan (Basin Plan) for the California Regional Water Quality Control Board, Central Valley Region. The Sacramento River Basin and the San Joaquin River Basin. 4th ed.

Montgomery, D.R., and J.M. Buffington, 1993. Channel classification, prediction of channel response, and assessment of channel conditions. Washington State Dept. of Natural Resources, Timber/Fish/Wildlife Agreement, Rpt. TFW-SH10-93-002, 84 p.

Rosgen, D.L., 1994. A classification of natural rivers. Catena 22: 169-199.

State Water Resources Control Board SWAMP-Compatible Quality Assurance Project Plans, Version 1.0 by George Nichol and Emilie Reyes, DWQ, in collaboration with Bill Ray, SWRCB Quality Assurance Program Manager. March 24, 2004)

Wolman, M.G., and J.P. Miller, 1960. Magnitude and frequency of forces in geomorphic processes" Journal of Geology 68