MokeWISE Program Scope of Work:
Project 1g: Mokelumne Water Quality, Soil Erosion & Sedimentation Inventory/Monitoring

April 2015

Problem Statement and MokeWISE Stakeholder Interests

Sediment is degrading the quality of Mokelumne River water. High quality water from the Mokelumne River is a very valuable resource. The Mokelumne watershed serves as a domestic water supply and as a critical source of life for aquatic species, including some that are endangered. Erosion and sediment delivery to the river and tributaries is greatest in the winter and spring during periods of high runoff and snow melt. A major source of sediment pollution is concentrated runoff from some roads and trails that have poor drainage, location, design, lack of maintenance, or all of the above. Sediment laden runoff is high in turbidity and bed-load and suspended loads, and it can include other contaminates that degrade water quality. Water in the Mokelumne River at the Tiger Creek Afterbay Reservoir is much lower in quality than water released from Lower Bear River and Salt Springs Reservoirs. Amador Water Agency has not been able to filter highly turbid water in the past. Sediment laden turbid water can contain heavy metals. It can "mask" microbiological contaminants making disinfection more difficult. Sediment laden water is more costly to treat for human consumption. And sediment has been reducing the capacity of the PG&E reservoirs that AWA relies on to back up our water rights.

Turbidity and sediment are adverse to the health of aquatic species. One potentially threatened or endangered species found in the Mokelumne River is the Foothill Yellow-Legged frog. The Sierra Nevada Yellow-legged frog and Yosemite Toad have habitats at higher elevations. High sediment loading of the river or tributaries can alter or eliminate habitat by smothering eggs and young and other bottom dwelling communities. Sedimentation impairs fisheries and can distribute toxic substances through the riparian and aquatic systems. Sedimentation can cement gravels needed for fish spawning, such as for reintroduction of Fall-Run Chinook Salmon.

The federal and state laws and regulations prohibit sediment pollution from what's called non-point sources, such as sediment or chemicals from dispersed locations. Numerous small non-point pollution sources can have a significant cumulative impact on water quality. By documenting the source of each, the hope is this will lead to future public and private actions to reduce degraded water quality.

Conservationists agree to the use of public funds for this inventory-monitoring of erosion-sedimentation in the Mokelumne River watershed. While supportive of the concept of reducing erosion, the Calaveras Planning Coalition (CPC) remains skeptical that restoration efforts will reap significant erosion reduction gains watershed-wide in the face of ongoing erosive activities. However, the project could help to reduce cumulative impacts on water quality. First, the nature and level of private forestry activity will continue to be a major contributor to erosion under the current regulatory system. This project may help to reduce violations if they are present. Second, more aggressive forestry efforts to increase water yield in Calaveras County are likely to result in a new source of increased erosion. While this pilot

project in Calaveras has yet to be developed, it is important that the activities comply with State adopted water quality standards called Best Management Practices.

Third, land use authorities in both Amador and Calaveras counties have been reluctant to implement low-impact development techniques to reduce erosion from new development. This may be addressed in future discussions between former Mokelumne Collaborative Group (MCG) stakeholders pursuant to the Land Use Coordination Policy Statement. Finally, wildfires and subsequent timber salvage activity are likely to continue, or to increase as forests transition to a changed climate. Thus, it is hoped that this inventory/monitoring project may lead to reduction of existing and future cumulative impacts.

Also, the CPC is skeptical that existing public land management agencies have the institutional capacity to take on additional activities focused on reducing erosion. However, a USFS land manager said that they are supportive of this proposal, and the project is work is consistent with inventorying of erosion-sedimentation they are doing in the Power Fire Area in Amador County.

Furthermore, the CPC does not want public funds to duplicate any other project that accomplishes the same products, including by the USFS in the Power Fire area.

State Water Bond funds, if secured for sediment reduction projects after completion of this inventory-monitoring project, should only be used to support projects on public lands or publicly maintained roads and trails. Other funding sources may be used to reduce erosion problems on private lands.

Such post-inventory/monitoring funds would be spent on projects, and should leverage other public funds through matching. Funds are to be spent to reduce erosion and sedimentation in the River or tributaries on open or closed roads and trails.

To ensure that the expenditures produce a net benefit and do not perpetuate existing problems, public funds should not be used to re-open closed roads or trails for public use, or to maintain roads on public lands that officials have decided to no longer maintain, or as a substitute for regular maintenance or construction funding for projects on public land or publicly maintained roads and trails. Funds should not be spent as a replacement for other public road and trail funds.

Background Information

The federal Clean Water Act, the federal Anti-degradation policy (40 CFR 131.12), the California Porter-Cologne Water Quality Control Act, and the Regional Water Quality Basin Plan all require control of non-point pollution sources to protect water quality. The Central Valley Regional Water Quality Control Plan specifies that,

> *"The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses."*
>
> *"Waters shall not contain substances in concentrations that result in the deposition of material that causes nuisance or adversely affects beneficial uses."*
>
> *"Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses."*

The State Policy for Water Quality Control states in II. 12,

> "*Monitoring programs must be provided to determine the effects on beneficial water uses including effects on aquatic life and its diversity and seasonal fluctuations."*

The Regional Water Quality Control Board has indicated that monitoring should be required to assure compliance with standards in some areas:

> *"Water quality and sediment monitoring may be required to ensure compliance with these requirements. For paved roads, entities maintaining or constructing road shall implement the Caltrans or equivalent management practices to comply with these requirements. For unpaved roads, entities maintaining or constructing road shall implement all reasonable management practices to control erosion during construction and maintenance activities. By 6 February 2009, county and agency road departments shall submit information describing the management practices that will be implemented to control erosion."*
>
> *"The State and Regional Water Boards entered into agreements with both the U.S. Forest Service and the California Department of Forestry and Fire Protection for use of Best Management Practices (BMPs) to control nonpoint sediment discharges by implementing actions certified by the State Water Board. The Regional Water Board enforces compliance with BMPs, and it may impose control actions if the practices are not applied or do not protect water quality."*

In 2007, the Upper Mokelumne River Watershed Authority (UMRWA) completed the "Upper Mokelumne River Watershed Assessment and Planning Project," which analyzed the watershed's existing hydrologic characteristics and recommended measures for improvement of water quality. Turbidity (sediment), nitrate, and fecal coliform were among the water quality constituents observed to exceed relevant standards (RMC 2007). Section 8.3.7 of the report, F3 – Implement Road Maintenance Practices states, "As a source of impermeable surface with its resulting erosion, increased peak runoff, and transport of

contaminants in runoff to the Mokelumne River, the maintenance of existing roads is an important factor in reducing pathogens, particulates, and metals."

The Final Report of the Upper Mokelumne River Watershed Assessment and Planning Project report identified "dirt and gravel road sediment is a major source of runoff contamination (pg. 8-12)." And "protecting and maintaining existing water quality will require consistent ongoing monitoring for detection of changes as well as good management of watershed lands (pg. 8-2). And a key recommendation is to "1. Identify potential water quality responses to watershed land uses, management, and activities" (pg. 9-9, Table 9-1), and it lists the following as an "Outcome Indicator: 4. Anthropogenic (man-caused) stressors identified by general location (page 9-9, Table 9-1: Performance Indicators for Part 2 Project)." And it recommends "…baseline water quality reflecting average monthly conditions be updated by the Authority once per year for the parameters of interest…" (pg. 9-1). "This will ensure that any preexisting or new benchmark exceedances can be tracked." It has been 7 years since this assessment was completed with no notable monitoring to locate "man-caused" erosion-sedimentation.

One way of measuring the degradation of water quality by sediment is to take samples from the river and tributaries. However, this is doesn't pin-point the source of increased sediment levels. The US Forest Service and Cal Fire have been approved California for use of Best Management Practices for water quality protection. These are best practices to control water quality to be employed in the planning, design, implementation, and monitoring of land disturbing activities. The Forest Service checks a sample of disturbed areas to monitor the implementation of BMPs periodically as a means of assessing the overall effectiveness of their BMP program. US Environmental Protection Agency has approved the USFS BMPs as a means of complying with the Clean Water Act. Counties were required to submit erosion control plans to the Regional Water Quality Control Board along their public roads.

However, even with these legal requirements aimed at protecting water quality, gullies and other non-point pollution sources still persist from some roads and trails that are adversely affecting the quality of the Mokelumne River. This project would identify those and provide the basis to set in motion erosion-sediment reduction actions following this inventory-monitoring effort.

This project is aimed at finding and documenting sites that exceed sediment water quality standards.

Project Information

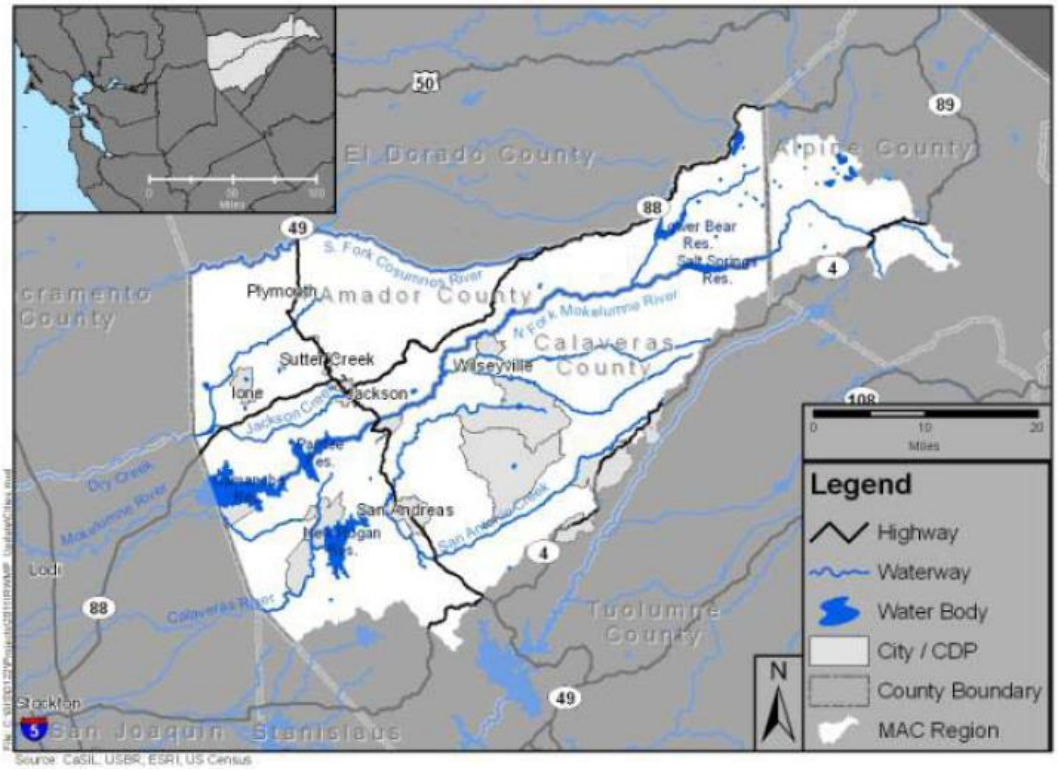
Project Description

This project will identify, assess, prioritize, and publish a report on areas of soil erosion-sedimentation reduction in the Mokelumne Watershed above Pardee Reservoir. The project includes establishing and coordinating with a stakeholder group and evaluating existing data and setting priorities for soil erosion and sedimentation reduction or any other source of pollutants entering the river or tributaries. Once sources of soil erosion and delivery to the Mokelumne River or tributaries have been mapped and digitized for analysis and future reference, a method for prioritizing these for restoration will be developed. Sources of restoration work based on the information produced by this project, would be primarily focused on property owners. Costs for this project are estimated to be $200,000 for planning, inventory, mapping, assessment of erosion-sedimentation reduction options, prioritization, stakeholder coordination, publishing the results, and outreach to seek follow-up erosion-sediment reduction work.

Project Location

The project is located in the MAC region, upstream of Pardee Reservoir (**Figure 1**).

Figure 1: MAC IRWM Region and Project Area above Pardee Reservoir



Project Sponsor

Amador Water Agency is the lead sponsor for this project; no co-sponsors have been identified.

Scope of Work

Task 1. Identification and Assessment for Soil Erosion-Sedimentation Reduction

The first step in this effort is to locate areas in the region that have and are undergoing erosion and delivery of sediment to the Mokelumne River and tributaries. Identification of erosion areas will help to target and prioritize restoration activities to achieve the greatest increase in water quality. Data records, sketches, photographs, and a location map with latitude and longitude coordinates will be produced for each eroding site. Use of GPS data recorders will be used for location, portability of data and recording. GIS layers and database will be used for documentation.

Subtask 1.1 Establish a Stakeholder Group and Land Owner Outreach

Stakeholders with an interest in soil restoration, erosion control and water quality improvement would be gathered into a formal working group to provide the opportunity to review and comment during the planning, prioritization, final documentation, and potential follow-up stages of soil restoration efforts. Outreach will be made to property owners to inform and gain support for this project. Stakeholder buy-in and support for restoration efforts ensures that these efforts are successful in the long-term. The stakeholder group could include interested members of the former MCG which guided development of the MokeWISE program, and the Amador Calaveras Consensus Group (ACCG), which is currently involved in restoration efforts with the United States Forest Service. The stakeholder group will consult the Amador-Calaveras Consensus Group (ACCG) on resource conservation standards developed by the ACCG.

Subtask 1.2 Map Erosion- Sedimentation of the River and Tributaries Upstream of Pardee Reservoir

Office Mapping

Aerial photographs will be used as a tool to target areas of potential erosion-sedimentation.

Field Mapping

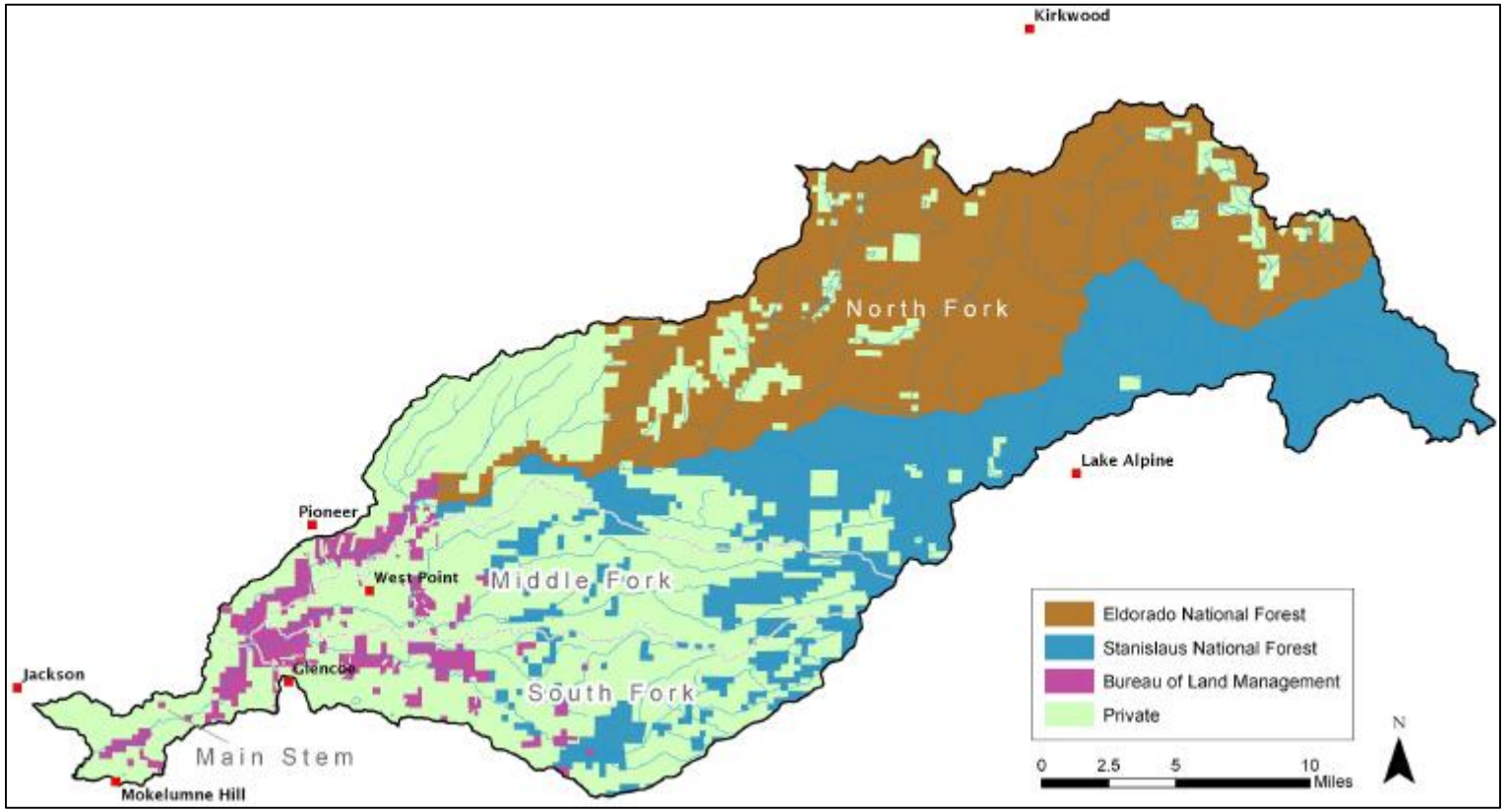
The first step in mapping is to acquire suitable aerial photographs and maps and to travel roads and trails and locate and record data on each erosion site that has or is delivering sediment to the River or tributaries using GPS data recorders. The data will be converted to GIS layers data to create maps and data characterizing the type of soil erosion-sedimentation with a key indicating a tentative method of rehabilitation.

The mapping data would be shared with the established stakeholder group to review the data, and discuss implications and opportunities for rehabilitation work.

Task 2. Prioritize Areas for Soil Erosion-Sedimentation Reduction

Upon completion of Task 1, areas for restoration will be prioritized in coordination with the stakeholder group. All lands within the Mokelumne watershed upstream of Pardee will be identified and assessed with the cooperation of land owners. It is anticipated that grants requested for project work following the completion of this project would only be used on public lands and easements for roads and trails. The status of "closed" roads or trails would not be changed. Factors to consider in setting priorities include past, current, and potential future erosion and sediment delivery to the Mokelumne or tributaries and landowner cooperation.

Figure 2: Major Land Ownership in the Upper Mokelumne River Watershed



Source: Upper Mokelumne River Watershed Assessment and Planning Project, 2007.

Subtask 2.1 Determine Prioritization Process

- Quantities of past, current, and future erosion-sedimentation into the river or tributaries
- Proximity to stream or river channel
- Anticipated restoration methods, including
    - Installing Rolling Dips
    - Rerouting or distributing concentrated drainage
    - Sediment trapping basins
    - Slope restoration
    - Pull back of unstable fill
    - Restoring eroding drainage channels
    - Erosion control with heavy rock or aggregate
- Feasibility, which may include but is not limited to the following considerations:
    - Ability to retain closed road/trail status
    - Site access for heavy equipment
    - Preliminary Assessment of Environmental Fatal Flaws
- Restoration costs
- Stakeholder comments

After discussing the various alternatives for prioritization, the stakeholder group will agree on a process.

Subtask 2.2 Prioritize Restoration Projects

This subtask involves applying the prioritization process determined in Subtask 2.1 to the list of sediment reduction projects. The prioritized list will be presented to the stakeholder group, who will discuss the prioritization and opportunities, and suggest adjustments as necessary.

This task will be further developed after the first phase is completed.

Task 3. Publish Results

This task involves packaging the inventory-monitoring results in a useable format for follow-up work and future monitoring and publishing for use by landowners and state and federal water quality control agencies.

Budget

The budget for this project is anticipated to be $200,000 for outreach, assessing, prioritizing, publishing results in a useable format, and seeking follow-up erosion-sedimentation work.

References

Upper Mokelumne River Watershed Assessment and Planning Project, December 2007, by Upper Mokelumne River Watershed Authority/RMC. Available: http://www.ccwd.org/pdf/pub/M-A-C/2007_umrwa_report.pdf