

5. EVALUATION CRITERIA

(a) Project Quality and Readiness

i. General Description

The primary goal of this project is to identify and deliver a total of ten ready-to-proceed, high-priority sediment reduction projects for native roads, diversion ditches, and abandoned mines within the North Fork and Middle Fork American River watersheds. A comprehensive GPS field survey of native roads, diversion ditches, and abandoned mines within the two watersheds will be conducted for the purpose of collecting detailed attribute data for use in the process-based WEPP model to predict soil erosion and sediment yield at the project-scale. WEPP simulations will be run for all roads, diversion ditches, and abandoned mines for which GPS data have been collected, and the results will be used to prioritize and identify sediment reduction projects with the greatest environmental benefit. Based on the comprehensive WEPP results, ten high-priority sediment reduction projects will be collaboratively selected with the appropriate Agencies and advanced for NEPA and CEQA due diligence. For this project, only those high-priority sediment reduction projects with the greatest environmental benefit that are anticipated as being Categorical Excluded under CEQA and NEPA will be advanced for due diligence completion. Due diligence will be completed through anticipated collaboration with the appropriate Agencies, and in partnership with the El Dorado National Forest for applicable projects to build capacity for USFS NEPA writing, editing, and other administrative support.

A secondary goal of this project is to fill a significant data gap with regards to instream suspended sediment quantity and quality through a SWAMP-approved stream monitoring program. A total of sixteen monitoring sites within the two watersheds will be identified for monthly stream monitoring using a top-down approach through collaboration with the SWRCB and CVRWQCB. On a monthly basis, flow will be measured and discrete surface water samples will be collected and analyzed for TSS, total mercury, and dissolved mercury at each sampling location. Results of the stream monitoring program will be used to calculate natural and anthropogenic suspended sediment loads, adsorbed mercury loads, and dissolved mercury loads.

The project goals are two-fold: to identify and deliver a total of ten ready-to-proceed, high-priority sediment reduction projects for native roads, diversion ditches, and abandoned mines, and to calculate natural and anthropogenic suspended sediment loads, adsorbed mercury loads, and dissolved mercury loads. All work described below to attain these two goals will be completed within the amount of requested SNC funding.

Goal 1: Identify and deliver ten ready-to-proceed, high-priority sediment reduction projects within the North Fork and Middle Fork American River watersheds

A total of ten high-priority, ready-to-proceed sediment reduction projects for native roads, diversion ditches, and abandoned mines located within the North Fork and Middle Fork American River watersheds will be delivered from this project through a combination of GPS field survey, WEPP erosion prediction modeling, GIS analysis, Agency collaboration, and the completion of CEQA and NEPA due diligence.

A comprehensive GPS field survey of native roads, diversion ditches, and abandoned mines within the two watersheds will be conducted over a three-month period for the purpose of collecting detailed attribute data for use in the process-based WEPP model to predict soil erosion and sediment yield at the project-scale. WEPP simulations will be run for all roads, diversion ditches, and abandoned mines for which GPS data have been collected, and the results will be used to prioritize and identify sediment reduction projects with the greatest environmental benefit. Based on the comprehensive WEPP results, ten high-priority sediment reduction projects will be collaboratively selected with the appropriate Agencies and advanced for NEPA and CEQA due diligence completion. For this project, only those high-priority sediment reduction projects with the greatest environmental benefit that are anticipated as being Categorical Excluded under CEQA and NEPA will be advanced for due diligence completion. The purpose filtering projects for those anticipated to be Categorical Excluded under CEQA and NEPA is to minimize grant expenditures for this project to complete due diligence. Projects that do not meet the criteria of Categorical Exclusion will also be identified as part of this project, and may be proposed for CEQA and NEPA due diligence in a separate proposal at a future date.

To date, a coarse-filtered erosion assessment that presents subwatershed differences in sediment yield from various landuses has been completed for the North Fork/Middle Fork American Rivers (Tetra Tech 2007). With this assessment was the delivery of a comprehensive GIS database, which will be fully utilized for this project to avoid duplication of efforts. The Tetra Tech assessment was performed to guide and prioritize additional, more focused field studies, and includes specific recommendations for predictive erosion modeling at a finer resolution in order to identify and prioritize restoration actions.

Utilizing the existing GIS database provided as part of the Tetra Tech assessment, a GIS-based analysis will be conducted to identify native roads, erodible diversion ditches, and abandoned mines that are hydrologically connected to perennial and ephemeral channels for the purpose of further refinement and prioritization of the field-level GPS survey. A GPS Field Survey Plan describing field routes and scheduling will be developed in collaboration with the appropriate landowner Agencies. A field-level GPS survey following the

routes and scheduling described in the GPS Field Survey Plan will be conducted over the course of three months. The purpose of the GPS survey is to collect detailed attribute data needed as input to the WEPP model.

WEPP is a continuous simulation, process-based (e.g. mathematical) erosion prediction model that was originally developed by an interagency group of scientists including the USFS, ARS, NRCS, BLM, and USGS to replace the empirical (factor-based) Universal Soil Loss Equation. It is currently the most sophisticated erosion prediction technology, and as it is process based can be applied to any eroding surface where input data are known. It has been applied to rangelands, agricultural lands, mining sites, and recreational ski areas, in addition to forest lands. The USFS WEPP Project Team at the Rocky Mountain Research Station in Moscow, Idaho has advanced WEPP specifically for application to forest roads, harvest, skid trails, wildfire, and prescribed fire to assist forest managers. It has been peer reviewed, and is currently the best available science for erosion predictions at the project-scale for agricultural, forest, rangeland, and mining land uses.

WEPP output includes runoff from snowmelt and rainfall, spatial distribution of erosion, sediment delivery from a surface, and characteristics of sediment delivered (sediment composition, particle size distribution, and enrichment ratio). Output may be daily, monthly, annual, average annual, probability-based (return period), or for single design storms. It is applicable at both the project-scale (WEPP Windows interface) and the watershed-scale (GeoWEPP interface). For this project, the WEPP Windows interface will be applied to predict soil erosion and sediment yield at the project-scale. Average annual predictions will be used for this project, as these are the appropriate predictions for long-term features (such as roads, diversion ditches, and mines), whereas probability-based predictions are appropriate for short-term impacts (such as wildfire).

Goal 2: Develop estimates of suspended sediment loads, adsorbed mercury loads, and dissolved mercury loads

Loads (mass per unit time) are calculated as the product of flow (volume per unit time) and concentration (mass per unit volume). To perform this calculation, flow rates and concentrations are needed. This will be accomplished by measuring flow, total suspended solids (TSS), total mercury, and dissolved mercury at 16 locations within the two watersheds. Site locations will be determined through collaboration with the SWRCB and CVRWQB, and potentially through collaboration with current SNC Project #070314 “Enhancing Water Supply and Improving Dam Operations” led by Environmental Defense Fund. Per discussions with Environmental Defense Fund, data collected as part of the stream monitoring component of this project could be useful for generating baseline data for their use in measuring hydrologic responses from silviculture

practices to improve water quantity through increased snowpack retention and decreased evapotranspiration.

Sampling will be conducted on a monthly basis using a top-down approach to estimate both natural and anthropogenic loads for TSS, adsorbed mercury, and dissolved mercury. All sampling will be performed following the methods of a SWRCB-approved Quality Assurance Project Plan (QAPP), to be developed as part of this project by a hydrologist, to ensure compliance with the Control Board's Surface Water Ambient Monitoring Program (SWAMP). Surface water samples will be analyzed at the accredited California Laboratory Services located in Rancho Cordova, CA for TSS using Standard Method 2540D, and for total and dissolved mercury using EPA Method 1631. Laboratory analytical results for TSS concentrations will be combined with flow rates to calculate suspended sediment loads. Laboratory analytical results for total mercury and dissolved mercury will be used to calculate adsorbed mercury concentrations on sediment (total mercury – dissolved mercury), which, in combination with flow rates, will allow for the calculation of adsorbed mercury loads. Dissolved mercury concentrations in combination with flow rates will allow for the calculation of dissolved mercury loads.

Flow will be measured by a hydrologist following USGS protocol using a USGS Type AA current meter and Aquacalc hand-held computer. Where conditions may prevent instream flow measurements, flow rates will be estimated using USGS methods for ungauged watersheds.

Deliverables for this project will include a detailed GPS Field Survey Plan, SWRCB-approved stream sampling QAPP, Final Technical Report, and ten ready-to-proceed high priority sediment reduction projects. The Technical Report will present all methods, assumptions, and limitations; WEPP modeling input and output; WEPP results presented in tabular and in GIS map format; stream monitoring results and summary; and estimates of natural and anthropogenic suspended sediment loads, adsorbed mercury loads, and dissolved mercury loads.

This project will be implemented by the Upper American River Foundation (UARF) and Em Hydrology LLC. UARF will be responsible for administering the grant. Em Hydrology, LLC will contract to UARF and be responsible for project management and executing all technical items in the Scope of Work, including GPS field survey, GIS analysis, WEPP modeling, QAPP development, stream monitoring, Technical Report preparation, and completing CEQA and NEPA due diligence for ten Categorical Excluded projects.

ii Workplan and Schedule

WORKPLAN

TASK 1. GPS FIELD SURVEY AND WEPP MODELING

- Subtask 1.1 Internal project kick-off meeting
- Subtask 1.2 Project kick-off meeting with Agencies
- Subtask 1.3 Compile and prepare existing GIS data for GIS field survey planning analysis
- Subtask 1.4 GIS-based field survey planning analysis
- Subtask 1.5 Develop GPS Field Survey Plan through collaboration with Agencies for feedback on priority routes
- Subtask 1.6 Purchase equipment and prepare for GPS field survey
- Subtask 1.7 Implement GPS field survey
- Subtask 1.8 GPS data post-processing for coupling with WEPP
- Subtask 1.9 WEPP set up and simulations
- Subtask 1.10 WEPP results post-processing and GIS-based results analysis
- Subtask 1.11 GIS map generation for Task 1

Task 1.Deliverables: GPS Field Survey Plan

TASK 2. MONTHLY STREAM MONITORING PROGRAM

- Subtask 2.1 Develop monthly stream monitoring program in collaboration with CVRWQCB and SWRCB
- Subtask 2.2 Develop SWAMP-approved QAPP for monthly stream monitoring program
- Subtask 2.3 Implement monthly stream monitoring program
- Subtask 2.4 Stream monitoring program data analysis
- Subtask 2.5 GIS map generation for Task 2

Task 2. Deliverables: SWRCB-approved stream monitoring QAPP

TASK 3. REPORTING

Subtask 3.1 Draft Technical Report

Subtask 3.2 Agency presentation Draft Technical Report

Subtask 3.3 Finalize and distribute Technical Report

Subtask 3.4 Compile all WEPP input, output, and GIS maps, shapefiles, and metadata electronically and burn to CD

Subtask 3.5 SNC Quarterly Reports

Task 3. Deliverables: Final Technical Report; CD compilation of WEPP input and output and GIS maps, shapefiles, and metadata; SNC Quarterly Reports

Task 4. PROJECTS DUE DILLIGENCE

Subtask 4.1 Collaborate with Agencies to identify and advance 10 high-priority sediment reduction projects for NEPA and CEQA due diligence completion.

Subtask 4.2 Complete NEPA and CEQA due diligence, including public scoping, for 10 identified high-priority sediment reduction projects

Task 4. Deliverables: 10 ready-to-proceed, high-priority sediment reduction projects

POST-PROJECT IMPLEMENTATON REVIEW

A post-project implementation review will be conducted three years after the conclusion of this project to determine the number of ready-to-proceed, high-priority sediment reduction projects that have been implemented. Results of this review will be reported to the appropriate SNC representative.

Table 1. Schedule

Milestones/Deliverables	Completion Date
GPS Field Survey Plan	Aug-09
SWRCB-approved QAPP	Aug-09
GPS field survey	Aug-10
Stream monitoring program	Aug-10
Final Technical Report	Nov-10
CEQA and NEPA due diligence	Dec-10
Post-project implementation review	Dec-13

iii. Budget

The project budget is presented as Attachment A. An in-kind contribution in the amount of \$7,000.00 for all travel time between Reno, NV and Auburn, CA for Em Hydrology, LLC personnel is being made to this project. Please note there are three unique budgets presented as Tables 1, 2, and 3 in Attachment A. These budgets correspond 1) to the full stream monitoring program proposed in this application, 2) a reduced scope for the stream monitoring program to include the North Fork American River only, and 3) no stream monitoring program, respectively.

iv. Status of Agreements and Land Tenure

Agreements and land tenure are not applicable to the project

(b) Land and Water Benefits

Water quality issues identified as affecting these watersheds include sediment and mercury. Sedimentation causes a substantial reduction in reservoir capacity, increased water treatment costs, and can adversely impact aquatic biota and habitat. To date, the majority of surface waters within these watersheds have not yet been assessed within the Clean Water Act regulatory framework for attainment of sediment water quality standards.

As mercury is primarily transported to surface waters via adsorption to eroded sediments, direct benefits of this project will be realized through the future implementation of ready-to-proceed high-priority sediment reduction projects.

Additionally, comprehensive WEPP results ranked in priority of sediment reduction projects with the greatest environmental benefit resulting from this project will be available to guide selection of future projects due diligence and implementation.

(c) SNC Program Goals

The primary SNC program goal of this project is to protect and improve water quality through delivering ten high-priority ready-to-proceed sediment reduction projects. Additional SNC program goals applicable to this project include aiding in the preservation of working landscapes, and protecting, conserving, and restoring the regions' physical resources.

(d) Cooperation and Community Support

Discussions with the El Dorado National Forest indicate a collaborative partnership is likely for the purpose of supporting USFS NEPA writing, editing, and administration efforts to develop ready-to-proceed projects. Discussions with Environmental Defense Fund, lead for SNC Project #070314 "Enhancing Water Supply and Improving Dam Operations", indicate collaboration would be welcome to identify sampling locations for the stream monitoring program that would generate useful baseline data for their later use in measuring hydrologic responses from silviculture practices to improve water quantity through increased snowpack retention and decreased evapotranspiration.

The project is compatible with the following mandatory plans that fully or partially address managing sediment for water resources, infrastructure, and habitat value: El Dorado County General Plan; Placer County General Plan; CALFED Ecosystem Restoration Program Plan and Programmatic Record of Decision; Central Valley Regional Water Quality Control Board Sacramento and San Joaquin Rivers Basin Plan; Sierra Nevada Regional Forest Plan; El Dorado National Forest Land Management Plan; FERC #184 El Dorado Hydroelectric Project; FERC #2079 Middle Fork American River License; FERC #2101 Upper American River Project, and FERC #2155 Chili Bar Project. The project is also compatible with the following mandatory plans that fully or partially address reducing mercury contamination in waterways: CALFED Ecosystem Restoration Program plan and Programmatic Record of Decision; Central Valley Regional Water Quality Control Board Sacramento and San Joaquin Rivers Basin Plan; and the Sierra Nevada Regional Forest Plan.

(e) Project Management

Drea Traeumer, hydrologist and owner of Em Hydrology, LLC, has extensive consulting, project management, and regulatory experience. She has managed and implemented a similar project for TMDL development in the S. Fork Clearwater River watershed in Idaho, including GPS field survey design and implementation, GIS analysis, and WEPP modeling. Drea s one of the handful of WEPP experts in the world capable of utilizing the model to its full capabilities, and to the best of her knowledge is the only independent WEPP modeler in the western U.S (the rest being in academia or the USFS). Drea was the first to apply WEPP in the Tahoe Basin, and is currently the Lead Scientist for a research project to optimize WEPP parameters for the Tahoe Basin and evaluate the impacts of prescribed fire. Previously, Drea worked in both the private sector and as TMDL Lead with the Washington State Department of Ecology.

6. PERFORMANCE MEASURES

Performance measures in Category A are not applicable to this project.

Performance measures in Category B that are applicable to this project include the collaborative development of two Planning Plans/Assessments (e.g. GPS Field Survey Guide and site locations for the stream monitoring program), and percent of pre-project planning efforts resulting in project implementation.

Performance measures in Category C Pre-Project Due Diligence that are applicable to this project include the percent of pre-project planning efforts resulting in project implementation. Performance measures in Categories B and C will be measured by technical reports and plans, ready-to-proceed projects delivered at the conclusion o f this project, and post-project implementation review and reporting.

7. ENVIRONMENTAL SETTINGS AND IMPACTS

The project area consists of the North Fork and Middle Fork American Rivers watersheds, located within Placer and El Dorado on the west slope of the northern Sierra Nevada.

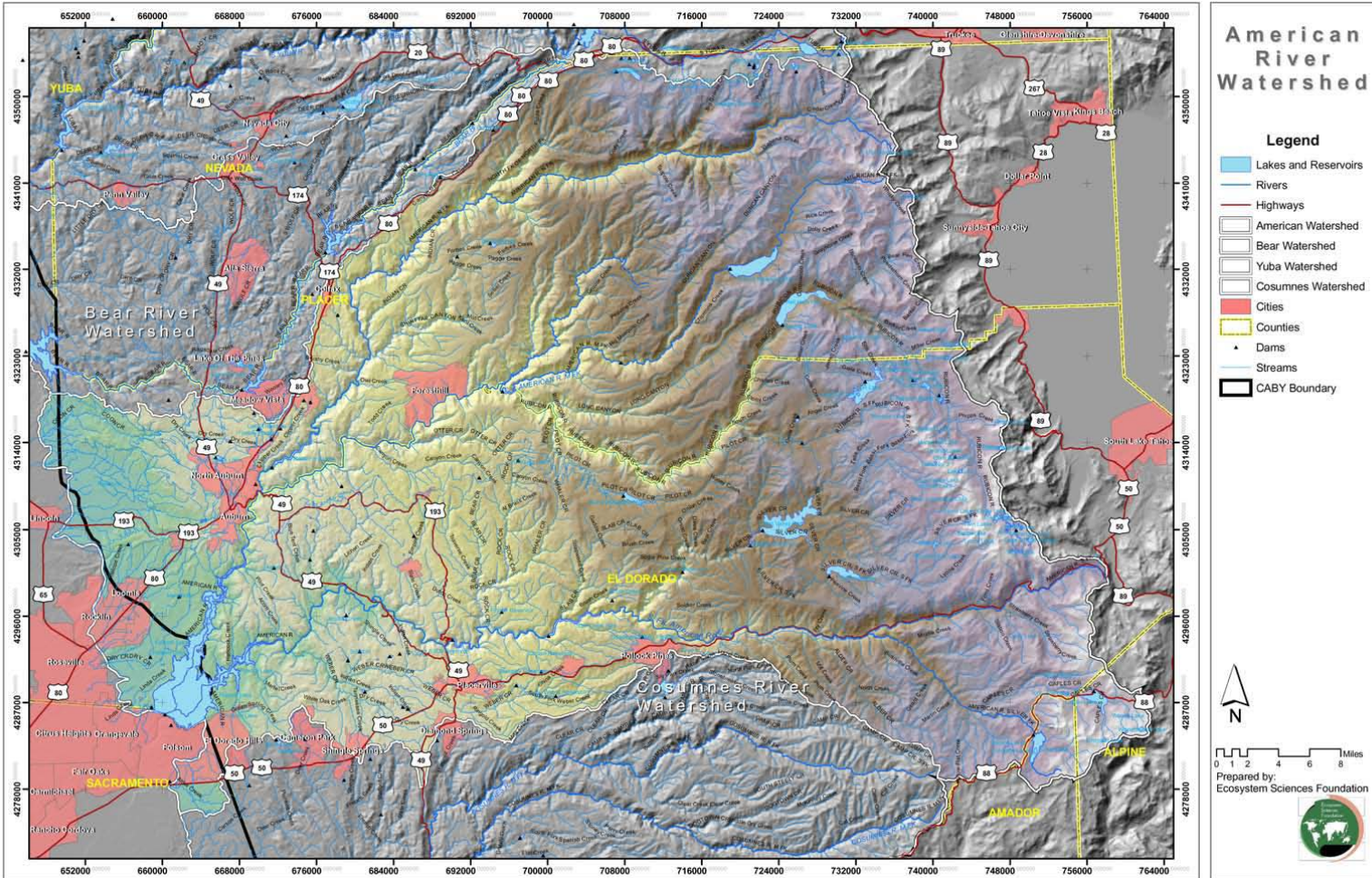
The American River originates in the high Sierra Nevada west of Lake Tahoe, in the Tahoe and Eldorado National Forests. The three main forks of the American River – the North, Middle, and South – flow through the Sierra foothills and converge east of Sacramento. Near Sacramento the American River drains into the Sacramento River, which eventually reaches the San Francisco Bay and the Pacific Ocean. This study focuses on the North and Middle forks of the American River watershed and their respective subwatersheds.

The North Fork/Middle Fork American River watershed is approximately triangular in shape. It is bordered by the crest of the Sierra Nevada and Lake Tahoe basin on the east, by the Yuba and Bear River watersheds on the north, by the South Fork American River watershed on the south, and by the Folsom Reservoir on the west. The North Fork/Middle Fork American River watershed study area begins at the upstream extent of Folsom Reservoir and encompasses approximately 625,500 acres (977 square miles).

The North Fork/Middle Fork American River watershed traverses a range of physical settings, including variations in geology, topography, hydrology, climate, soil, and land use. Elevations in the North Fork/Middle Fork American River watershed range from over 9,900 feet at the headwaters of the Rubicon River to less than 500 feet at Folsom Reservoir. Deep river canyons occur throughout the watershed where the North Fork and Middle Fork American Rivers have entrenched into the underlying bedrock. Most of the watershed (over 60 percent) includes hillslopes between 11 and 50 percent. Slopes 70 percent or greater make up just over 10 percent of the North Fork/Middle Fork American River watershed.

The average annual precipitation for the North Fork/Middle Fork American River watershed is just under 60 inches. The watershed generally experiences warm, dry summers and cold, wet winters. Weather can change rapidly during all seasons of the year, and elevation influences temperature and precipitation. At elevations less than 3,500 feet, the majority of precipitation falls as rain. Between 3,500 and 6,000 feet, precipitation may fall as either rain or snow. Above 6,000 feet precipitation falls mainly as snow. Most precipitation falls from October through April annually.

8. PROJECT LOCATION MAP



9. PHOTOS OF PROJECT AREA



Photo 1. Iowa Hill Rd. Bridge at N. Fork American River with sediment-laden waterfall



Photo 2. Sediment plume N. Fork American River from sediment-laden waterfall. Looking downstream from Iowa Hill Rd. Bridge on N. Fork American River.



Photo 3. Extreme turbidity N. Fork American River immediately downstream of Iowa Hill Rd. Bridge



Photo 4. Tributary to N. Fork American River at Iowa Hill Rd. and Mineral Bar Area, Auburn State Recreation Area

10. LAND TENURE

Land tenure is not applicable to the project

11. CEQA AND NEPA COMPLIANCE

Not applicable for work being performed as part of this project.