

RUSSIAN RIVER WATERSHED ADAPTIVE MANAGEMENT PLAN (WMP)

FINAL SCOPE OF WORK

I. PROJECT

Russian River Watershed Assessment and Adaptive Management Plan (WMP)

II. BACKGROUND

The Russian River originates in central Mendocino County, California, approximately 15 miles north of the city of Ukiah. The watershed encompasses 1,485 square miles (approx. 950,000 acres) within Sonoma and Mendocino Counties, emptying into the Pacific Ocean near Jenner, about 20 miles west of the city of Santa Rosa. The main channel of the river is about 110 miles long and flows generally southward from its headwaters near Redwood and Potter Valleys to Mirabel Park, where the direction of flow changes generally westward as the river crosses a part of the Coast Range and eventually flows into the Pacific Ocean near the town of Jenner.

Phase I of the Study established a forum for stakeholders representing diverse economic, environmental and public interests to review critical issues information, evaluate existing research data and recommend additional studies regarding restoration efforts within the watershed. The results of Phase I have been compiled in the Plan of Action for Phase II (POA). The POA articulates critical issues and potential actions as identified by the stakeholders comprising the Russian River Watershed Council (RRWC). The RRWC was formed through a cooperative effort between the United States Army Corps of Engineers (USACE), California Resources Agency through cooperation of the California Department of Fish and Game (CDFG), Sonoma County and Mendocino County, and residents in the Russian River watershed to recommend and design natural and structural solutions for problems endangering the biological health of the Russian River watershed. The POA is available on website <http://www.rrwc.net>.

The RRWC and the POA guided the formation of this scope of work. A draft scope of work was submitted to an independent Scientific and Technical Review Panel for review. The Panel was comprised of individuals representing U.S. Army Corps of Engineers, Regional Water Quality Control Board, Natural Resources Conservation Service, U.C. Cooperative Extension, Department of Fish and Game, U.C. Davis, private consultant with experience in planning, geomorphology, hydrology, biology, range management and agricultural practices. With the Panel's recommended changes incorporated into the scope of work, the RRWC unanimously approved of the tasks identified. Phase II will be the completion of the Russian River Watershed Adaptive Management Plan (WMP) through two components: Completion of (1) a watershed plan containing documentation of baseline watershed conditions, watershed rankings for restoration and conservation potential, screening of management measures to achieve that potential; implementation plan, and monitoring plan and (2) a series of research studies.

Russian River Watershed Council (RRWC)

The mission of the RRWC is to protect, restore, and enhance the biological health of the Russian River and its watershed through a community-based process, which facilitates communication and collaboration among all interested parties.

The RRWC's primary goals are:

1. To ensure the recovery of the Russian River and its watershed to a condition such that the native wild anadromous fishery recovers to a healthy and sustainable level;

2. To ensure a strong, healthy, and diverse economy in the Russian River region; and
3. To promote stewardship of the Russian River and its watershed by developing an informed and engaged citizenry.

Russian River Watershed Adaptive Management Plan (WMP) Purpose

The WMP will be a tool to prevent further degradation and develop a healthy and sustainable watershed. Completion of the plan as described and called for in this scope of work is one step in achieving the RRWC goals. The WMP will evaluate water quality, water quantity and the physical, hydrologic, and biological health and functions of the watershed. The WMP will provide measurable goals and recommendations to implement improvements and continue watershed assessment for the next 50 years.

III. DESCRIPTION OF WORK AND SERVICES REQUIRED

Through this project, the contractor will complete a thorough evaluation of the Russian River Watershed and its tributaries and complete the WMP. This project consists of two components: Watershed Adaptive Management Plan development; and Research (Figure 1). The components and tasks for the respective components can be implemented out of the sequence. However, funds will be initially focused and applied to completion of the Plan component. Furthermore, the Research component and corresponding sections could be adapted based on information generated from the Plan component. As a result, work on the Research component is to be initiated only with the concurrence of the WMP Technical Committee.

This Plan component is comprised of five sections:

1. Baseline documentation and assessment of watershed conditions will be generated with existing information in Task 1.A through 1.F.
2. Information from Task 1.A through 1.F will be compiled and presented in the draft WMP developed through Task 2.A through 2.E.
3. Plan implementation provided for in Task 3.A through 3.C.
4. Plan monitoring provided for in Task 4A. through 4.E.
5. The final WMP combines the baseline watershed assessment (draft WMP), as well as the implementation and monitoring plans to complete Task 5.A.

The research component of this project consists of eight tasks designed to identify representative watersheds and conduct additional data collection and analysis for unanswered resource management questions in Tasks 6.A through 6.H.

The work to be conducted in the Plan and Research components are to be carried out at a spatial scale that is consistent and accepted with other watershed planning and resource management efforts. This will increase the applicability of existing Geographical Information Systems data for the watershed. Scales to be considered include the CALWATER Version 2.2a planning watershed, the State Water Resources Control Board hydrologic sub unit, and others. The selection of the study spatial scale should also consider the scales of organization at which local watershed groups and councils are formed within the basin.

The development of WMP will require collaboration with watershed residents, representatives of local municipalities and local, State, and Federal agencies in an assessment and planning process. The POA is a working document adopted by watershed participants to further watershed restoration and to assist in the completion of the WMP. The WMP will also incorporate key recommendations identified in the POA, such as the objectives on pages seven and eight, the critical issues and potential actions in Chapter 4 and the detailed potential actions in Appendix IV of the POA. In addition, other relevant information sources should be used and in particular, the Russian River Interactive Information System (RRIIS) among others. The goal of the WMP is to provide the tools (e.g. watershed baseline

conditions; menu of management measures; implementation and monitoring plans; public outreach; and research projects) that are applicable on watershed and site-specific scales:

- to implement environmentally and economically sustainable conservation and restoration measures;
- to identify opportunities, through a synthesis of watershed information, for restoration of watershed and fisheries habitat; and
- to provide information to property owners and the general public for potential implementation.

The WMP will identify agency requirements, such as National Environmental Policy Act (NEPA)/California Environmental Quality Act (CEQA) documentation in order to implement its goals and recommendations. Appendix A is a list of items important to consider during the completion of the scope of work.

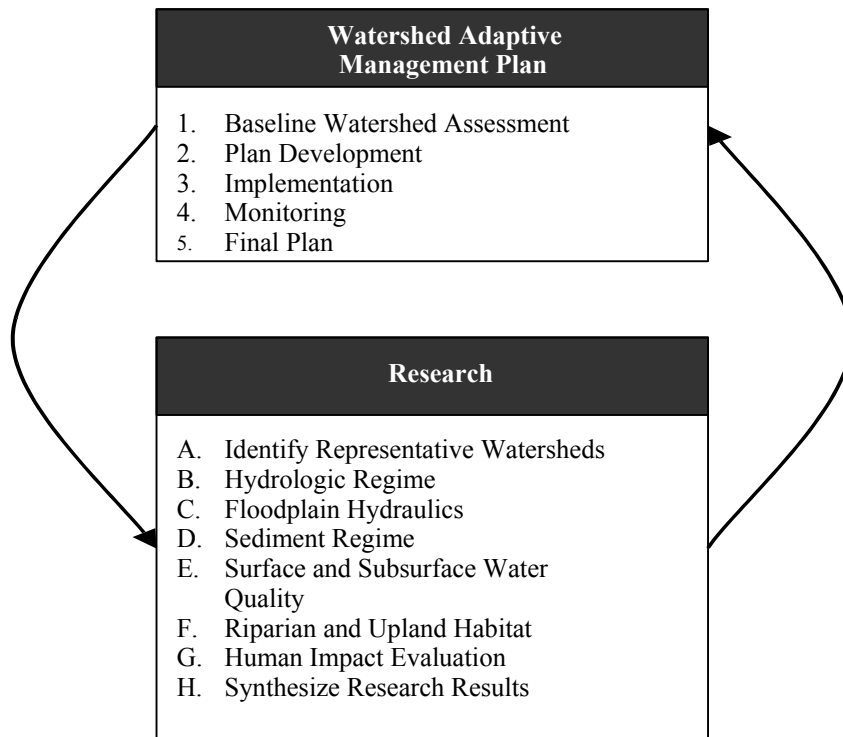


Figure 1: Project components and respective sections for completion of the Russian River Watershed Adaptive Management Plan.

This process will have the input and concurrence of RRWC WMP Technical Committee. Within specific tasks, the contractor is directed to propose and receive approval for respective work and study plans, as well as public outreach measures. This approval will come directly from the contract administrator with the recommendation of the RRWC WMP Technical Committee.

The RRWC WMP Technical Committee will be a multidisciplinary team, familiar with the watershed approach, and representative of the RRWC goals and interests. Committee membership will consist of representatives from RRWC caucuses and or workgroups, resource agencies, and other organizations. Member training, experience, and background will provide technical expertise in appropriate disciplines including but not limited to animal agriculture, forestry, geology, geomorphology, biology, community outreach, hydrology, land use planning, restoration ecology, soil

science, and viticulture among others. The RRWC and its partners will have the responsibility of forming the WMP Technical Committee in support of this project.

Project Management

The contractor, in collaboration with the RRWC and project sponsors, will coordinate with local municipalities (e.g.: County Boards of Supervisors, City Councils, and other elected Boards, as well as, county department heads, city managers, special districts, etc.) to ensure the data contained in the WMP will support local policies to safeguard the long-term sustainability of the watershed. This will ensure that the WMP development proceeds in accordance with the schedule and guidelines set forth herein and that these activities are coordinated with other related regional projects and programs.

The contractor will meet with the RRWC WMP Technical Committee to schedule meetings, keep meeting minutes, and share relevant information during the development of the WMP. Meetings with WMP Technical Committee will occur at a minimum monthly during data development and analyses. The frequency of these meetings can be decreased as determined appropriate by the WMP Technical Committee. The contractor will present the evolving draft WMP to the RRWC on a biannual basis and make periodic progress reports (a minimum of six (6) to the Corps, Resource Agency and/or Counties, as requested).

The contractor will provide progress reports of WMP at a minimum on a bimonthly basis through the contract period on a publicly accessible website, e.g.: RRIIS. Field data and analyses will be loaded on RRIIS for public review. Provide the information to other venues, as appropriate. When applicable, use key recommendations identified in the POA and other relevant information sources, e.g. RRIIS, to characterize watershed conditions during the development of the WMP. This will require coordination with the RRIIS contract team or future, as of yet unidentified, management and maintenance administrators of RRIIS.

Each task shall be developed as an independent work product. This approach will enable individual tasks to be completed as Corps and project partners funds are provided. It is anticipated that project partners participation will play a key role in the timely implementation of this scope of work. The contractor will work collaboratively with agencies, including State Regional Water Quality Control Board (RWQCB), CDFG, National Marine Fisheries Service (NMFS), Natural Resources Conservation Service (NRCS), United States Geologic Survey (USGS), Sonoma County and Mendocino County, the water supply municipalities, special districts, local jurisdictions, Resource Conservation Districts (RCDs), nonprofits, community organizations, and other sources to prevent duplication of on-going research and to identify opportunities for collaboration. Documents produced under this project will recognize the contributions of all agencies involved in their development. The contractor will not start work on a task without a notification to proceed (NTP).

It is anticipated that staff from key agencies will participate as members of the WMP Technical Committee. All relevant information should be loaded on RRIIS, e.g.: digital map by the watersheds, according to the classifications in this scope of work. Newly mapped data shall be compatible with existing GIS database, including data format and database design, to the greatest extent possible.

The data and analysis compiled for each task and the final report will establish the baseline conditions to support the potential development of “spin-off” projects, which may result from the evaluation. The baseline conditions documentation and watershed assessment will meet the Federal objective to establish the without project conditions. All models developed shall be consistent/interchangeable across all tasks, when feasible.

The contractor, with the support of project sponsors, will publish information in a form useful to people and relevant entities in Sonoma and Mendocino Counties. The WMP shall use when feasible, other Russian River Watershed planning efforts, i.e.: the CDFG Russian River Basin Fisheries Restoration Plan, the draft NMFS Recovery Effort (including Section 7 consultation), Region 1 Water

Quality Control Board Water Quality Control Plan for the North Coast Region, Federal Energy Regulatory Commission (FERC) State CESA Recovery Plan, No. 77-110 (The Potter Valley Project), Sonoma and Mendocino General Plans (as well as pending updates), and pending Russian River Total Maximum Daily Loads.

Tasks 1 through 6 may annotate “Potential Actions” identified as “Critical Issues” in the POA, (i.e.: Include POA Action Item #...). The relevant description of identified Action Items should be considered when completing the Tasks. Based upon the POA and other relevant planning efforts, complete the following tasks.

COMPONENT 1 - WATERSHED ADAPTIVE MANAGEMENT PLAN

SECTION 1: Baseline Watershed Assessment

Through Section 1 of the study, the contractor will **describe watershed conditions for restoration and protection potential** by using existing watershed information and data. An important starting point and source for that data is RRIIS. In addition, this assessment should consider protocols and recovery goals being developed by NOAA Fisheries, CDFG Basin Recovery and Statewide Coho Salmon Recovery Strategies, RWQCB Basin Plan, Natural Resources Conservation Service (NRCS) Technical Manual, the Federal Guide for Watershed Assessment other resource organization manuals, and local watershed group plans and assessments. This will include a synthesis of existing information for the watershed and its tributaries into a format that is accessible to the general public, local government, and potential funding sponsors and identification of gaps in the existing information that will be needed to complete the WMP goals and objectives. Task 1.A through 1.E are requested to complete the watershed assessment and should be conducted with the final deliverable of watershed multiple rankings as described in Task 1.E. In addition, the contract will provide for public outreach as described in each task. This should include, when appropriate for the task and recommended by the WMP Technical Committee, providing updates and create awareness for the plan and its progress, gathering and incorporating input on plan elements and content, and building partnerships for plan implementation.

Baseline Task 1.A. Compile existing data and information for the Russian River Watershed and tributaries. Parameters for the following categories should be considered:

1. Hydrology, including water supply, use, and storage;
2. Flood Plain;
3. Sediment;
4. Water Quality;
5. Riparian Habitat;
6. Geology;
7. Biota; and
8. Human Impacts

In addition to these categories, conditions parameters that provide indication of human influences on the watershed should be considered. These include among others: land use, land use change, development pressure, land ownership (public/private), vegetation change detection, population density/change, stream crossings, recreation, road density, stream canopy, water diversions, point sources (treatment facilities, businesses), and non-point (ag, urban, mines).

Vulnerability/Recovery parameters that serve as response variables and indicate a risk to degradation and opportunity for restoration and conservation should also be considered. These include among others: erodible soils, riparian land, lakes and wetlands, aquatic listed species, fisheries, impaired

waters, high quality and quantity water, drinking water, recreation. These suggested parameters are a minimum that should be considered when compiling the baseline conditions database. Existing data will be standardized by conversion to percentage, number, or area density.

The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

Deliverables: 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
2) Baseline conditions database loaded on RRIIS with corresponding values for respective category, condition, and vulnerability parameters for each watershed.
3) Summary of implemented public outreach measures.

Task Option 1.B. Baseline data analysis and gap identification of each watershed for the category, condition, and vulnerability parameters. This includes evaluation of data quality and identification of lacking data for category, condition, and vulnerability parameters within each watershed. Review the recent data gaps analysis conducted by the RRIIS contract team. Because that analysis partially, and may fully, fulfill the needs of this task it should be considered when estimating the resources needed to complete the task. The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

Deliverables: 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
2) Report that provides a description of data quality, identifies data gaps, and assesses baseline conditions database's level of readiness to conduct watershed assessment modeling.
3) Summary of implemented public outreach measures.

Task Option 1.C. Fill data gaps through additional data collection to a level sufficient to complete the critical tasks 1.D and 1.E. Step one of this task is to develop, propose, and receive approval of a work plan to conduct this work. Approval will be sought from the WMP Technical Committee and USACE. Step two of this task is to complete the work agreed to in the work plan. Review a recent data gaps analysis conducted by the RRIIS contract team. Because this analysis partially, and may fully, fulfill the needs of this task it should be considered when estimating the resources needed to complete the task. The contractor is directed to complete this task within one year and with a maximum funding of \$100,000. The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

Deliverables: 1) Work plan to fill data gaps and make ready the baseline conditions database to conduct baseline watershed assessment including proposed and approved public outreach measures.
2) Additionally collected data documented and loaded on RRIIS.
3) Summary of implemented public outreach measures.

Task Option 1.D. Synthesize existing and collected data compiled through Tasks 1.A to 1.C for each respective watershed to make ready the baseline conditions database for watershed assessment and ranking in Task 1.E. The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

- Deliverables:** 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
 2) Baseline conditions database ready for watershed assessment and ranking.
 3) Summary of implemented public outreach measures.

Task Option 1.E. Develop criteria and rank watersheds according to their potential for conservation and restoration potential. The objectives of that potential and criteria for ranking the watersheds will be proposed by the contractor and approved by the WMP Technical Committee. Examples could include conservation and restoration potential to provide cold water fishery habitat, decrease watershed drainage density through road drainage improvements and urban storm water runoff management, or improve surface water quality. This is a decision for the council and its committee and partners to make in collaboration with the contractor. The critical issues identified in Chapter 4 of the POA should be considered in developing this criteria and rankings. Develop criteria that are technically adequate and rank watersheds for conservation and restoration potential according to the multiple ranking objectives. A condition total and vulnerability total ranking will be provided for each watershed. The most adverse effect will be ranked lowest. Methods to consider in conducting this assessment and ranking include Northern California Watershed Assessment Program, as well as Arkansas, Oregon, and Washington watershed assessment methods. In addition, the ecological scorecard approach implemented by the Bay Institute for San Francisco Bay provides useful context to establish these rankings. A scorecard approach is requested as part of the WMP monitoring plan (Task 4.A) and as a result should be considered at this stage of the project. The ranking may be conducted through statistical modeling in which the variability in a vulnerability parameter, such as stream canopy for cold water fishery habitat, is explained by the condition variables. In addition, the weighting of individual parameters and the use of ranking groups instead of a continuous ranking value may be appropriate in this effort. Respective criteria and watershed rankings will be completed for each of the determined ranking objectives. The criteria and watershed rankings will:

- Use the data and information compiled in Tasks 1.A through 1.D;
- Provide a set of indicators of watershed health to evaluate the success or failure of watershed management actions;
- Apply criteria to all watersheds in the Russian River watershed;
- Rank each watershed, group adjacent watersheds, and describe a desired future condition of each watershed that closely approximates natural conditions to the degree practicable;
- Map each watershed on a Russian River watershed map to illustrate ranking of condition and vulnerability parameters. Use a color code to indicate where the greatest positive influence on watershed health can be achieved; and
- Be loaded on to RRIIS.

The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

- Deliverables:** 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
 2) Proposed and approved ranking criteria.
 3) Map each ranking with embedded supporting data.
 4) Watershed ranking and maps loaded on RRIIS.
 5) Summary of implemented public outreach measures.

Task Option 1.F. Synthesize Baseline Watershed Assessment There may be an opportunity for a project partner to complete one or more of Tasks 1.A through 1.F Baseline Watershed Assessment. If a project partner were to fund the completion of a portion of this section, it is the responsibility of the partner to ensure the report submitted meets all elements of the task(s). The contractor will collaborate with the partner(s) and their contractor to ensure the information fulfills the criteria indicated above and reviews the report for adequacy and quality control. The report and relevant data will be posted on the RRIIS website.

Deliverables: 1) Report synthesizing partner's completion of this section and the use of that information for completion of the Plan component.
2) Summary of implemented public outreach measures.

SECTION 2 - Draft Watershed Management Plan

In this section of the study, the contractor will draft **the Russian River Watershed Adaptive Management Plan (WMP)** using the watershed rankings to indicate where opportunities for watershed restoration and protection exist. The contractor will screen and conduct implementation cost analysis of management measures that are appropriate and relevant to the baseline condition documentation and watershed rankings completed in Tasks 1.A through 1.E. The rankings and screened management measures will then be compiled into the Draft WMP. In addition, the contract will provide for public outreach as described in each task. This should include, when appropriate for the task and recommended by the WMP Technical Committee, providing updates and creating awareness for the plan and its progress, gathering and incorporating input on plan elements and content, and building partnerships for plan implementation.

Task Option 2.A: Develop Russian River Watershed Plan Management Measures based on the multiple watershed ranking results from Tasks 1.A through 1.E. Identify, evaluate and describe management measures to protect and restore the hydrologic and biological integrity of the watershed, and to conserve and restore according to ranking conducted in Task 1.A through 1.E. For example, watersheds may be ranked in Task 1.E according to road drainage density and road maintenance. In this case, appropriate and relevant management measures to be identified would include road drainage improvement, road decommissioning, and road maintenance programs. It is important that identified management measures be grounded in what is currently provided for under existing land use policies (e.g. County General Plans) with the potential to recommend changes to that policy as management measures themselves. The generation of management measures should consider the potential actions listed in Chapter 4 of the POA, as well as the detailed potential actions in Appendix IV of the POA. The management measures that at a minimum should be considered include: water quality and quantity objectives that will meet or exceed current regulations for stream protection; integrated pest management; erosion and sediment control; storm water retention; vegetated buffers; mitigation banking for comparable purposes; sediment retention structures; improve groundwater recharge/retention; conservation easements and other incentive programs; road maintenance programs; utilization of alternative treatment systems such as constructed wetlands, composting toilets, and oxidation lagoons; and other education programs and public policies. Key considerations in selecting measures are:

- Summary of the intended functions and design characteristics of the management measures;
- Use existing implementation plans for water quality/quantity management measures within the watersheds and determine their performance effectiveness; and

- Selection of management measures that address, as solutions, the causes of vulnerability identified through the watershed rankings.

These measures shall encompass appropriate and relevant practices, policies, programs, and projects and also integrate beneficial and suitable uses of the watershed including flood control, sediment management, economic development, urban uses, agricultural uses, recreation, water conservation, groundwater management, environmental restoration, and water quality compliance.

The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

Deliverables: 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
2) List of appropriate and relevant management measures to be screened in Task Option 2.B.
3) Summary of implemented public outreach measures.

Task Option 2.B. Develop a Screening Matrix and Screen Management Measures to identify the most appropriate and feasible measures to implement within the Russian River and its tributaries. Develop/compare selection criteria for evaluating various management measures with site conditions and the probability for implementation. Evaluate watershed management plan measures through feasibility screening of key issues. The screening will include an assessment of differing levels of intervention including a "no action alternative" that projects the Russian River watershed conditions in Sonoma and Mendocino Counties with no change in existing programs/policies. It is important that identified management measures be grounded in what is currently provided for under existing land use policies (e.g. County General Plans) with the potential to recommend changes to that policy as management measures themselves. The screening matrix should at a minimum give consideration to the measures' effects on flood protection, sediment transport, erosion, habitat and corridor preservation, land uses, and surface and ground water quality and quantity, as well as the probability for implementation. Rank measures according to but not limited to the following indices: physical impact; efficiency; operational requirements; probability of implementation; private and public economic costs and benefits; ecosystem benefits; and outcomes. The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

Deliverables: 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
2) Document screened management measures with description of applied evaluation matrix, indices, and indices scores for each measure document.
3) Summary of implemented public outreach measures.

Task Option 2.C. Complete a cost/benefit analysis of the screened management measures identified in Task 2.B including costs and benefits of not implementing the projects. This analysis will document the management measures implementation costs on a unit basis. Examples could include cost per road mile to upgrade road drainage or costs per acre to purchase conservation easements or costs to review and implement policies. Costs should also reflect any lost revenue or income on investment. The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

- Deliverables:** 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
 2) Report of projected implementation costs for each of the screened management measures on unit basis.
 3) Summary of implemented public outreach measures.

Task Option 2.D. Complete the Draft Russian River Watershed Management Plan (WMP)

WMP that is clearly organized to follow a logical sequence in documenting the plan formulation process through to plan development. Provide verification of scientific protocols and other supporting documentation (within the body of the document or as technical appendices) of the watershed rankings and management measure selection and screening. The WMP shall include strategies and tools for reaching consensus among various stakeholders.

The WMP should include summaries of Tasks 1 and 2 including the following elements:

- Executive summary
- Incorporate planning watershed baseline conditions, assessment, and rankings.
- Incorporate decision matrix that summarizes the essential features of the management measures available for comparison and consideration.
- Justification/methodology for selecting recommended management strategy.
- Recommend watershed management measures based upon the performed implementation costs analysis. Focus shall be on balancing political and stakeholder interests that would make it possible to achieve consensus but still maintain the fundamental technical objectives.
- Projection of Russian River watershed conditions in Sonoma and Mendocino Counties with no change in existing programs/policies.
- Management measures implementation cost analysis.
- Sections for (1) monitoring and data collection networks that may be required, including surface/groundwater monitoring, (2) agencies that could have responsibility for implementation, and (3) an evaluation program to determine the effectiveness of the measures (These will serve as place/holders for work to be completed in Tasks 3 and 4).

The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

- Deliverables:** 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
 2) Draft Watershed Management Plan loaded on RRIIS and distributed to RRWC WMP Technical Committee members and RRWC members.
 3) Summary of proposed, approved, and implemented public outreach measures.

Task Option 2.E. Synthesize Draft Watershed Plan There may be an opportunity for a project partner to complete one or more of Tasks 2.A through 2.D Draft Watershed Plan. If a project partner were to fund the completion of a portion of this section, it is the responsibility of the partner to ensure the report submitted meets all elements of the task(s). The contractor will collaborate with the partner(s) and their contractor to ensure the information fulfills the criteria indicated above and reviews the report for adequacy and quality control. The report and relevant data will be posted on the RRIIS website. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

- Deliverables:** 1) Report synthesizing partner's completion of this section and the use of that information for completion of the Plan component.

3) Summary of implemented public outreach measures.

SECTION 3 - Implementation Plan

The contractor will complete the tasks in this section to **develop the plan of implementation** for the WMP. This will include advanced planning and design of the screened management measures identified in Tasks 2.A through 2.C. In addition, the implementation plan should provide direction for implementation through the identification of lead agencies and organizations for the implementation of the management measures as well as potential funding sources to carry out that implementation. In addition, the contract will provide for public outreach as described in each task. This should include, when appropriate for the task and recommended by the WMP Technical Committee, providing updates and creating awareness for the plan and its progress, gathering and incorporating input on plan elements and content, and building partnerships for plan implementation.

Task Option 3.A. Develop demonstration management measure site designs for the screened measures (Tasks 2.A through 2.C) within different watersheds to protect and restore the river and its tributaries. These designs will be developed so that any willing and appropriate agency or group can implement the measures. Develop detailed plans with technically supportable design and planning documentation of the recommended protection and restoration projects, complete with:

- Evaluation of preferred alternatives;
- A checklist of the necessary environmental compliance (e.g. NEPA/CEQA) to support the implementation of the projects and incorporate discussion of the opportunities for basinwide permits by relevant regulatory agencies, including regional 404 and NPDES permits;
- Detailed design and specifications;
- Timeline for implementation;
- Necessary ordinance compliance;
- Restoration strategies;
- Recommendations for an ongoing monitoring program to measure project effectiveness in the ecosystem including upland projects (refer to Task 4.C);
- Recommended funding sources;
- Partnership opportunities; and
- Identification of potential funding sources;

The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

Deliverables: 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
2) Demonstration management measure site designs document.
3) Summary of implemented public outreach measures.

Task Option 3.B. Develop WMP Implementation Plan complete with timeline and budget. This plan should consider implementation of the screened management measures including identification of the appropriate level and approach to implementation (e.g. local government, adoption, educational program, construction and maintenance, and others). In developing this plan, the contractor should consider the recommendations for implementation provided in Chapter 5 of the POA. The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

- Deliverables:** 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
 2) WMP Implementation Plan
 3) Proposed, approved, and implemented public outreach measures.

Task Option 3.C. Synthesize Implementation Plan There may be an opportunity for a project partner to complete one or more of Tasks 3.A through 3.B Implementation Plan. If a project partner were to fund the completion of a portion of this section, it is the responsibility of the partner to ensure the report submitted meets all elements of the task(s). The contractor will collaborate with the partner(s) and their contractor to ensure the information fulfills the criteria indicated above and reviews the report for adequacy and quality control. The report and relevant data will be posted on the RRIIS website.

- Deliverables:** 1) Report synthesizing partner's completion of this section and the use of that information for completion of the Plan component.
 3) Summary of implemented public outreach measures.

SECTION 4 - Monitoring Plan

Through this section of the study the contractor will develop and finalize the WMP **monitoring plan**. The monitoring plan will include methods for data collection, compilation, and analysis to assess the long term trends of identified vulnerability parameters, as well as the implementation and effectiveness of screened management measures. This monitoring plan should identify measurable goals linked with specific purposes for the protection and restoration of the watershed. One purpose is to provide adequate information to governments, agencies, landowners, and other interested parties to assess and compare the potential costs and benefits of specific actions. Also, identify an accountability process for decision makers to support wise decisions concerning land use within the watershed, consistent with the overall WMP goals. The monitoring plan should account for a 50 year timeline and recognize that monitoring methods, needs, and requirements will change over that duration. In developing this plan the contractor should also consider and coordinate monitoring recommendations with ongoing monitoring currently conducted by local jurisdictions, special districts, and other organizations in the watershed.

In addition, the contract will provide for public outreach during the development of the monitoring plan as described in each task. This should include, when appropriate for the task and recommended by the WMP Technical Committee, providing updates and creating awareness for the plan and its progress, gathering and incorporating input on plan elements and content, and building partnerships for plan implementation.

Task Option 4.A. Develop watershed conditions scorecard that builds on the baseline conditions and watershed assessment in Tasks 1.A through 1.E. as a starting point. This scorecard will track parameter changes through time as an indicator of WMP levels of success. In developing this scorecard the contractor should consider the ecological scorecard approach applied by the Bay Institute for the San Francisco Bay Index.

The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

- Deliverables:** 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
 2) Watershed conditions scorecard document.

3) Summary of implemented public outreach measures.

Task Option 4.B. Develop implementation monitoring methods to document management measure implementation. Methods should include detailed protocols for the duration and frequency of data and information collection, as well as the costs, capacity, and expertise required to conduct that monitoring. Proposed monitoring methods need to be appropriate and relevant to the types of management measures implemented including education programs, public policies, upland projects, as well as stream restoration. The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

Deliverables:

- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
- 2) Implementation monitoring methods report.
- 3) Summary of implemented public outreach measures.

Task Option 4.C. Develop effectiveness monitoring methods to document the long-term effectiveness of implemented management measures. Methods should include detailed protocols for the duration and frequency of data and information collection, as well as the costs, capacity, and expertise required to conduct that monitoring. Proposed monitoring methods need to be appropriate and relevant to the types of management measures implemented including education programs, public policies, upland projects, as well as stream restoration. The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

Deliverables:

- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
- 2) Effectiveness monitoring methods report.
- 3) Summary of implemented public outreach measures.

Task Option 4.D. Complete the WMP monitoring plan that incorporates the watershed condition scorecard, implementation monitoring, and effectiveness monitoring into a final monitoring plan. This plan should include a monitoring calendar and schedule identifying the duration and frequency with which specific monitoring tasks are to be done. The plan will also provide direction on database management including the compilation, storage, and analysis of collected information and data. Lastly, the plan will provide recommendations for the format and venue for reporting monitoring results.

The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task.

Deliverables:

- 1) WMP Monitoring Plan.
- 2) Summary of proposed, approved, and implemented public outreach measures.

Task Option 4.E. Synthesize Monitoring Plan There may be an opportunity for a project partner to complete one or more of Tasks 4.A through 4.D Monitoring Plan. If a project partner were to fund the completion of a portion of this section, it is the responsibility of the partner to ensure the report submitted meets all elements of the task(s). The contractor will collaborate with the partner(s) and their contractor to ensure the information fulfills the criteria indicated above and reviews the report for adequacy and quality control. The report and relevant data will be posted on the RRIIS website.

Deliverables:

- 1) Report synthesizing partner's completion of this section and the use of that information for completion of the Plan component.

- 3) Summary of implemented public outreach measures.

SECTION 5 - Final Russian River Watershed Adaptive Management Plan

Task Option 5.A. Complete the Final WMP that will incorporate the watershed baseline conditions and assessment (Tasks 1.A through 1.E), screened management measures and draft WMP (Tasks 2.A through 2.D), management measure implementation (Tasks 3.A through 3.C), and monitoring (Tasks 4.A through 4.C). The completion of this plan will include a public review period of 180 days to collect comments from the RRWC and local communities before being presented to appropriate entities.

The contractor will also propose, receive approval, and implement appropriate public outreach measures for this task. This should include, when appropriate for the task and recommended by the WMP Technical Committee, providing updates and creating awareness for the plan and its progress, gathering and incorporating input on plan elements and content, and building partnerships for plan implementation. A Work and/or Study Plan will be provided to the WMP Technical Committee for concurrence of task steps and protocols.

- Deliverables:**
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures.
 - 2) Final RRWC WMP including 50 hard copies, 200 CDs, and posting on the RRIIS.
 - 3) Summary of implemented public outreach measures.

COMPONENT 2 - RESEARCH

In this component of the study, the contractor will develop and implement research studies for the identified resource topics. This research will be conducted on a select number of watersheds and portions of the mainstem that will be used to validate and calibrate the models and investigations requested in each respective task. It is anticipated that the watershed ranking results in Task 1.E will inform this research. As a result the contractor, RRWC WMP Technical Committee and its partners will need to reassess the relevance and relative priority for each of the subsequent research tasks as a first step. It is important to reiterate that study tasks can be implemented out of sequence. This latitude affords the flexibility needed to be adaptive in the WMP development. If, at anytime, study work and findings in Tasks 1 through 5 identify a critical need to complete one of the following research tasks, and there are sufficient available resources, than that task can be completed.

Task Option 6.A. Identify Representative Watersheds to support a detailed assessment process. The scale for this assessment would use existing watersheds classification, when possible. If existing watersheds designation is not available, the watershed scale of 15-45 square miles is preferred. Work with the WMP Technical Committee and based on elements stated in the following tasks identify not less than six (6) watersheds and sections of the Russian River main stem that are representative of sub-basins of the Russian River watershed climate, stream dynamics, and indicative of viable salmonid habitats. The selection of the representative watersheds would use the Hydrologic Sub Areas (HSA) units, as identified in the DFG, Russian River Basin Fisheries Restoration Plan. The not less than 6 watersheds analyses completed in Task 6.A through 6.G will be correlated with existing information to evaluate/characterize the entire Russian River watershed (Tasks 1.E and 6.H). As part of the selection of the representative watersheds provide valid analyses comparing the significance of different responses among the streams to ensure they are representative of the Russian River watershed regions. Selection of the not less than six watersheds will include consideration of available scientific

knowledge of the watersheds, active watershed groups, likelihood to foster community support and property access for data collection.

Task Option 6.B1: Develop Hydrologic Regime Analyses to measure water supply, use and storage in the watersheds. The analyses will be used to characterize pre-development water quality and quantity and surface and subsurface flows, current development water quality and quantity and surface and subsurface flows, storage (e.g. off-stream winter storage) and potential future conditions for water use, including possible reductions in the amount of water imported from the Eel River. A Study Plan will be provided to the WMP Technical Committee for concurrence of study protocol. When Task 6.B1 is complete, a Hydrologic Regime Analyses Report will be provided (including: 1. Full analysis of uncertainties in data and conclusions, 2. All data will be geo-referenced, coverages identified, and Federal Geographic Data Committee (FGDC) compliant metadata, 3. Suggested ecosystem based restoration strategies, 4. Guidance for long term monitoring and adaptive management in the basin.). The findings will be presented to the WMP Technical Committee and posted on RRIIS.

a) Utilize available hydrologic studies and investigations to evaluate watersheds' hydrology. The evaluation will provide a foundation for the development of a comprehensive model, compatible with objectives of the POA.

b.) Determine the hydrologic characteristic parameters of the watersheds to manage flows for economic and ecological benefits and establish a flow regime that is appropriate for listed species and the sustainability of natural habitats (e.g. upstream summer migration of fingerlings).

Include POA Action Item #SH2

c.) Map, link and size all aquifers and other subsurface resources throughout the watershed to describe and analyze the watersheds' hydrologic processes and relationship to subterranean water flows - groundwater and underground systems that maintain functional flows for listed species. Identify changes in subsurface flows and determine how ground water pumping and channel modifications may impact the interconnection between groundwater and subterranean and surface flows.

Include POA Action Item #UR3

d.) Develop an annual water budget for the Russian River watershed and its sub-watersheds linked to fisheries biology (specifically fisheries/flow relationship). Evaluate reports and studies regarding dam operations and maintenance projects to determine the watershed-wide impacts of agency activities and potential alternatives (e.g., low and pulse flow mechanisms, new pipelines, inflatable dams and infiltration ponds).

Include POA Action Item #WS1 and WS2

e.) Investigate and map upland groundwater recharge and infiltration to identify opportunities to reduce excessive run-off, improve soil infiltration and increase water-holding capacity in the watershed. Develop standardized criteria for identifying successful and effective recharge and infiltration techniques, for example: restore native perennial grass cover on what are now annual grass watersheds to improve infiltration, elevate groundwater levels, increase dry-season streamflow and restore cooler summer water temperatures.

Include POA Action Item #UR3

f.) Quantify changes to natural run-off patterns in watersheds and determine changes in infiltration and retention rates.

g.) Identify effective techniques and develop additional strategies for improving topsoil conditions in cultivated areas and subsoil water infiltration in upland and riparian areas for the watersheds. Identify activities that enhance opportunities for groundwater recharge and reduce the impact of impermeable surfaces such as erosion and potential opportunities for flash flooding in the stream and its tributaries.

Include POA Action Items #SH4 and WS3

Task Option 6.B2. Synthesize Hydrologic Regime Analyses There may be an opportunity for a project partner to complete Task 6.B1 Hydrologic Regime Analyses. If a project partner were to fund the completion of Task 6.B1, it is the responsible of the partner to ensure the report submitted meets all elements of Task 6.B1. The contractor will collaborate with the partner(s) and their contractor to ensure the information fulfills the criteria indicated above and reviews the report for adequacy and quality control. The report and relevant data will be posted on the RRIIS website.

Task Option 6.C1: Evaluate the Floodplain Hydraulics for watershed flows to determine hydraulic parameters for storms of various return frequencies. Identify and recommend practices that manage a flow regime that is appropriate for listed species and the sustainability of natural habitat in the watersheds, mainstem, and estuary (i.e.: Russian River Coho Salmon Recovery Program). Review data developed by resource agencies (e.g., FEMA, SCWA, USACE, DFG, DWR and NMFS) to improve understanding and applicable policies regarding estuary and channel functions and potential role in flow management. A Study Plan will be provided to the WMP Technical Committee for concurrence of study protocol. In developing and implementing the study plan for this task the contractor should consider and propose conducting this task and Task 6.D1 simultaneously and in an integrated fashion. When Task 6.C1 is complete, a Floodplain Hydraulics Report will be provided including: 1. Full analysis of uncertainties in data and conclusions; 2. All data will be geo-referenced, coverages identified, and FGDC compliant metadata; 3. Suggested ecosystem based restoration strategies; 4. Guidance for long term monitoring and adaptive management in the basin. The findings will be presented to the WMP Technical Committee and posted on RRIIS.

- a.) Investigate and develop a floodplain report with mapping to illustrate behavior and potential erosion and channel migration patterns for the floodplain corridors in the watersheds. Investigate options that sustain a naturalized form and function for the river and its tributaries.
- b.) Evaluate the utilization of floodplain and secondary channels by juvenile and adult salmonids as storm refugia.

Include POA Action Item #SC4

Task Option 6.C2. Synthesize Evaluation of Floodplain Hydraulics There may be an opportunity for a project partner to complete Task 6.C1 Evaluate the Floodplain Hydraulics. If a project partner were to fund the completion of Task 6.C1, it is the responsible of the partner to ensure the report submitted meets all elements of Task 6.C1. The contractor will collaborate with the partner(s) and their contractor to ensure the information fulfills the criteria indicated above and reviews the report for adequacy and quality control. The report and relevant data will be posted on the RRIIS website.

Task Option 6.D1: Assessment of the Watersheds Sediment Regime to understand the natural, existing and future sediment regime in the basin. Quantify watershed sediment production, sediment transport, and sediment deposition. A Study Plan will be provided to the WMP Technical Committee for concurrence of study protocol. In developing and implementing the study plan for this task the contractor should consider and propose conducting this task and Task 6.C1 simultaneously and in an integrated fashion. When Task 6.D1 is complete, a Sediment Regime Report will be provided (including: 1. Full analysis of uncertainties in data and conclusions, 2. All data will be geo-referenced, coverages identified, and FGDC compliant metadata, 3. Suggested ecosystem based restoration strategies, 4. Guidance for long term monitoring and adaptive management in the basin.). The findings will be presented to the WMP Technical Committee and posted on RRIIS. The specific elements of this task would include:

a.) Review previous sedimentation studies conducted in portions of the watersheds to assess watershed and hydraulic conditions, hydrology, applicability of methods, data, and results pertinent to the present conditions. Include the review and identification of major sediment sources within the watersheds, the effects of watershed fires, historic stock grazing, topsoil depletion, agricultural/mining activities on sediment production and channelization for flood control measures that may limit flood plain deposition. Compile the information that may be used to characterize watershed soil erosion rates (influenced by factors such as vegetation, parent material, slope, climate, and management.) and sediment yield.

Include POA Action Item #UR1

b.) Evaluate the watersheds soil and hydrologic characteristics to assess and quantify the erosion potential for specific rainfall events. A range of potential sediment yield or production rates shall be estimated. Measure the turbidity in each stream to account for storm seasonal and annual variability. Identify and develop estimates (with error) of significant active sources of sediment production generated in the watersheds. Evaluate the positive and negative effects of sediment trapping by upstream reservoirs, detention basins, and unpaved roads that may impact downstream sediment delivery estimates.

Include POA Action Item #SH1

c.) Develop a sediment transport relationship (mass per unit area per year) for tributaries' reaches for the suspended load and the bed load. Evaluate how new materials enter the system and how the redistribution of sediment within the system occurs. Analyze bed material transport capacity by applying applicable sediment transport relationships between total load, hydraulic capacity and grain-size distribution (percentage by volume in boulder, cobble, gravel, sand, and fine size categories).

Include POA Action Item #UR1

d.) Identify appropriate strategies that are applicable to the watersheds to manage sediment sources to improve water quality and habitat conditions (e.g., sediment management measures may include: riparian setback and revegetation, management of large wood in channels, vineyard erosion control and prevention practices, road maintenance and reconstruction practices, permissible land-use activities in landslide hazard areas, etc.).

Include POA Action Item #LU1

Task Option 6.D2. Synthesize Assessment of the Watersheds Sediment Regime There may be an opportunity for a project partner to complete Task 6.D1 Assessment of the Watersheds Sediment Regime. If a project partner were to fund the completion of Task 6.D1, it is the responsible of the partner to ensure the report submitted meets all elements of Task 6.D1. The contractor will collaborate with the partner(s) and their contractor to ensure the information fulfills the criteria indicated above and reviews the report for adequacy and quality control. The report and relevant data will be posted on the RRIIS website.

Task Option 6.E1: Assessment of the Watersheds Surface and Subsurface Water Quality and Quantity regime to evaluate the major sources of existing/future point and non-point pollution in the watersheds. A Study Plan will be provided to the WMP Technical Committee for concurrence of study protocol. When Task 6.E1 is complete, a Surface and Subsurface Water Quality Report will be provided (including: 1. Full analysis of uncertainties in data and conclusions, 2. All data will be geo-referenced, coverages identified, and FGDC compliant metadata, 3. Suggested ecosystem based restoration strategies, 4. Guidance for long term monitoring and adaptive management in the basin.). The findings will be presented to the WMP Technical Committee and posted on RRIIS.

- a.) Use the water quality parameters identified in the POA to address surface and/or subsurface problems of concern in the watershed.
Include POA Action Item #WQ3
- b.) Identify historic and current problems with water quality impairment in the watershed. Identify and map restoration solutions for sources of pollution. Collaborate with agencies, organizations and citizens to identify programs and projects that lead to improved water quality.
Include POA Action Items #WQ 1 and 6
- c.) Identify methods and feasibility for treating and reusing wastewater in the watershed.
Include POA Action Items #WQ1

Task Option 6.E2. Synthesize Assessment of the Watersheds Surface and Subsurface Water Quality and Quantity There may be an opportunity for a project partner to complete Task 6.E1 Assessment of the Watersheds Surface and Subsurface Water Quality. If a project partner were to fund the completion of Task 6.E1, it is the responsible of the partner to ensure the report submitted meets all elements of Task 6.E1. The contractor will collaborate with the partner(s) and their contractor to ensure the information fulfills the criteria indicated above and reviews the report for adequacy and quality control. The report and relevant data will be posted on the RRIIS website.

Task Option 6.F1. Evaluate Riparian and Upland Habitat by stream reach and slope to preserve natural vegetation, reduce invasive species, and sustain economic and environmental benefits to the watersheds. Recommend the appropriate vegetation management techniques based on specific land conditions and interconnections within the ecosystem. A Study Plan will be provided to the WMP Technical Committee for concurrence of study protocol. When Task 6.F1 is complete, a Riparian and Upland Habitat Report will be provided (including: 1. Full analysis of uncertainties in data and conclusions, 2. All data will be geo-referenced, coverages identified, and FGDC compliant metadata, 3. Suggested ecosystem based restoration strategies, 4. Guidance for long term monitoring and adaptive management in the basin.). The findings will be presented to the WMP Technical Committee and posted on RRIIS.

- a.) Evaluate the effects of changes in the channel geometry on riparian habitat based on hydraulic and sedimentation conditions. Evaluate the relationship and effects of reduced flow regimes on riparian habitat viability.
Include POA Action Item #SC2
- b.) Map the historical and current riparian and upland habitats in the watersheds. Use historical analysis and field geomorphic-and-ecological analyses to define relationship between large wood load and amount of deep pools, and amount and quality of spawning sites. The evaluation shall use, but not limited to, aerial photographs, existing biologic information, infrared photographs, and ground surveys. Include local antidotal information.
Include POA Action Item #SH6
- c.) Identify desired future extent of upland and riparian habitat through an analysis of historical and recent aerial photography and healthy habitat form and function.
- d.) Propose appropriate methods to improve structure and function of stream corridor. Identify specific reaches where opportunities for active introduction of large wood appear to be favorable to improve frequency and quantity of spawning sites and warranted given current habitat conditions and geomorphic attributes, and property protection and public safety issues.
Include POA Action Item #UR5
- e.) Identify and rank vegetation management approaches and methods for riparian and upland habitats with appropriate conditions (e.g., flora and fauna) and locations (e.g., upland areas), including non-toxic removal and replacement methods appropriate for the watersheds. Complete

quantitative assessment of current levels of large wood loading (volume per area of channel) and functions (e.g., pool, bar, or step formation; bank stability, in-channel cover, spawning gravel retention, etc.) based on field surveys. Talk with property owners to request input on what works. Include POA Action Items #SH1, SC2 & 5 and UR2

f.) Define key high value upland habitat areas. Identify upland areas in the watershed that provide valuable habitat (e.g., oak woodlands, meadows, and forests). Identify appropriate conservation or restoration measures to retain high value upland habitat.

g.) Define key high value riparian habitat areas in the watershed. Identify in and near stream areas that provide valuable riparian habitat (seral stage trees and willow forest). Identify appropriate conservation or restoration measures to retain high value riparian habitat.

h.) Identify important geomorphic features and processes for the function and sustained maintenance of riparian and upland habitat in the watersheds. This analysis will include a definition of the relationships between hydrogeomorphic properties and the functions of stream corridors and wetlands.

Include POA Action Items #SC1 and RA2

i.) Identify location specific vegetation management techniques to preserve natural vegetation, reduce invasive species, and benefit the watershed.

Include POA Action Item #UR2

Task Option 6.F2. Synthesize Evaluate Riparian and Upland Habitat There may be an opportunity for a project partner to complete Task 6.F1 Evaluate Riparian and Upland Habitat. If a project partner were to fund the completion of Task 6.F1, it is the responsible of the partner to ensure the report submitted meets all elements of Task 6.F1. The contractor will collaborate with the partner(s) and their contractor to ensure the information fulfills the criteria indicated above and reviews the report for adequacy and quality control. The report and relevant data will be posted on the RRIIS website.

Task Option 6.G1. Evaluate Human Impacts on Watershed Resources by examining land use, development, and current management practices in the watershed. Recommend appropriate sustainable land use management techniques based on specific land conditions and human impacts within the ecosystem. A Study Plan will be provided to the WMP Technical Committee for concurrence of study protocol. When Task 6.G1 is complete, a Social and Resources Relationships Report will be provided (including: 1. Full analysis of uncertainties in data and conclusions, 2. All data will be geo-referenced, coverages identified, and FGDC compliant metadata, 3. Suggested ecosystem based restoration strategies, 4. Guidance for long term monitoring and adaptive management in the basin.). The findings will be presented to the WMP Technical Committee and posted on RRIIS.

a.) Identify the practices damaging to watershed health and function occurring. Identify the social, political, and regulatory issues preventing resolution of the issues and the steps involved to resolve the situation.

Include POA Action Item #UR1, UR4, RA1, RA2, and SA2

b.) Use present trends to predict areas most at risk from human impacts.

c.) Develop programs to encourage innovative urban development (e.g. Village Homes, Davis, CA).

Include POA Action Item #SH1 and RA2

d.) Develop programs to encourage local watershed stewardship, identify micro watershed conditions and interface with agencies.

Include POA Action Item #UR1, WQ2, WQ3, LU1, LU2, RA1, SA1, SA2, PE1, PE2, and PE3

e.) Provide informational exchange programs that highlights restoration protocols and regulatory actions. The programs shall be accessible on RRIIS.

Include POA Action Item #LU1 and LU2

Include POA, Strategy Area III-A: Land Use, Development, and Management (LU)

Task Option 6.G2. Synthesize Evaluate Human Impacts on Watershed Resources There may be an opportunity for a project partner to complete Task 6.G1 Evaluate Human Impacts on Resources. If a project partner were to fund the completion of Task 6.G1, it is the responsible of the partner to ensure the report submitted meets all elements of Task 6.G1. The contractor will collaborate with the partner(s) and their contractor to ensure the information fulfills the criteria indicated above and reviews the report for adequacy and quality control. The report and relevant data will be posted on the RRIIS website.

Task Option 6.H. Extrapolate Information from Representative Watersheds (Tasks 6.A through 6.G) to evaluate, characterize, and correlate the Russian River watershed conditions. Link these conditions to serve as indicators for long-term management actions. This process will have the input and concurrence of a multidisciplinary team, familiar with the watershed approach, and representative of the RRWC goals and interests. The findings will be presented to the WMP Technical Committee and posted on RRIIS.

IV. SUBMITTALS AND CHECK POINTS AND SCHEDULE

The minimum requirements to fulfill this scope of work are as follows:

WMP will be provided in both hard copy and electronic form reproduced by color copier and electronically. WMP will include computer generated color maps with the written document and maps searchable by key word and linked with GIS mapping on RRIIS.

Provide a flowchart that outlines specific products with preliminary measurable products and timeline to meet the needs of each Task, including prearranged meeting dates with the WMP Technical Committee, RRWC and update meetings with local municipalities.

Provide an agenda and any supporting documentation at least 48 hours in advance of WMP Technical Committee monthly meetings. Provide minutes summarizing the WMP Technical Committee meetings with the contractor in attendance within seven days of the meeting. Provide material to be presented at the biannual RRWC meetings two and half weeks in advance of the RRWC meeting for the agenda setting Steering Committee meeting and for loading on the RRWC website. Provide bi-monthly status report of on-going project development.

Periodically (minimum monthly) update RRIIS (RRWC website) to reflect changes and on-going development of WMP.

COMPONENT 1 - WATERSHED ADAPTIVE MANAGEMENT PLAN

SECTION 1 - Baseline Watershed Assessment

Baseline Task 1.A. Compile existing data and information

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 3 month of NTP.
 - 2) Baseline conditions database loaded on RRIIS with corresponding values for respective category, condition, and vulnerability parameters for each watershed within 10 months of NTP.
 - 3) Summary of implemented public outreach measures within 12 months of NTP.

Task Option 1.B. Baseline data analysis and gap identification

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.
 - 2) Report that provides a description of data quality, identifies data gaps, and assesses baseline conditions database's level of readiness to conduct watershed assessment modeling within 3 months of completing Task 1.A or NTP.
 - 3) Summary of implemented public outreach measures within 5 months of completing Task 1.A or NTP.

Task Option 1.C. Fill data gaps

- Deliverables:
- 1) Work plan to fill data gaps and make ready the baseline conditions database to conduct watershed assessment within 3 months of completing Task 1.B or NTP.
 - 2) Additionally collected data within 9 months of completion of the work plan or NTP.
 - 3) Summary of implemented public outreach measures within 12 months of completing Task 1.B or NTP.

Task Option 1.D. Synthesize existing and collected data

- Deliverables:
- 1) Task Work and/or Study Plan within 1 month of NTP.
 - 2) Baseline conditions database ready for watershed assessment and ranking within 6 months of completing Task 1.C or NTP.
 - 3) Summary of implemented public outreach measures within 6 months of NTP.

Task Option 1.E. Develop criteria and rank watersheds

- Deliverables:
- 1) Task Work and/or Study Plan within 1 month of completing Task 1.D or NTP.

- 2) Proposed and approved ranking criteria within 6 months of completing Task 1.D or NTP.
- 3) Map each ranking with embedded supporting data within 8 months of ranking criteria approval or NTP.
- 4) Watershed ranking and maps loaded on RRIIS within 2 months of completing the ranking maps or NTP.
- 5) Summary of proposed, approved, and implemented public outreach measures within 18 months of NTP.

Task Option 1.F. Synthesize Baseline Watershed Assessment

- Deliverables:
- 1) Report synthesizing partner's completion of this section task(s) and the use of that information for completion of the Plan component within 4 month of NTP.
 - 2) Summary of implemented public outreach measures within 4 month of NTP.

SECTION 2 - Draft Watershed Management Plan

Task Option 2.A: Develop Russian River Watershed Plan Management Measures

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.
 - 2) List of appropriate and relevant management measures to be screened in Task Option 2.B within 3 months of completing Task 1.E or NTP.
 - 3) Summary of implemented public outreach measures within 3 months of completing Task 1.E or NTP.

Task Option 2.B. Develop a Screening Matrix and Screen Management Measures

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.
 - 2) Document screened management measures with description of applied evaluation matrix, indices, and indices scores for each measure within 6 months of completing Task 2.A or NTP.
 - 3) Summary of implemented public outreach measures within 6 months of NTP.

Task Option 2.C. Complete a cost/benefit analysis

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.
 - 2) Report of projected implementation costs and benefits for each of the screened management measures on unit basis within 8 months of completing Task 2.B or NTP.
 - 3) Summary of implemented public outreach measures within 6 months of NTP.

Task Option 2.D. Draft Russian River Watershed Management Plan (WMP)

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.
 - 2) Draft Watershed Management Plan loaded on RRIIS and distributed to RRWC WMP Technical Committee members and RRWC members within 4 months of completing Task 2.C or NTP.
 - 3) Summary of proposed, approved, and implemented public outreach measures within 4 months of NTP.

Task Option 2.E. Synthesize Draft Watershed Plan

- Deliverables:
- 1) Report synthesizing partner's completion of this section task(s) and the use of that information for completion of the Plan component within 4 month of NTP.
 - 2) Summary of implemented public outreach measures within 4 month of NTP.

SECTION 3 - Implementation Plan

Task Option 3.A. Develop demonstration management measure site designs

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.
 - 2) Demonstration management measures site designs within 10 months of NTP.
 - 3) Summary of implemented public outreach measures within 12 months of NTP.

Task Option 3.B. Develop WMP Implementation Plan

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.
 - 2) WMP Implementation Plan within 6 months of completing Task 3.A or NTP.
 - 3) Summary of proposed, approved, and implemented public outreach measures within 6 months of NTP.

Task Option 3.C. Synthesize Implementation Plan

- Deliverables:
- 1) Report synthesizing partner's completion of this section task(s) and the use of that information for completion of the Plan component within 4 month of NTP.
 - 2) Summary of implemented public outreach measures within 4 month of NTP.

SECTION 4 - Monitoring Plan**Task Option 4.A. Develop watershed conditions scorecard**

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.
 - 2) Watershed conditions scorecard report within 12 months of NTP.
 - 3) Summary of implemented public outreach measures within 4 months of NTP.

Task Option 4.B. Develop implementation monitoring methods

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.
 - 2) Implementation monitoring methods report within 6 months of completing Task 4.A or NTP.
 - 3) Summary of implemented public outreach measures within 4 months of NTP.

Task Option 4.C. Develop effectiveness monitoring methods

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.
 - 1) Effectiveness monitoring methods report within 4 months of completing Task 4.B or NTP.
 - 2) Summary of implemented public outreach measures within 4 months of NTP.

Task Option 4.D. Complete the WMP monitoring plan

- Deliverables:
- 1) Project Work and or Study plan within 1 month of NTP.
 - 2) WMP Monitoring Plan within 6 months of completing Task 4.C.
 - 3) Summary of implemented public outreach measures within 6 months of completing Task 4.C or NTP.

Task Option 4.E. Synthesize Implementation Plan

- Deliverables:
- 1) Report synthesizing partner's completion of this section task(s) and the use of that information for completion of the Plan component within 4 month of NTP.
 - 2) Summary of implemented public outreach measures within 4 month of NTP.

SECTION 5 - Final WMP**Task Option 5.A. Complete the Final WMP**

- Deliverables:
- 1) Task Work and/or Study Plan including task steps and protocols and proposed and approved public outreach measures within 1 month of NTP.

- 2) Final Draft RRWC WMP available for review within 8 months of completing Task 4.D or NTP.
- 3) Final RRWC WMP including 50 hard copies, 200 CDs, and posting on the RRIIS within 16 months of NTP.
- 4) Summary of implemented public outreach measures.

A Final Draft WMP will be completed 16 months after the completion of Task 4.D. A final draft will be submitted to the RRWC for review and comments. After incorporating all applicable RRWC comments, the final draft of the WMP will be made available for public comment for 180 days. After 180 day review period, the contractor, with the support of the RRWC, will presents the WMP to both Mendocino and Sonoma County Board of Supervisors, a minimum of eight (8) City Councils, and/or other elected Boards for final review and comments.

After document review is complete and all applicable comments are incorporated into the WMP, provide a digital copy for loading on RRIIS, 200 CDs and fifty (50) hard copies of the final WMP to U.S. Army Corps of Engineers, San Francisco District. The WMP will be submitted to the South Pacific Division and Headquarters for approval and inclusion into Water Resources Development Act (WRDA), as appropriate. The final plan will be submitted 3 months after completion of final review and comments.

COMPONENT 2: RESEARCH STUDIES

Task Option 6.A: Identify Representative Watersheds

Deliverables: Task Report completed 3 months from NTP.

Task Option 6.B1: Develop Hydrologic Regimes Analyses Deliverables: Task Report completed 30 months from NTP.

Task Option 6B2. Synthesize Hydrologic Regime Analyses within 4 month of NTP

Task Option 6.C1: Evaluate the Floodplain Hydraulics

Deliverables: Task Report completed 24 months from NTP.

Task Option 6.C2: Synthesize Evaluate the Floodplain Hydraulics within 4 month of NTP

Task Option 6.D1: Assessment of the Watershed Sediment Regime

Deliverables: Task Report completed 24 months from NTP.

Task Option 6.D2. Synthesize Assessment of the Watersheds Sediment Regime within 4 month of NTP

Task Option 6.E1: Assessment of the Watershed Surface and Subsurface Water Quality and Quantity

Deliverables: Task Report completed 24 months from NTP.

Task Option 6.E2: Synthesize Assessment of the Watershed Surface and Subsurface Water Quality and Quantity within 4 month of NTP

Task Option 6.F1: Evaluate Riparian and Upland Habitat

Deliverables: Task Report completed 18 months from NTP.

Task Option 6.F2: Synthesize Evaluate Riparian and Upland Habitat within 4 month of NTP

Task Option 6.G1: Evaluate Human Impacts on Watershed Resources

Deliverables: Task Report completed 12 months from NTP.

Task Option 6.G2: Synthesize Evaluate Human Impacts on Watershed Resources within 4 month of NTP

Task Option 6.H1: Extrapolate Information of Representative Watersheds

Deliverables: Task Report completed 6 months after the completion of Tasks 1 through 6 or 6 months after NTP. Task Report will include a summary of Tasks 1 through 6 with explanation of watershed unit comparison analyses.

V. QUALITY CONTROL

All work performed by the contractor will be in accordance with U.S. Army Corps of Engineers, federal, state, and local rules and regulations. The contractor will provide a Quality Control Plan (QCP) to identify the process to ensure the field data, the evaluation, and each plan and report are scientifically supportable/verifiable, including: 1) Full analysis of uncertainties in data and conclusions, 2) All data will be geo-referenced and coverage's and 3) FGDC compliant metadata will be provided.

Federal QA oversight and assess of QC implementation will occur, as necessary, for the duration of the contract.

APPENDIX A: ADDITIONAL CONSIDERATIONS BY TASK

Tasks 1 and 2

Investigate engineering options to create stable form and function for the river and tributaries in spite of the current sediment budget deficit present in the watershed (e.g. grade control structures near the mouths of tributaries incorporating necessary fish passage structures).

Model the extent of channel incision resulting from flow and sediment imbalances in both the mainstem and its tributaries. Use this information to determine the efficacy of historic remediation and the level of active stream bank erosion that may be advisable to restore fluvial geomorphic balance.

Identify highly successful and effective measures (e.g., native plant methods and bioremediation projects) for voluntary and mandatory implementation in areas where natural and human-induced erosion must be minimized or controlled.

Work with state and federal agencies to develop alternative analyses for environmentally sustainable approaches and incentives during permitting. Inventory existing corridor encroachments and evaluate opportunities for incremental restoration. Monitor restoration effectiveness utilizing protocols being developed DFG.

Obtain input from private property owners about their issues and barriers to implementing existing BMPs and continue to work directly with private property owners throughout development processes

Incorporate all variables (e.g., solar radiation) to promote restoration decisions that are based on all known inputs and energy balances.

Develop key protection and restoration measures to restore stream corridors through a variety of stream corridor protection and watershed management methods (e.g., meander corridor setbacks, floodplain and wetland protection, and riparian revegetation). Consider the following in determining appropriate practices/measures: 1) Stream flow patterns, 2) Appropriate locations for levees or offset levees, 3) Impacts related to bank hardening and dams, 4) Recreational access to public land areas, 5) Fish passage, bridge and culvert impacts on velocity, stability, flow and fish passage, 6) Reach specific techniques, 7) Adjacent land values, 8) Landowner participation and community involvement, 9) Effectiveness Monitoring Protocol being developed with UCB and Humboldt State University for implementation throughout the watershed, and 10) recommendations and actions in existing plans.

Task 6.B:

Due to potential impacts from global warming, the watershed management plan will include the effects of global warming to water reliability.

Department of Water Resources has completed a revision of the bulletin that characterizes the groundwater aquifers. Other shallow subsurface water resources have not been as comprehensively documented.

An accurate water budget that is well defined and continuously managed throughout the watershed, including its sub-watersheds, to enhance understanding about the relationship between water

quantity and flow and allow resource management and restoration actions to be comprehensively evaluated for implementation. A usable water budget will accurately catalog diversion (subsurface and surface), transfer, and conservation activities. It will require prioritizing the collection of relevant data and the deployment of gauges and monitoring equipment in streams, tributaries, wells and groundwater supplies.

Ensure the water budget includes comprehensive and continual monitoring systems to identify trends over time and wet and dry season characteristics. Provide the appropriate input of the physical characterization data for the watersheds and the creek systems, including routing parameters for channel and reservoirs/basins. Integrate the erosion process into the rainfall-runoff model utilizing the same model structure.

A stream channel can function as a recharge (stream loses water) or discharge (stream gains water) area depending on the elevation of the groundwater along the stream corridor. Groundwater elevation can vary significantly over short distances along the stream corridor based on subsurface characteristics (The Federal Interagency Stream Corridor Restoration Working Group 1998). Therefore, eliminating stream channel disturbances may help to minimize changes in the distances and connections between groundwater supplies and subterranean and river/stream flows. Use information to recommend improvements to surface and subsurface flows for sustainability of listed species.

Verification will be performed utilizing additional historic data not applied during the calibration process to provide a comparison result from empirically derived parameters. Synthetic design storms shall be analyzed with the calibrated comprehensive watershed models for the range of frequencies being investigated which reflects (1) natural watersheds, (2) existing watershed conditions, and (3) future land use alternatives within the watersheds. The structure of the model developed should be flexible to accommodate additional modifications or manipulations within the watersheds.

Natural run-off patterns are a function of the reference used. Unfortunately, there is no data for pre-European conditions and limited rainfall and runoff data over the last 100 years.

Task 6.C:

Baseline hydraulic analysis shall evaluate the natural and manmade controls that influence the level of flood protection, sedimentation, and erosion potential along stream corridors.

Regulated flows in the mainstem and tributaries have led to channel incision, channelization, diminished gravel recruitment, riparian encroachment and habitat simplification. As a result, salmonid rearing habitat has decreased due to high summer flows in mainstem and increased velocities that make pool stratification impossible (Steiner Environmental Consulting 1996). Instream flow management that considers salmonid needs and life cycles may help to sustain fisheries and beneficial uses within the watershed.

Determine the accuracy of available Water Surface Profile modeling that exist for the watersheds.

Model the hydraulic parameters including top width, slope, velocity, and depth for a range of storms. Develop an overall assessment of the floodplain boundaries and hydraulic characteristics

within the main drainages of the watersheds. Investigate high, medium, and low-frequency storms to assist in identifying flood control needs, floodplain risk, effect on riparian resources, and land use constraints.

A qualitative geomorphic analysis using available data, historic information, and geomorphic principles to identify key factors that may govern creek morphology shall be prepared. Historical limits and boundaries of the riparian habitat shall be used to evaluate the response of the ecosystem to flood events and the natural recovery potential of the creeks. Current channel trends and the formulation of predictions of future behavior through qualitative analysis shall be identified. Locations and causes of lateral erosion shall be investigated.

Task 6.F:

Use vegetation management techniques such as prescribed burning, shaded fuel break and ground mulch included in CDF's Fire Plan and application process.

Use CDF's unit plans for Mendocino and Sonoma County to identify high hazard areas, actions (e.g., prescribed burning, intensive inspection program, shaded fuelbreak, etc.) recommended and rationale provided.