

Executive Summary

Clavey River Watershed Analysis

DWR WAREHOUSE
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US Department of Agriculture,
Forest Service
Pacific Southwest Region

Stanislaus National Forest
19777 Greenly Rd
Sonora, CA 95370

Project Description

We propose to conduct a Watershed Analysis (WA) for the Clavey River Watershed. We also propose to initiate a streamflow and stream condition monitoring element associated with the WA.

The Clavey River is a 157 square mile tributary watershed of the Tuolumne River. The Clavey River is in the upper watershed portion of the ERPP Study Area and is located entirely within the Stanislaus National Forest.

The Clavey River is one of the most significant watersheds in the Sierra Nevada. It is one of the range's last fully free flowing major streams; it is California's first designated Wild Trout Stream; it is one of the state's premier proposed Aquatic Diversity Management Areas because its native fish assemblage is nearly intact; it has one of the highest Index of Biotic Integrity ratings in the Sierra Nevada; and it is proposed as a national Wild and Scenic River.

Although the Clavey watershed has these outstanding attributes it has numerous ecosystem elements whose existing condition remains less than the desired condition. It is essential to analyze the entire watershed for success in restoring portions which are degraded.

Primary Biological/Ecological Objectives

- 1) To conserve the aquatic biodiversity of the Clavey River by optimizing habitat conditions for its native assemblage of fish and other aquatic species.
- 2) To assure that the Clavey River ecosystem is sustainable in the long term, thus enhancing ecological condition within the larger San Joaquin River watershed and the Bay-Delta.

Approach/Task/Schedule

The Clavey River watershed analysis (WA) will be conducted using the USDA Forest Service Pacific Southwest Region watershed analysis guide, "Sustaining Ecosystems, A Conceptual Framework". The tasks for this WA will follow the nine step process outline in the guide. A key task in this process is public collaboration. The product of the analysis is a set of management opportunities which will become projects for conserving/restoring ecological processes in the watershed.

We propose beginning the Clavey River WA in Spring 1998 and finishing in Spring 1999. The monitoring element associated with the WA will extend into the year 2000.

We envision the Clavey River WA as the first phase of a larger analysis of the Tuolumne River watershed within the Stanislaus National Forest. The Tuolumne is a major part of the San Joaquin River basin and, since much of the public land portion of the Tuolumne River is in designated wilderness, it is strategically important to work toward improving ecological condition on the remaining non-wilderness federal land.

Justification for the Project and Funding by CALFED

Ecologically, we believe that this proposal is justified because it addresses a high priority landscape in the upper watershed portion of the ERPP Study Area. We believe the proposal is socially important due to demonstrated high public interest in the Clavey River watershed. Economically the proposal is necessary to supplement very limited Forest Service funds.

Budget Costs and Third Party Impacts

We request \$210,000 in CALFED funding for assistance in the Clavey River watershed analysis and monitoring element. Third party impacts will accrue as beneficial effects on the local economy of this region from the employment and monetary recirculation generated by projects developed out of the watershed analysis.

Qualifications

The Forest Service has been the land steward for 100 years on lands within the Stanislaus National Forest. We have the ability to conduct landscape scale analyses and to implement and monitor ecosystem restoration activities.

Monitoring

Although this is a watershed planning proposal, we also propose beginning streamflow and stream condition monitoring prior to implementing management activities resulting from the watershed analysis. Doing so will provide pre-treatment data to help determine effectiveness of the management activities.

Local Support/Compatibility with CALFED objectives

The Clavey River watershed has significant local support. We have recently completed a collaborative study with several public and private groups to assess the existing condition of the Clavey's Wild and Scenic River attributes. The principal recommendation from the collaborative group is to conduct a watershed analysis for the entire Clavey River watershed.

We believe this proposal is consistent with CALFED objectives in that restoration of all portions of the CALFED watersheds is necessary for long term ecosystem health. This proposal will lead to implementation of management activities which will enhance ecological condition in a key area within the ERPP Study Area.

Clavey River Watershed Analysis

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RFP Project Group Type

Group 3 - Watershed Management Planning and Implementation.

Project Description

Project Description , Location and Approach

We propose to conduct a watershed analysis (WA) for the Clavey River watershed. We also propose to initiate a streamflow and stream condition monitoring element associated with the WA.

The goal of a WA is to determine the condition and function of ecological processes in a watershed and recommend management practices to maintain or restore them. A WA has not yet been conducted for the Clavey watershed because this process is relatively new and has been delayed by budget constraints.

The Clavey watershed is 100,400 acres (157 square miles) and is entirely within the Stanislaus National Forest in Tuolumne County (Figure 1). The Clavey River is 47 miles long and has numerous perennial tributaries important in sustaining its unique native assemblage of fish (Figure 2). The Clavey is one of the Sierra's last remaining major free flowing rivers.

The Clavey River WA will be conducted using the USDA Forest Service Pacific Southwest Region watershed analysis guide, "Sustaining Ecosystems: A Conceptual Framework" (1995). This WA Guide employs a nine step approach to produce a set of management activities which can be implemented to maintain, enhance or restore ecological processes at the landscape scale.

Our approach to staffing the WA is to use a Forest Service interdisciplinary team of specialists in the resources applicable to the Clavey River watershed. These resource specialties will primarily include hydrology, fisheries, silviculture, range conservation, landscape architecture, fuels and fire management, engineering, wildlife biology and GIS. Other specialties would be used as needed. Outside agencies and groups will provide additional input to the WA process.

We would begin the WA in the spring of 1998 by collating existing information and initiating public participation. Summer and fall of 1998 would be used for original data collection as needed where existing information is not available or sufficient. Winter and spring of 1999 would be used for analysis and synthesis of the information and producing the final product of the WA.

In addition to the Clavey River WA, we propose instituting a streamflow and stream condition monitoring element. We anticipate that benefits of the management activities the WA generates will include an increase in summer/fall base flows and improvement in stream channel condition attributes. It is important to begin pre-project monitoring as soon as possible to be able to compare against post-implementation conditions. The monitoring element would begin in summer 1998 and extend into summer 2000. See the Monitoring section for more details.

Background

With the exception of water developments and gold mining, the Clavey watershed has a similar land use history to other west slope Sierran watersheds. Primary land use has been sheep and cattle grazing, railroad logging, tractor logging, and the development of logging roads. The effects

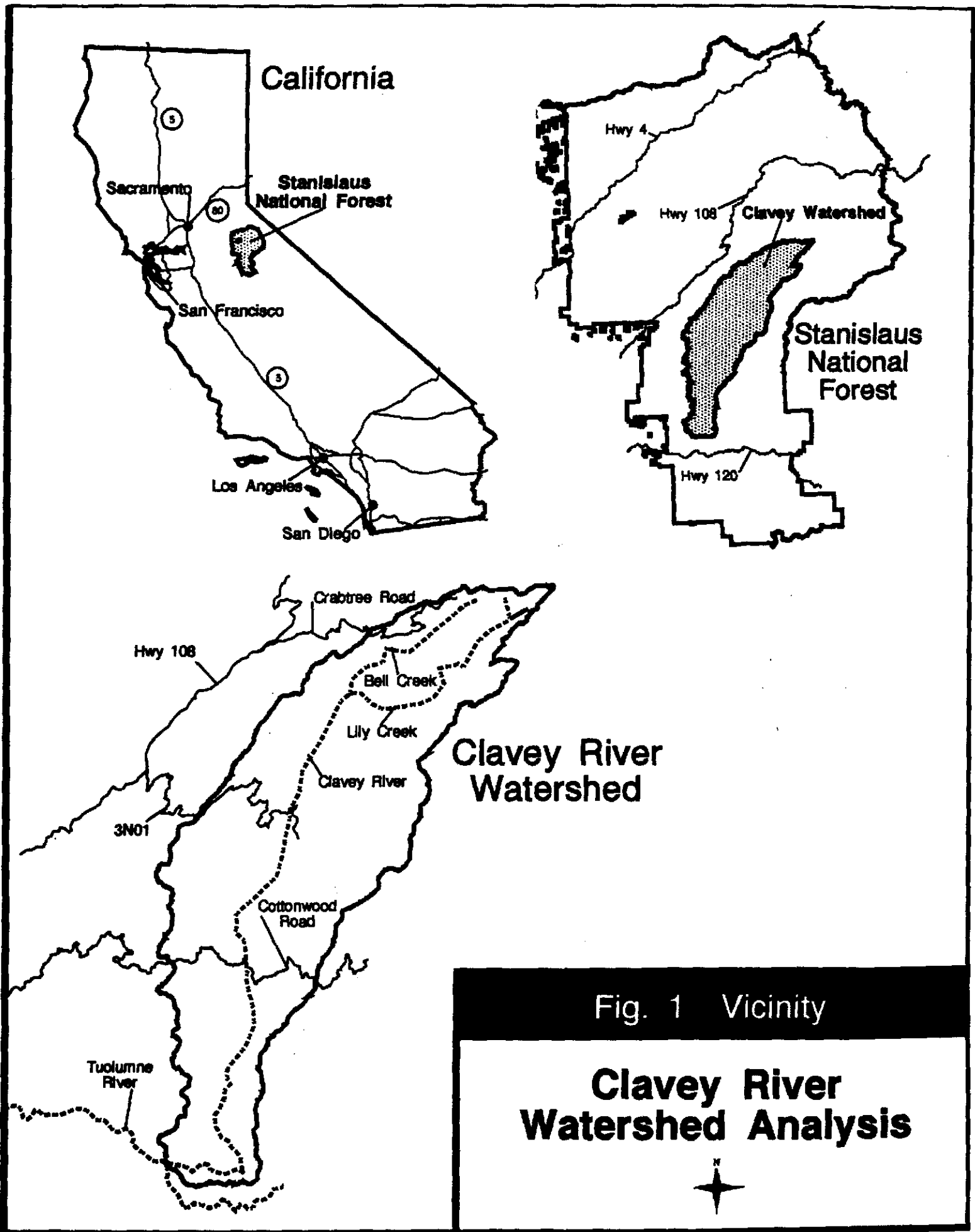
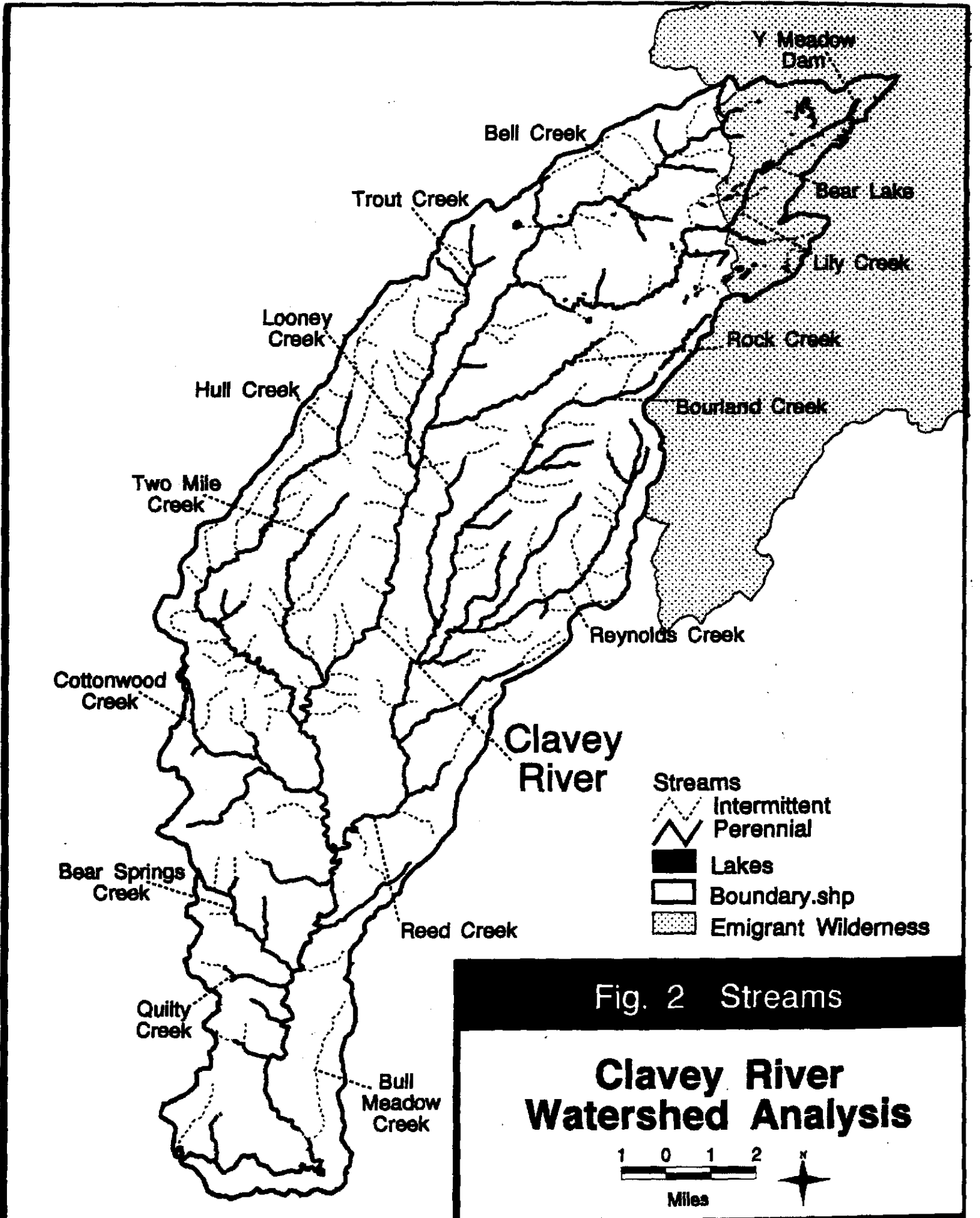


Fig. 1 Vicinity

Clavey River Watershed Analysis





of these activities remain present but appears to be less than in other Sierran locations because the Clavey watershed is relatively remote and has limited access.

In 1995 the Federal Energy Regulatory Commission (FERC) recommended not to license a proposed major dam and hydroelectric facility on the Clavey River. As a result, the Clavey has now been recommended for inclusion in the national Wild and Scenic River system (Figure 3). The Clavey watershed is currently managed to protect the Outstandingly Remarkable (OR) values that make the river eligible for Wild and Scenic designation. The OR values include: one of the longest remaining free flowing streams in the Sierra Nevada; the only "rainbow trout" river left in the Sierra Nevada with its original fish assemblage still intact; an 8,000 acre tract of late-seral forest habitat; the largest stand of aspen in the Sierra south of the Eldorado National Forest; and a combination of landscape ecology features making it distinct within the Sierra Nevada.

Recent planning efforts have recognized the Clavey River's special attributes. Because of its high Index of Biological Integrity (Moyle and Randall, 1996), SNEP (Sierra Nevada Ecosystem Project, 1996) proposes that the Clavey be managed as an Aquatic Diversity Management Area (ADMA) watershed (Moyle, 1996). The California Spotted Owl RDEIS (USDA, 1996) identifies the Clavey River as an "emphasis watershed" to be managed under the guidelines of its Aquatic Conservation Strategy. The Clavey River Wild and Scenic Value Review (USDA, 1997) has recommended a watershed analysis be conducted as well as the adoption of the SNEP or California Spotted Owl RDEIS approach for protection of aquatic biodiversity. This multi-agency collaborative effort identified degraded resource conditions and a need for better information regarding effects of management practices on aquatic resources. Information is limited on fish population status and trends, and there is only general understanding of trophic ecology of the Clavey River and its tributaries.

The Clavey River was the first designated Wild Trout stream in California (California Department of Fish and Game, 1985). The Clavey Review recommended expanding the designated Wild Trout area to include important tributaries or to the entire watershed.

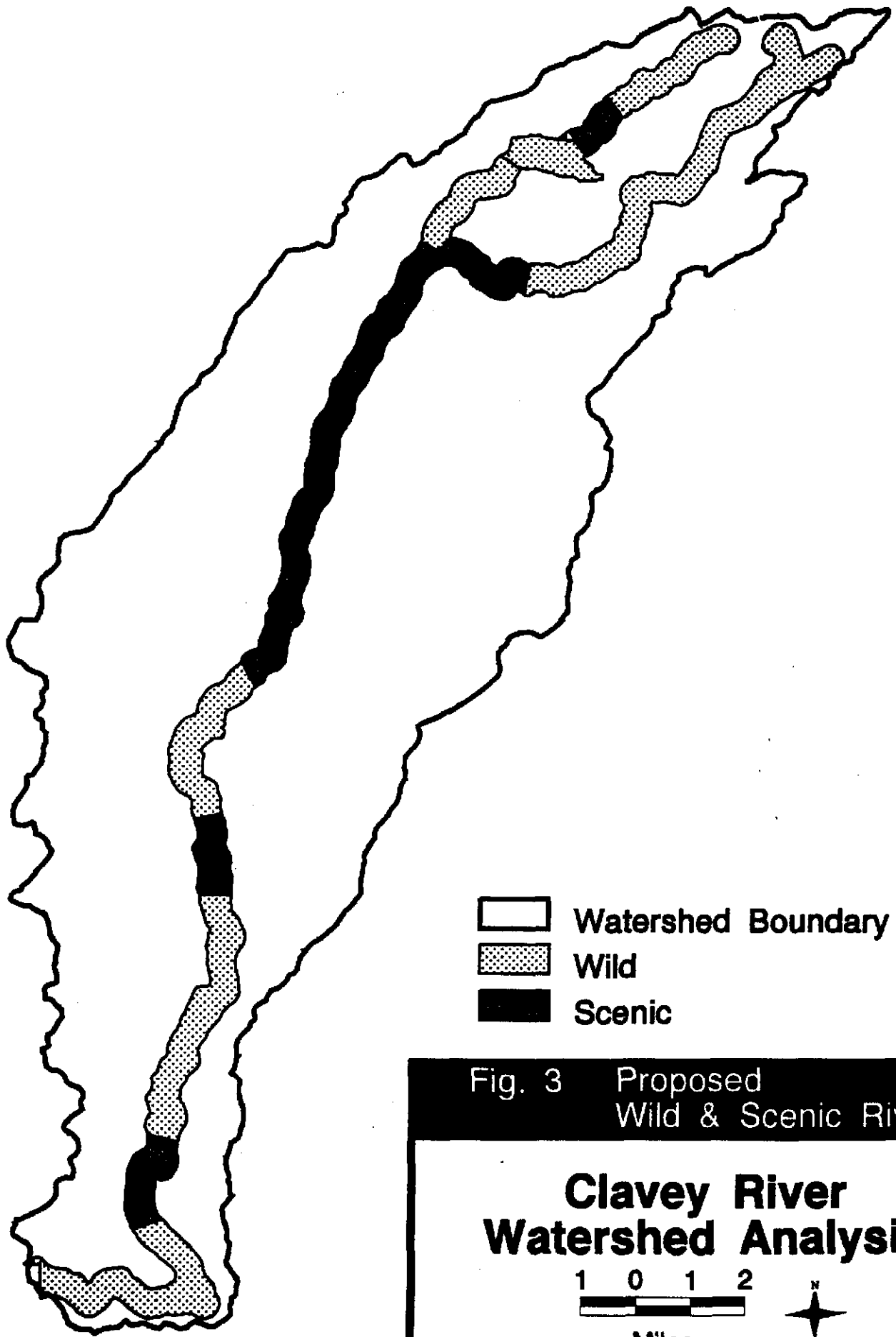
Existing Condition (Stressors)

Although the Clavey River watershed has many attributes which make it a significant watershed in the Sierra Nevada, it has numerous ecological stressors which are believed to be preventing it from achieving desired condition:

Forest Vegetation Density/Fuel Loading - Due to century-long fire suppression policies the forest overstory and understory is much denser than the desired condition. This has adversely altered hydrograph function and creates a clear and present danger of wildfires which would disturb the watershed well in excess of that expected in a natural fire regime. This is perhaps the principal overriding stressor since it affects several other conditions in the watershed.

Hydrograph Alteration - The century-long buildup of fuels in many parts of the Clavey watershed has reduced its summer and fall base flows as a result of an increase in plant transpiration. Restoration of these flows, especially in the Clavey River tributaries, is very important for aquatic resources to reach their desired condition.

Stream Channel Morphology Change - Meadow streams within the watershed have been altered by direct management practices such as grazing and recreation and cumulatively by other land uses such as roads, fire and timber harvest. Meadows are rare and valuable components of the





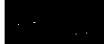
-  Watershed Boundary
-  Wild
-  Scenic

Fig. 3 Proposed Wild & Scenic River

Clavey River Watershed Analysis



watershed and are the most sensitive to disturbance. Streams have become widened, less shaded, and pool habitats have been degraded.

Riparian Vegetation Degradation - Meadows physically degraded by land uses have poor vegetative condition. Outside meadows, riparian vegetation is at less than desired condition in places from past management activities such as timber harvest, roads and recreation.

Grazing Practices - Grazing in the Clavey watershed stresses sensitive areas, especially meadows and meadow streams.

Past Wildfire and Subsequent Vegetation Management Practices - The combination of fire and reforestation site preparation has degraded portions of the watershed.

Past Silvicultural Practices and Roads - The era of road construction and clear cutting over the past several decades has resulted in an increase in peak flows and stream sedimentation.

Need for the Project

A keystone principle of ecosystem restoration is to begin by protecting the healthiest landscapes. In this context, the significance of the Clavey River among watersheds in the Sierra Nevada makes it a logical investment for conserving and, where needed, restoring ecological processes.

The importance of the Clavey watershed is validated by the recommendations of the Clavey River Wild and Scenic Value Review collaborative group. This group of stakeholders has expressed strong interest in seeing that a watershed analysis is conducted. They also recommend the Clavey River monitoring element we propose.

In addition, we see the Clavey River WA as the first phase of a larger analysis and management activity implementation process. We envision following the Clavey WA with others on the remainder of the Tuolumne River watershed on the Stanislaus National Forest. The Tuolumne is a major portion of the San Joaquin River basin and is a prime candidate for this type of ecosystem planning and improvement. Much of the public land in the Tuolumne River watershed is in federally designated wilderness in the Stanislaus National Forest and in Yosemite National Park. These relatively undisturbed lands serve well the keystone principal of first conserving the lands that are most likely to show success toward achieving desired condition. Conducting ecosystem planning and improvement activities on non-wilderness lands in the same watershed is a logical way to advance as rapidly as possible to ecosystem conservation in a large portion of the San Joaquin River basin.

For the Bay-Delta to properly function, the entire ecosystem from source to mouth must also properly function. At present, however, the major disconnect is that the Bay-Delta, the major reservoirs and the upper watersheds are managed as three separate parts, none well coordinated with the others. We believe it is essential to start to reconnect all parts at the same time in order to conserve and restore the entire ecosystem. The Clavey River watershed is an excellent place to begin the nexus.

Project Benefits

General Benefits

The Clavey River WA will produce an understanding of the ecological processes in the watershed that are at or less than desired condition. The WA will verify current problems, likely identify new ones and will produce an understanding of the relationship between problems as processes. Most importantly, it will allow us to implement meaningful management activities for maintaining and restoring proper ecological processes in the watershed.

As part of the WA process we will use extensive public collaboration to guide us in determining problems and solutions that are ecologically and socially acceptable. Public participation is key to design and acceptance of management practices which will benefit the ecological processes in the watershed as well as the people dependent on it for employment and those who enjoy its other benefits.

The reinstallation of the Clavey River Stream Gauge is intended to continue obtaining long term flow data on a reference stream in the Sierra Nevada.

Specific Benefits

We expect the following primary benefits of management activities implemented as a result of this WA:

- * Restoration of the Natural Hydrologic Regime - Flood flows can be reduced by restoring infiltration capacity in compacted areas and by reducing accelerated runoff from the road system. Base flows can be increased and seasonally sustained by thinning overstocked stands to reduce plant transpiration.
- * Reduction of Risk of Large and Damaging Wildfire - At present, overstocked stands exist in the watershed and pose a severe risk that wildfire will do more damage than under a natural stand density. Such fires are a significant threat to aquatic habitat and processes from sedimentation, channel erosion and riparian vegetation consumption.
- * Meadow Condition Improvement - Improvement of meadow stream processes, hydrologic function, aquatic habitat and riparian vegetative condition, and change in grazing and other land use practices can be implemented.
- * Reduction in Stream Sedimentation - Key sources of sediment will be identified and reduced.

Secondary Benefits of the Watershed Analysis

- * Wildlife Habitat Improvement - Managing to reduce timber stand density increases sunlight to the forest floor and restores habitat currently unusable by species such as deer and birds. It will also provide small mammal and rodent habitat improvement and improve predator-prey relationships.

- * Recreation - Improvement of aquatic habitat and riverine aesthetics is expected to improve recreational opportunities in the watershed.

Third Party Benefits

We expect that the WA will lead to implementation of management practices which will cause an increase in local employment and recirculation of revenue. Tree thinning, meadow and other restoration activities, and increased recreational opportunities are examples of such practices.

Scope of Work

The scope of work includes conducting a watershed analysis (WA) and a monitoring element in conjunction with the WA.

Within the scope of the watershed analysis and its associated monitoring element there are three work tasks: (1) Conduct a watershed analysis, (2) monitor streamflow and stream condition in the tributary streams within the Clavey watershed, and (3) Reinstall and operate the Clavey River streamflow gauge.

The three tasks will occur in five phases, as follows:

- Phase 1 Conduct steps 1, 2, and 3 in the WA Guide and initiate the public collaboration process. Phase period is spring 1998. The deliverable for this phase is a report including results of steps 1-3 and public involvement.
- Phase 2 Conduct steps 4, 5 and 6 in the WA Guide. Collect field data for WA and tributary monitoring. Reinstall Clavey River streamflow gauge. Phase period is summer/fall 1998. The deliverable is a report of steps 4-6 and gauge installation.
- Phase 3 Conduct steps 7, 8, and 9 in the WA Guide. Phase period is winter 1998-99 and spring 1999. The deliverable is the final WA Report.
- Phase 4 Conduct monitoring of Clavey tributaries and Clavey River flow gauge. Phase period is summer/fall 1999. The deliverable is streamflow and stream condition report.
- Phase 5 Conduct monitoring of Clavey tributaries and Clavey River flow gauge. Phase period is summer/fall 2000. The deliverable is streamflow and stream condition report.

An additional deliverable at the completion of each phase will be a Bill for Collection for reimbursement of work accomplished.

Monitoring and Data Evaluation

The Clavey River WA will have an associated monitoring element. Streamflow and stream condition will be monitored prior to management activities being implemented as a result of the WA. The purpose of such monitoring is to capture as much of the pre-treatment condition as possible to help later determine effectiveness of land and water treatments.

The first monitoring activity is to measure streamflow and stream condition in tributaries of the main channel of the Clavey. We anticipate an increase in summer/fall base flows from locations where trees are thinned and will establish cross sections for measuring summer/fall flows. We will also select stream reaches and measure attributes of stream condition as described in the USDA Forest Service Pacific Southwest Region Stream Condition Inventory Technical Guide (USDA, 1996).

The second monitoring activity is to reinstall the streamflow gauge on the lower Clavey River at road 1N01. This is a U.S. Geological Survey gauge that has been discontinued due to funding constraints. This gauge is identified as 11283500, Clavey River near Buck Meadows, CA. We believe it is essential to have a long term record of discharge on one of the Sierra's last free flowing streams to serve as a reference for natural flow regimes in this mountain range. We envision reinstalling the gauge and operating it for 2 years while we seek long term operating funds.

Implementability

The Clavey River WA is easily implemetable once funding is provided. NEPA compliance is not required because a WA is not a decision document under federal regulations. Streamflow and stream condition monitoring can be readily conducted since the watershed is national forest land. Reinstallation and operation of the Clavey River streamflow gage is a routine matter between the Forest Service and the Geological Survey.

Costs and Schedule to Implement Proposed Project

The estimated project cost breakdown is shown in Table 1. Costs are subject to change.

Table 1 - Cost Breakdown

Task	Salary	Overhead	Service Contracts	Material & Acquisition Contracts	Total Costs
Task 1 (watershed Analysis)	\$72,000	18,000			90,000
Task 2 (Tributary Monitoring)	48,000	12,000			60,000
Task 3 (Clavey Monitoring*)			30,000	30,000	60,000
	120,000	30,000	30,000	30,000	210,000

*Service contract is for streamflow gauge operation and Maintenance.

We need CALFED funding for this project because Forest Service budget constraints essentially prevent us from embarking on this watershed analysis and associated monitoring at this time. We may be able to provide in-kind contributions but have not received our fiscal year 1998 budget, and will not know about the ensuing annual budgets until August preceding each October 1 fiscal year start.

We request full funding for this project via CALFED. However, if only partial funding is available we request that it be provided incrementally in the order the project tasks are shown in Table 1.

Schedule Milestones

The project schedule is shown in Table 2. It includes project phases, tasks and associated costs. The schedule is subject to change.

Table 2 - Project schedule

Project Phase	Phase Period	Task 1 (T1) (Watershed Analysis)	Task 2 (T2) (Tributary Monitoring)	Task 3 (T3) (Clavey Monitoring)	Total Costs
Phase 1	Mar 98 - Jun 98	\$30,000			30,000
Phase 2	Jul 98 - Nov 98	30,000	20,000	30,000	80,000
Phase 3	Dec 98 - Mar 99	30,000			30,000
Phase 4	Jun 99 - Oct 99 (T2) Oct 98 - Sep 99 (T3)		20,000	15,000	35,000
Phase 5	Jun 00 - Oct 00 (T2) Oct 99 - Sep 00 (T3)		20,000	15,000	35,000
		90,000	60,000	60,000	210,000

Third Party Impacts

We expect that the watershed analysis will lead to implementation of management practices which will cause an increase in local employment and revenues. This includes ecosystem restoration work such as fuel reduction (i.e., tree thinning, prescribed burning), meadow and stream rehabilitation and road obliteration. In addition, local recreational use revenues from camping, hiking, fishing, hunting, etc. may increase as a result of improved environmental conditions in the Clavey watershed. We anticipate no adverse third party impacts as a result of this project.

Application Qualifications

The Clavey River watershed analysis will be staffed with Forest Service journey level professionals and technicians in the appropriate resource disciplines. An interdisciplinary team (IDT) will be assembled for this task if the proposal is successful. The organization of the IDT for the WA will include a team leader, and core and extended team members. Core resource disciplines are expected to include hydrology, fisheries, silviculture, range conservation, landscape architecture, fire management, engineering, wildlife biology and GIS. In addition, the public collaboration element of conducting a WA includes persons from other groups or agencies who will provide valuable information regarding resource issues and conditions. These include state and other federal agencies, environmental groups and industry representatives.

The monitoring element of this project to assess streamflow and stream condition on the tributaries within the Clavey River watershed will be staffed by Forest Service hydrologic and biologic technicians experienced in such work.

The reinstallation and operation/maintenance of the Clavey River streamflow gauge will be done by the U.S. Geological Survey, Water Resources Division, Sacramento Field Office. They are staffed with hydrologists and hydrologic technicians experienced at these tasks.

Compliance with Standard Terms and Conditions

The terms and conditions described in RFP Attachment D are acceptable. Since we are an Agency as shown in RFP Table D-1 we are not required to submit forms at this time.

Literature Referenced

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