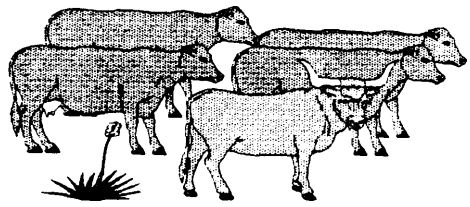
STATE WATER RESOURCES CONTROL BOARD
DIVISION OF WATER QUALITY
NONPOINT SOURCE PROGRAM



# California Rangeland Water Quality Management Plan

July 1995

STATE WATER RESOURCES CONTROL BOARD

SACRAMENTO, CALIFORNIA

JULY 20,1995

ITEM: 6

SUBJECT: CONSIDERATION OF ACCEPTING THE CALIFORNIA RANGELAND WATER QUALITY MANAGEMENT PLAN AS FULFILLING THE CONTRACT WITH THE CALIFORNIA ASSOCIATION OF RESOURCE CONSERVATION DISTRICTS

DISCUSSION: The State Board of Forestry (BOF) has requested that the State Water Resources Control Board (SWRCB) consider amending its Nonpoint Source Management Plan (NPS Plan) to include the proposed California Rangeland Water Quality Management Plan (Rangeland Plan)(Copy attached).

The BOF is the State agency concerned with rangeland as part of its responsibilities relative to timber management and improvement and fire prevention and protection. Rangelands are described as all nonforest vegetation cover types characterized by a predominance of herbaceous and shrub species. To assist in this effort, the Range Management Advisory Committee (RMAC) was established by law to advise the BOF on maintaining and improving rangeland resources considering watershed protection and conservation and the prevention of soil erosion. Several years ago, a BOF initiative directed RMAC to address the issue of managing rangeland riparian areas. RMAC decided to include the broader issue of water quality management on nonirrigated rangelands. In this effort, RMAC was assisted by the Cooperative Extension Service, Natural Resources Conservation Service, California Association of Resource Conservation Districts (CARCD), and SWRCB.

Using funds provided by the U.S. Environmental Protection Agency pursuant to Section 319(h) of the federal Clean Water Act, the SWRCB contracted with CARCD to produce a proposed Rangeland Plan on behalf of RMAC and BOF. CARCD in turn subcontracted with Advocate, Inc., to facilitate the development of the Rangeland Plan. A broad-interest-based advisory committee was formed to address technical and policy issues such as appropriate best management practices (BMPs), BMP implementation programs, monitoring and assessment programs, institutional commitments, and policy issues.

The proposed Rangeland Plan represents a voluntary/cooperative approach to rangeland water quality management and corresponds to Tier One of the NPS Plan. It also sets forth the triggers which would move Regional Water Quality Control Boards (RWQCBs) regulation of rangeland management into Tiers Two and/or Three. The NPS Plan describes Tier One as voluntary cooperation implementation of BMPs, Tier Two as regulatory encouraged implementation of BMPs, and Tier Three as regulatory based implementation of BMPs. The Rangeland Plan outlines how ranchers can assess resources present on their lands and how their lands and operations may impact beneficial uses and water quality. It provides information on how ranchers can develop a management strategy, choose and implement management practices, and monitor water quality, vegetation, and stream characteristics. The Rangeland Plan also provides information on technical and financial assistance that is available. The Rangeland Plan process was underway before the beginning of the SWRCB effort to address Coastal Zone Management Act requirements but was adapted to address those requirements. The proposed Rangeland Plan is widely supported by other agencies and organizations including the grazing industry.

The Rangeland Plan was presented as an information item to the North Coast, Central Coast, Central Valley, and Lahonton RWQCBs. Both verbal and written support for the Rangeland Plan was received. Consideration should be given to implementation of the Rangeland Plan on a pilot scale subject to RWQCBs' approval.

It should be noted that of the 40 million acres of rangeland in California, approximately 20 million acres are federally-owned and managed and approximately 20 million acres are privately owned and managed. The Rangeland Plan addresses nonfederal rangelands, pasture, and other grazed lands of California, including private lands and public lands not owned by the federal government. The U.S. Forest Service (USFS) and the U.S. Bureau of Land Management (USBLM) have authority and responsibility for most of the federal rangeland in California. The SWRCB and the USFS established a Water Quality Management Plan/Management Agency Agreement (WQMP/MAA) in 1981 that includes rangeland management on federal lands. The SWRCB and USBLM entered into an MOU in 1993 which includes a commitment to establish a WQMP/MAA that will include rangeland management on federal lands. Development of a WQMP/MAA is underway at the present time. USBLM is also in the process of identifying management standards and guidelines relative to its "Healthy Rangelands for All Users" effort.

The WQMP/MAA process provides for the implementation of management practices on federal lands to meet or exceed State water quality standards. In an effort to provide for coordination and consistency, representatives of the USFS and USBLM participated in the Technical and Policy Committee established to assist in the development of the Rangeland Plan for nonfederal lands.

**POLICY ISSUE:** Should the SWRCB accept the Rangeland Plan as fulfilling the contract with CARCD?

**FISCAL IMPACT:** None.

**RWQCB IMPACT:** Rangeland Plan implementation may necessitate increased RWQCB participation in planning and implementation efforts, but this should be more than offset by reduced need for RWQCB regulatory enforcement actions.

**STAFF RECOMMEND-DATION:** **That the SWRCB:**

1. **Accepts the Rangeland Plan as fulfilling the contract with CARCD.**

2. **Approves implementation of the Rangeland Plan commencing on a pilot scale subject to RWQCB's approval.**

3. **Directs Staff to evaluate amending the NPS Plan or State and/or Regional Water Quality Control Plans to incorporate the Rangeland Plan.**

4. **Directs staff to participate in the development process currently underway by the USBLM for "Healthy Rangeland for All Uses."**

**Note: The California Rangeland Water Quality Management Plan is not available electronically. For copies contact:**

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**STATE WATER RESOURCES CONTROL BOARD**
**RESOLUTION NO. 95-43**

**ACCEPTANCE OF THE CALIFORNIA RANGELAND WATER QUALITY MANAGEMENT PLAN AS FULFILLING THE CONTRACT WITH THE CALIFORNIA ASSOCIATION OF RESOURCE CONSERVATION DISTRICTS**

**WHEREAS:**

1. **The State Board of Forestry (BOF) is the State agency concerned with rangeland, as part of its responsibilities related to timber management and improvement and fire prevention and protection.**

2. **The Range Management Advisory Committee (RMAC) was established by law to advise the BOF on range management.**

3. **The BOF adopted an initiative directing the RMAC to address the issue of managing rangeland riparian areas on nonfederal lands.**

4. **The RMAC decided to include the broader issue of water quality management on nonirrigated rangeland.**

5. **The State Water Resources Control Board (SWRCB), using federal Clean Water Act Section 319(h) funds, contracted with the California Association of Resource Conservation Districts (CARCD) to develop a proposed Rangeland Water Quality Management Plan (Rangeland Plan).**

6. **The CARCD subcontracted with Advocate, Inc., to facilitate the development of the Rangeland Plan.**

7. **A broad-interest-based advisory committee was formed to address technical and policy issues.**

8. **The proposed Rangeland Plan represents a voluntary/ cooperative approach to rangeland water quality management and corresponds to Tier One of the Nonpoint Source Management Plan (NPS Plan).**

9. **The proposed Rangeland Plan sets forth triggers which could move regulation of rangeland management into Tiers Two and/or Three.**

10. **The development of the Rangeland Plan was underway before the Coastal Zone Management Act requirements were promulgated, but the proposed Rangeland Plan was adapted to address these requirements.**

11. **The proposed Rangeland Plan is supported by other agencies and organizations including the grazing industry.**

12. **Based on initial support of some Regional Water Quality Control Boards (RWQCB), consideration should be given to commencing implementation of the Rangeland Plan on a pilot scale subject to RWQCBs' approval.**

13. **The BOF has requested the SWRCB to consider amending its NPS Plan with the Rangeland Plan.**

14. **The request by the BOF for the SWRCB to consider amending its NPS Plan is supported by other interested parties.**

15. **To provide continuing coordination and consistency between the rangeland management program on federal and nonfederal lands, staff should participate in the U.S. Bureau of Land Management's (USBLM) "Healthy Rangeland for All Uses" process currently underway.**

**THEREFORE BE IT RESOLVED THAT:**

**The SWRCB:**

1. **Accepts the Rangeland Plan as fulfilling the contract with CARCD.**

2. Approves implementation of the Rangeland Plan commencing on a pilot scale subject to RWQCB's approval.

3. Directs Staff to evaluate amending the NPS Plan or State and/or Regional Water Quality Control Plans to incorporate the Rangeland Plan.

4. Directs Staff to participate in the process currently underway by the USBLM for "Healthy Rangeland for All uses."

**CERTIFICATION**

The undersigned, Administrative Assistant to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on July 20,1995.

Maureen Marché

Administrative Assistant to the Board

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# Rangeland Water Quality Management Plan

## ONE: INTRODUCTION

increasing attention has been focused on nonpoint source pollution (NPS) as a major barrier to clean water. The original Clean Water Act (1972) describes nonpoint source pollution, methods to control it through "Best Management Practices" (BMPs), and the 1987 amendments required individual States to conduct assessments and write a plan on how to control their nonpoint source problems. The Coastal Zone Act Reauthorization Amendments (CZARA) adopted in 1990, place additional requirements on the states to address nonpoint source pollution in several categories. including rangeland.

Initial assessmentshave shown that agriculture, in general, is a major contributor, but did not separate grazing from other agricultural uses. However, recognizing that many important watersheds and hydrologic units are within the 40,000,000+ acres of public and private lands, utilized for grazing in California, there was strong consensus that existing and potential grazing impacts must be considered and managed. In 1990, the Range Management Advisory Committee (RMAC) identified water quality as a major rangeland issue that would impact livestock producers.

Surmising that there was a "window of opportunity", the livestock industry agreed to become involved in developing a cooperative approach to the regulations already required under the Clean Water Act, and those being proposed under the Coastal Zone Act Reauthorization Amendments (CZARA). RMAC obtained funding and acquired consultants to conduct necessary hearings and create a Rangeland Water Quality Management Plan (RWQMP) for adoption into the State's Nonpoint Source Management Plan, and serve as the grazing element required under the CZARA By taking the positive step of developing a nonpoint source control program, California's livestock industry hopes to show its commitment to a quality environment while remaining a viable economic force in the state.

## 1 a. Management Area

The rangeland water quality management plan limits its scope to water quality Impacts on all non-federal rangelands, pasture and other grazed lands of California, including private lands and public lands not owned by the federal government. Rangeland is land on which the existing vegetation, whether growing naturally or through management, is suitable for grazing and browsing of domestic livestock at least part of the year. Rangeland includes any natural grasslands, savannas, shrublands, deserts, woodlands, and wetlands which support a vegetative cover of native grasses, grass-like plants, forbs, shrubs or other naturalized species.

This plan does not specifically 'cover irrigated pastures except for the grazing aspects related to primarily rangeland operations. Irrigated pastures, hay and other croplands. are covered by other technical reports to the State Water Resources Control Board, as are confined animal feeding operations and nutrient management.

Not covered within this management plan are nonpoint sources generated by activities including, but not limited to:

Dams and other hydromodification structures
Forestry operations
General development, stormwater runoff and ranchette subdivisions
Historical impacts
Mining and aggregate extraction
Recreational activities
Roads, railroads and utility corridors
Other agricultural practices: 1) confined animal facilities; 2) irrigated lands; etc.

## 'lb. Findinas:

1) Approximately 20 million acres of California rangelands are managed by private landowners, contributing property tax revenue, fuel load management, groundwater

recharge areas, wildlife habitat as well as open space to the public In addition. they create jobs. econonmic value and play an Important part in the overall food supply

2) "Assessments are normally performed on waterbodies that have been subject to complaints or where major impacts are suspected. For this reason, a large proportion of California's waterbodies, especially those in more remote or rural areas, have not been assessed. This means many waterbodies in rangeland areas have not been assessed. In addition, because each Regional Board has different perceptions regarding the types of impacts occurring within its area, the number and level of impairment of waterbodies varies from Region to Region. It is important to note that the State and Regional Board do not necessarily equate assessment with monitoring; assessment means that the waterbody has been surveyed in some fashion, but few, if any, monitoring studies have been conducted." (Kier Report, 1993)

3) Seasonal and long-term climatic variations can have unplanned impacts and must be considered in assessing the health of rangelands, as well as implementation of this RWQMP. Other causes of nonpoint source pollution are created off-site. and/or are beyond the control of the landowner/manager, including:

Dams and other hydromodification structures
Forestry operations
General development, stormwater runoff and ranchette subdivisions
Historical impacts
Natural disturbances: fires, drought, floods, wildlife, etc.
Mining and aggregate extraction
Recreational activities
Roads, railroads and utility corridors
Naturally-occurring elements leaching into riparian areas
Natural erosion process
Natural geologic action

4) Grazing animals are a natural component of rangeland ecosystems: their Interaction IS Important to the sustained health of many native California perennial grasses and other herbaceous species.

5) Improving the quality of grazing lands has important benefits to both the rancher and the environment, if done in an economically viable and sustainable fashion. Healthier soil and grass, and greater control over livestock use patterns increase agricultural production. Appropriate grazing practices may promote a diversity of plants, protect waterways, reduce erosion, reduce fuel loads and are key to the long-term health of our watersheds and for meeting water quality goals.

6) Livestock and wildlife's use of rangelands may impair beneficial uses of water by adding inorganic and organic sediments and bacterial contaminants to water. and by physically altering riparian and instream habitats. These impacts may be derived from upland, streamside, or instream activities. Animals may affect soil compaction and removal of vegetation which can, on some sites, decrease infiltration and increase erosion. Runoff may then carry more sediment into the stream, impairing several types of beneficial uses.

7) With access to appropriate technical assistance and economic incentives, landowners are fully capable of developing and implementing rangeland water quality management programs, monitoring results and assessing their effectiveness. The credibility of volunteers conducting assessment and monitoring has been demonstrated through the widespread use of volunteer monitors by both agencies and environmental groups.

8) Price and production movements have a direct bearing on farm management decisions which may involve the ability of the landowner to make financial investments for improvements. When the market price of livestock are at a low level, the landowner may not have the necessary disposable income available to implement best management practices in the time frame originally intended. Therefore, reasonable adjustments to an individual water quality management plan must be expected.

## Ic. **Goals and Objectives:**

The primary goal of the **RWQMP is** to maintain and improve the quality and associated benefictai uses of surface water as it passes through and out of rangeland resources in the state. Programmatic emphasis will be placed on a voluntary cooperative approach to water quality management, using economically and technically feasible means, which will be adopted within the State Water Resources Control Board (SWRCB) Nonpoint Source Management Plan. This approach will include appropriate technical assistance, planning mechanisms, program incentives and regulatory authorities as identified in this submission. In order to achieve this goal, the RWQMP must:

1) Maintain and/or enhance the quality of water resources within California, stressing prevention rather than costly fixes.

2) Stress voluntary participation through education, technical assistance, program incentives, and emphasize the benefits of such an approach.

3) Reduce conflicting regulatory authorities, fees and permit requirements in order to encourage implementation of management measures and practices that produce net water quality or other environmental gains.

4) **Focus** programs, policies and technical assistance on encouraging local planning, implementation and monitoring at the ranch and/or watershed level.

5) Provide adequate assistance, including both educational materials and program funding, to allow full participation by landowners in all aspects of rangeland water quality efforts and achievements.

6) Encourage research into the magnitude of water quality impairments, causes, methods for designations, monitoring and appropriate solutions.

7) Allow a reasonable time frame for implementation.

8) Balance legal requirements with the need for flexibility.

## TWO: RANGELAND WATER QUALITY MANAGEMENT STRATEGY

The Rangeland Water Quality Management Plan presents the following strategy for the individual landowner, or a watershed management group, as a means to conduct a self-initiated approach to address nonpoint source (NPS) pollution as it relates to grazing (or non-confined) livestock operations in California. The State defines pollution as impairments to beneficial uses in terms of the physical, chemical, or biological characteristics of water. There is also an “anti degradation" directive in both state and federal law. EPA Guidelines, for biennial water quality assessment (CWA §305b) reports, assesses impairments to designated beneficial uses of a water body in terms of designated use support. This support would be determined to fall within one of four categories: fully supporting, fully supporting but threatened, partially supporting and not supporting.

Designating the beneficial uses for all waters is the responsibility of the Regional Water Quality Control Boards. For all uses there are “criteria” either in a numerical form (for toxics and where a specific number is known) or narrative form ( where single numbers are difficult to determine) . The designated beneficial uses and their associated criteria become the water quality standards for a given waterbody. Protection of beneficial uses by meeting water quality criteria and anti degradation are the water quality targets for any management program.

Potential sources of NPS pollution from grazing are sediments (physical), nutrients (chemical), and pathogens (biological), as well as thermal impacts due to changes in riparian conditions.

Selected terminology relating to water quality are found in Appendix A.

### Management Objective

The objective of the RWQMP is to conduct management activities in a manner that will prevent sedimentation, nutrients, pathogens and thermal pollution from exceeding prescribed standards established by the Regional Water Quality Control Boards.

## Management Approach

The starting point for landowners/resource managers in developing a management strategy at the ranch or watershed level is to determine the extent that the beneficial uses, related to the waters involved, are impaired. The next step is to assess the causes of identified impairments. If there are no impairments, or potential for impairments, then there is no need to develop a comprehensive plan. However, if impairments are identified, or there is a desire to guard against future degradation, then more effort will be needed.

A self-initiated approach assists the landowner to recognize current or potential impairments to beneficial uses and develop a plan to maintain or improve resource health. This document provides guidelines for management, while leaving specific implementation up to individual landowners or a watershed group. If a property owner is affecting beneficial uses, either an individual plan or participation in a watershed planning process must be initiated by the landowner to avoid Tier II enforcement as described in section 3b of this document.

If a landowner/resource manager is involved with other planning processes where water quality management practices for the ranch are being identified, then there is no need to duplicate efforts with an individual water quality plan. Such planning processes include, but are not limited to:

NRCS Conservation Management System,
US Forest Service or Bureau of Land Management activity plans,
Ranch or Resource plans such as Holistic Resource Management
Participation in Coordinated Resource Management Planning (CRMP)

The Rangeland Water Quality Management Strategy can be accomplished by the landowner/resource manager through the following or a similar approach for either an individual property (or operation) or via a watershed level working group:

Acquiring information
Developing a management strategy for the ranch or watershed
Recognizing or implementing practices
Monitoring
Adjust plan and practices in accordance with monitoring results

## 2a. Acquiring Information

The first step necessary for determining the future management strategy is to identify the beneficial uses of water, on lands being assessed, and the impairments, either current or potential. This may be done utilizing information gathered from agency sources coupled with a self-analysis process. The agencies which can provide the landowner/resource manager with assessment and beneficial use information Include the:

USDA Natural Resource Conservation Service Field Offices
USDA Forest Service & USDI Bureau of Land Management
US EPA, Region 9 Office, Water Quality Branch
USDI Fish and Wildlife Service
California Regional Water Quality Control Board Offices
California Department of Fish and Game Offices
California Coastal Commission
University of California Cooperative Extension Offices

A self-analysis process requires basic information on what to look for: 1) beneficial uses and associated criteria and 2) a non-eroding stream. riparian area, pastures and rangelands. Published materials, workshops and field days are required to provide this type of information to those interested (also see Monitoring Section).

## 2b. Developing a Management Strategy

As previously stated. a management strategy must fit the needs of the situation. A three-level approach is recommended to allow for a range of documentation from simple to complex. (Examples are found in Appendix B). All three of these approaches are under the Tier One, voluntary and cooperative approach, of the Porter-Cologne Water Quality Control Act (described in sections 3a and 3b of this document).

### Approach #1 —Letter of Intent

Where water quality issues are minimal and/or a management strategy is in place, a letter of intent may be written and filed either at home or the local Resource Conservation District Office. This letter should include brief paragraphs on the evaluation of water quality status. management approach being implemented, and the

monitoring program for continuing evaluation. It will be a document to use if and when water quality issues arise. In some cases, landowners/resource managers may wish to file this letter with the local office of their Regional Water Quality Control Board.

Approach #2 —Nonpoint Source Management Plan

Where a written plan is desired, it does not have to be lengthy or complicated, but should include the following elements:

1) an inventory of resources (soils, animals, climate, water sources, etc.),

2) problem assessment (site conditions, potential or current NPS problems),

3) statement of goals (measurable outcomes or products),

4) existing and/or alternative management practices (technical/economic feasibility, desired outcome, timetable for implementation, etc.), and

5) monitoring (progress toward goals, effectiveness of management decisions).

This management strategy should be ongoing, with evaluation and revisions as needed.

Approach #3 —Recognized Nonpoint Source Manaaement Plan

Many landowners have a desire for some form of institutional recognition of their planning and implementation efforts as well as legal support against potential nuisance complaints. There are currently two methods available that would provide for a Nonpoint Source Management Plan to be recognized as utilizing acceptable standards and practices that affected agencies will recognize and support:

A: The landowner/resource manager voluntarily chooses to work with NRCS to complete a conservation plan, with specific attention paid to water quality, and then agrees to implementation as a cooperator with their local Resource Conservation District. Concurrent with this conservation plan, the landowner/resource manager may also choose to request a supplemental agreement [under 57 of the Endangered Species Act] that could determine a net environmental benefit, obtained through implementation of a RWQMP. and allow for some incidental take of endangered species.

B The landowner/resource manager voluntarily chooses to approach their local Regional Water Quality Control Board staff and request review of the individual RWQMP developed for their operatron. Approval under this option could provide agency support for a RWQMP that Included capital investments staggered over multiple years, and potentially qualify the landowner/resource manager for quick permitting and waiving of fees for necessary streambed alterations [under §1603, California Fish & Game] and some relief from concerns with endangered species [under §2081, California Fish & Game] potentially moving onto improved habitat.

Although some landowners/resource managers may choose to participate in this plan at a minimum level, for others there is opportunity, through program incentives, to encourage full implementation of water quality management programs that may also result in improved habitat, increased biodiversity and sustainable agriculture. To facilitate effective utilization of such incentives, and the recommended coordination mechanisms, adequate technical assistance and educational materials must be available to those involved with implementation at all levels: local, regional or statewide. These include:

A: Workshops for landowners/resource managers in which they receive guidance and tools to successfully develop their RWQMP, conducted by a UCCE, NRCS, RCD and/or other qualified resource management professionals;

B: Availability of qualified resource management professionals, for those whose to choose to contract out development of their RWQMP, as well as adequate access to NRCS, RCD and/or UCCE staff;

C: Opportunities and support for landowners/resource managers to participate in development and implementation of recognized Watershed Plans and/or Coordinated Resource Management Plans (CRMP).

D: Recognition and support for RWQMP activities organized by professional societies, industry associations, and peer-to-peer networking groups.

Each of these options has pros and cons, including questions concerning future availability of staff and funding. Each area will need to establish a comprehensive program that best fits their needs and available resources.

## 2c. Implementing Manaaement Practices

Management Practices, as defined for water quality protection, can be any practices or methods that suitably address the goal of maintaining or enhancing the beneficial uses of water. In selecting which management practices to use, the overall management objective of the ranch/property must be taken into consideration and should compliment the land use activity currently taking place. These practices may come from established range/ranch management approaches (e.g. Total Ranch Management, NRCS planning process, Holistic Resource Management, etc.) or from the landowner's own initiative. The following practices include most types of management activities which relate to livestock production and to rangeland and other grazing land water quality. These are given as **examples only,** not as an exclusive answer. A list of selected practices, found within the NRCS Field Office Technical Guides, appear in Appendix C.

1. LIVESTOCK MANAGEMENT

   Practices which assist with the control, time, frequency, or intensity of grazing to maintain vegetative cover sufficient to protect the soil and maintain or improve the quantity and quality of desired vegetation (e.g. prescribed grazing, feeding and salting locations, etc.).

2. STRUCTURAL IMPROVEMENTS

   Infrastructure improvements (e.g. water development, fencing, erosion control, etc.) and structures associated with normal livestock production operations (barns, sheds, corrals, shipping pens, etc.) may be used to facilitate grazing management. These practices should be planned, constructed, and utilized in a manner that enhances or maintains water quality.

3. LAND TREATMENT

   Land treatments (e.g. burning, mechanical manipulation, seeding, weed control, fertilization, etc.) may be used to manage vegetation, reduce erosion, improve range or improve wildlife habitat.

4. LIVESTOCK HEALTH

   Practices used to reduce internal/external parasites and pathogens.

The diversity of rangeland resources and types of livestock operations within California make it impossible to set specific standards and specifications for these practices at the state or even regional level. Standards and specifications must be established at the most local level possible. The USDA/ NRCS Field Office Technical Guide is an Important source of localized information and examples of specifications adaptable to a local area.

**2d. Water Quality Monitoring**

Start with a simple monitoring process and move to a more complex or detailed monitoring program as required by specific situations or as the landowner's interest grows. This strategy describes both why monitoring should be done and items that could be monitored. "When" and "how" decisions need to be made after identifying "why" and "where" and must fit each individual case. Materials and approaches are now being developed for this approach and will be tested during the next two years. It is reasonable to assume that the process of testing and revising of rangeland monitoring approaches will continue as knowledge and experience increases. Selected sources of monitoring information and approaches are found in Appendix D.

Monitoring should be done at both the ranch or watershed level to:

1. Document current status/condition of waterbodies, riparian area and upland vegetation.
2. Document off-site uses and unplanned disturbances (fire. floods, drought, insects. freezes, etc.) that influence water quality.
3. Document implementation of management strategies and/or management practices:
4. Measure the effectiveness of management practices over time (trend) for use in an adaptive process where monitoring may indicate a need for management changes to meet desired objectives (plan, implement, monitor, replan).

The most simple and least costly (in time and money) methods need to be identified for each of the above types of monitoring. Systematic use of photographs and recording of observations can provide the least expensive and most effective documentation for

waterbodies. vegetation status/condition. and effectiveness. Watershed-based “key indicator sites" can provide multiple stakeholders with detailed information necessary to understand changes and conditions throughout the watershed.

The key to monitoring success is consistency of measurements and a commitment to long-term monitoring. Locally suited monitoring approaches and materials are available from local Cooperative Extension, NRCS and RCD offices. Where seriously impacted situations are present, a quantitative method may be required. Watershed-based efforts need to agree on criteria and methodology for all participants to utilize. Items that can be considered for monitoring include, but are not limited too:

1) **The characteristics of the water** -
   physical: temperature, turbidity,
   chemical: nitrogen, nitrates, phosphorus, minerals, toxics, pH,
   biological: pathogens, aquatic organisms;

2) The **status of vegetation -**
   vegetation (ground) cover, type of riparian vegetation, species composition, age, class;

3) The **stream characteristics** -
   channel/ bed materials, streambank condition, width/depth ratio, channel morphology/type.

## THREE: POLICY AND COORDINATION MECHANISMS

### 3a. Lead Agency

The RWQMP proposes adoption of a voluntary cooperative program. within the State Nonpoint Source Management Plan, designed to maintain and/or enhance the quality of water resources associated with rangeland uses. This program is to be administered by the State Water Resources Control Board, as defined in the Porter-Cologne Water Quality Control Act, adopted by California in 1969.

The Porter-Cologne Water Quality Control Act gives the State Water Resources Control Board (SWRCB), and the nine Regional Water Quality Control Boards (RWQCBs). authority to control water pollution regardless of the source. Water quality control is defined by the **Act** to mean "the regulation of any activity or factor which may affect the quality of the waters of the state and includes prevention and correction of water quality or nuisance." Federal Clean Water Act §208 funds have been used to assess water quality conditions in California's 16 hydrologic basins and create water quality management plans, familiarly known as "Basin Plans".

These Basin Plans identify the designated beneficial uses for waterbodies within each hydrologic basin and the water quality objectives, stated as physical and/or chemical parameters, to be achieved or maintained to protect each beneficial use. Beneficial uses include domestic, municipal, agricultural and industrial supply, power generation, recreation, aesthetic enjoyment, navigation and preservation and enhancement of fish, wildlife and other aquatic resources or preserves.

Utilizing this information, the State Nonpoint Source Management Plan utilizes three different levels, or "tiers" of successive enforceable policies and mechanisms, of the Porter-Cologne Water Quality Control Act, designed to ensure achievement of water quality objectives. These "tiers" are also utilized by California to meet regulatory needs outlined in the Clean Water Act and the Coastal Zone Act Reauthorization Amendments.

## 3b. Enforceable Policies and Mechanisms

The RWQMP focuses on Tier One, the voluntary and cooperative approach However. it is Important to understand the enforceable policies and mechanisms within Tier Two and Tier Three. At all times, the least stringent option that successfully protects or restores beneficial uses, will be utilized. More stringent options [such as Tier Two and Tier Three] will be Implemented only if impairment has been shown, timely improvements in beneficial use protection are not being achieved and if the Tier One approach is not utilized or is ineffective. The three Tiers are to be administered as follows:

TIER ONE: **VOLUNTARY IMPLEMENTATION OF MANAGEMENT MEASURES:**

Landowners/resource managers voluntarily implement Management Measures and Management Practices. Implementation could occur for economic reasons and/or through increased awareness of environmental benefits. Voluntary implementation can be encouraged through education, training, financial assistance, technical assistance, demonstration projects and institutional incentives. A voluntary approach should take advantage of the expertise and incentives offered by a variety of existing State and Federal programs which promote private actions that could have water quality benefits. Agencies providing such programs include the USDA Natural Resources Conservation Service, the USDA Consolidated Farm Services Agency, Resource Conservation Districts, and UC. Cooperative Extension as well as other federal and/or state resource management agencies.

Landowners/resource managers whose operations are clearly shown to be impacting beneficial uses, as determined by the Regional Water Quality Control Board, will be considered to be eligible for Tier Two enforcement. At that point they are requested to:

1) assess the impact of their operations on beneficial uses, and
2) prepare and implement a nonpoint source management plan as described in section 2b. approach #2 or #3, of this document.

If the landowner/resource manager does not respond to the initial request, the Regional Water Quality Control Board will mail a notice, by certified mail, that beneficial uses have been impaired and advise the landowner/resource manager to either:

1) show existence of a viable RWQMP with implementatron underway, or

2) contact the NRCS, RCD, UCCE, or a qualified resource professional of their choice. to schedule an assessment and begin development of a RWQMP.

The applicant may remain within Tier One if the assessment is completed, a management plan developed and good faith effort toward implementation of recommended management practices is shown, within six months, and expected to be effective in restoring and/or protecting beneficial uses.

TIER TWO: REGULATORY-BASED **ENCOURAGEMENT OF MANAGEMENT MEASURES:** The Porter-Cologne Act constrains Regional Boards from specifying the manner of compliance with water quality standards, however Regional Boards may encourage implementation of management measures/practices by waiving adoption of waste discharge requirements on condition that dischargers comply with best management practices. Alternatively, the State Water Board and the Regional Boards may regulate indirectly by entering into management agency agreements (MAA's) with other agencies which have enforcement authority. MAA's may include (or reference) specific. acceptable program implementation requirements. Both the State Board and Regional Boards may enter into MAA's. Enacting this tier would require the landowner or manager to implement planning and management measures as described in section 2b, approach #2 or #3, of this document.

Landowners/resource managers who either:

1) fail to respond to notification, or

2) fail to develop and implement a NPS management plan,

are eligible for Tier Three enforcement actions.

TIER THREE: EFFLUENT REQUIREMENTS /WASTE DISCHARGE PERMITS: Regional Boards can adopt and enforce requirements on the nature of any proposed or existing waste discharge, including discharges from nonpoint source. Although Regional Boards are precluded from specifying the manner of compliance with waste discharge limitations, in appropriate cases limitations may be set at a level which in practice, requires implementation of specific management practices.

**3c. Assessments:**

The State Water Resources Control Board and nine Regional Quality Control Boards are responsibel for the quality of California's waters as defined in federal and state law. The most recent results of these mandated assessments and programs are available from several sources, including the SWRCB 1992 Water Quality Assessment (per CWA §305b) and the Regional Water Quality Control Board Basin Plans.

In addition to those sources, RMAC contracted with William M. Kier Associates to prepare an assessment of water quality problems associated with rangeland grazing activities. Among other things they found that the most common approach to identify Impacts from grazing relied on either soil erosion factors or locally suspected water quality problems: nowhere were both factors taken into account.

To improve the quality and utility of mandated assessments, it is important that the general public, particularly landowners, understand the process and participate fully with ongoing efforts. Therefore, it is recommended that:

1) To the extent possible, criteria utilized to set water quality objectives (standards) be established at the local level, however there is also need for consistency of federal, state and local resource management criteria:

2) Current methodologies utilized for designating beneficial uses and level of impairment be examined and opportunities for review and public input be established;

3) Public input must be actively requested and incorporated into RWQCB Basin Plan updates, including greatly expanding outreach to affected interest groups, particularly landowners; and

4) When determining whether an unacceptable impact from livestock grazing is taking place on an individual parcel, the landowner/manager must be **fully informed** of the nature of the impacts as well as the source of complaint and/or information utilized. Representatives from the responsible resource agencies (RWQCB, Fish & Game, etc.) must respond to requests from the

landowner/resource manager to meet jointly **prior to regulatory proceedings.** At that meeting, the landowner/resource manager should make arrangements for someone from NRCS, RCD, UCCE, and/or a qualified resource professional of their choice to attend. The group should then inspect the site. discuss any factors relating to water quality management and attempt to reach a conclusion together whether unacceptable impacts are occurring and additional management practices are needed. This inspection would serve as an individual site assessment, when hard data is lacking.

**3d. Coordination Mechanisms:**

SWRCB, as lead agency, retains the responsibility for program implementation and oversight. However, of key importance to the success of this Rangeland Water Quality Management Plan is coordination between federal, state, regional and local agencies responsible for land use programs and permitting, water quality permitting and enforcement, habitat protection, and public health. This coordination should include relevant Memorandums of Understanding (MOUs), Management Agency Agreements (MAAs), changes in permitting processes, cross training of staff, and other mechanisms as appropriate. Discussion and resolution of issues, policies and program components shall be conducted through the SWRCB's Interagency Advisory Committee (IAC). which is already working toward such goals. At a minimum there must be general agreement on:

1) Criteria for evaluating the validity of data and/or opinions presented in any dispute:
2) Appropriate review of any complaint before an injunction or abatement is ordered;.
3) Procedures for arbitration and/or mediation options;
4) Field staff compliance with MOUs, MAAs, etc., made by agencies; and
5) Cooperation, to the extent possible, with the designated lead agency's decisions.

These incentives should include, but are not limited to, the following recommendations:

A) U.S. Armv Corps of Enaineers

1) Offer watershed-wide §404 permits for projects that are covered in an acceptable watershed or CRMP plan. These would include, but not be limited to, erosion control, cattle crossings in conjunction with ripanan

fencing. removal of exotic plants, and other activities that enhance the natural environment and require permits.

B) U.S.D.I. Fish and Wildlife Service

1) Enter into an appropriate MAA (under Section 7 of the Endangered Species Act), with the Natural Resources Conservation Service, that would allow for accelerated review of individual conservation plans and recognize the net benefit gained through implementation of the RWQMP as well as potential benefit of species moving onto private property due to improved habitat. This agreement should allow expanded permits for potential incidental take of endangered species while implementing an approved ranch, or watershed, water quality management plan.

C) U.S.D.A. Consolidated Farm Services Agency (formerly ASCS)

1) Enact appropriate policies that give preference for cost-share funding for any activity that is part of implementing an approved ranch, or watershed, water quality management plan.

D) California State Water Resources Control Board and all Regional Water Quality Control Boards

1) Utilize the Interagency Advisory Committee (IAC) to further coordination between agencies, involved in any aspect of rangeland water quality, including potential reallocation of staff and/or other resources.

2) Create MOUs, with appropriate resource management agencies and/or organizations, that clearly define standards and responsibilities for:

a) Criteria for evaluating the validity of data and/or opinions presented in any dispute;

b) Appropriate review of any complaint before an injunction or abatement is ordered;

c) Procedures for arbitration and/or mediation options;

d) Field staff compliance with MOUs, MAAs, etc.; and

e) Cooperation, to the extent possible, with the designated lead agency's decisions and RWQMP approvals.

E) California State Coastal Commission

1) Enter into a MAA wiht SWRCB / RWQCBs directing implementation **in the** field and consistency of staff actions concerning water quality.

F) California Department of Fish and Game

1) Enter into MAA (under §2081 CESA) with SWRCB that would recognize the net benefit gained through implementation of a "recognized" RWQMP and allow for an agreed upon level of incidental take of endangered species that may occur while implementing an approved ranch, or watershed, water quality management plan.
2) Enter into a MAA with SWRCB / RWQCBs to waive fees and provide accelerated permitting procedures for projects. implementing a "recognized" ranch, or watershed, water quality management plan, that would require a §1603 permit (streambed alteration). These would include, but not be limited to. erosion control, cattle crossings in conjunction with riparian fencing, and other activities.
3) Enter into a MAA with SWRCB / RWQCBs directing implementation in the field and consistency of staff actions concerning water quality:

G) California Board of Forestry / Department of Forestry & Fire Protection

1) Enter into a MAA with SWRCB / RWQCBs directing implementation in the field and consistency of staff actions concerning water quality and requirements for fuel load management (i.e. firebreaks, fire roads, residue levels, etc.). Ensure that county programs [contracted to CDF&FP] also comply with program agreements.
2) Provide adequate funding and/or staff support for RMAC efforts associated with the RWQMP, including continued review of recommended coordination mechanisms and effectiveness of the SWRCB NPS management plan, etc.

H) California Department of Transportation

1) Enter into a MAA with SWRCB / RWQCBs directing implementation in the field and consistency of staff actions concerning water quality and requirements for roadside vegetation management (i.e. spraying, chemical

drift, residue levels. etc.) and construction technologies that can affect water quality (during construction and under continued normal use).

I) Various County Governments

1) Recommend that all county governments enact programs designed to waive fees and provide accelerated permitting procedures (if required) for projects, directly associated with implementation of an approved ranch, or watershed, water quality management plan, in recognition of the net environmental benefit gained through implementation of the RWQMP.
2) Recommend that all non-contract county programs (County Fire Marshall) are consistent with actions concerning water quality and requirements for fuel load management (i.e. firebreaks, fire roads, residue levels, etc.).
3) Recommend that Public Works projects utilize management and construction practices that protect water quality, particularly for roadside vegetation management (i.e. spraying, chemical drift, residue levels, etc.) and construction technologies that can contribute to erosion and/or residue runoff (during construction and under continued normal use).

## 3e. Technical Assistance

A voluntary cooperative approach relies on adequate education and technical assistance as its foundation. All involved parties, the landowners/managers. agency staff, interest groups, need to approach water quality management from a common understanding and level of knowledge. Technical assistance and educational materials need to be available to those involved with implementation at all levels: local, regional or statewide.

The following areas of education and technical assistance have been identified as necessary to facilitate implementation of the voluntary, cooperative program. These items relate to either ranch and/or watershed level planning efforts:

- Understanding the goals of the land owner/manager;
- Identifying problems and/or setting criteria for healthy watersheds;
- Recognizing the potential of watersheds to respond to changes in management;
- Developing and implementing plans;
- Utilization of management practices and monitoring approaches;

- ◆ Sources of funding and assistance,
- ◆ CRMP or group approaches to watershed planning; and
- ◆ Basic principles of the rangeland ecosystems and their components.

Some examples of current educational models to consider are:

- ◆ California Cattlemen's Association Quality Assurance Program,
- ◆ UCCE's Ranch Resource Management Short Courses,
- ◆ University Extension's Annual Rangeland Ecosystem Management Short Course,
- ◆ Traditional field days, workshops, and programs conducted by UCCE, NRCS, etc.
- ◆ Range managers/owners peer networking
- ◆ Private for-profit or non-profit short courses (i.e. Stan Parson's Ranching for Profit, Holistic Resource Management, etc.)

**3f. Milestones**

Milestones are factors that measure response to change in rangeland management and overall program implementation. Milestones, for the stated objectives, should include:

1) The plan must maintain and/or enhance the quality of California's water resources:

   a) The characteristics of the water -
      physical: temperature, turbidity
      chemical: nitrogen, nitrates, phosphorus, minerals, toxics, pH
      biological: pathogens, aquatic organisms;

   b) The status of vegetation -
      vegetation (ground) cover, type of riparian vegetation, species composition

   c) The stream characteristics -
      channel/ bed materials. streambank condition, width/depth ratio.

2) Provide for the coordination of regulatory authorities, fees and permit requirements that facilitate implementation of management measures and practices.

   a) Implementation of watershed permits for ACOE §404. F&G §1603. etc.

   b) Adoption of recommended MAAs and MOUs

3) Focus programs, policies and technical assistance on encouraging local planning, implementation and monitoring at the ranch and/or watershed level.

a) Increased numbers of “recognized” plans being adopted.

b) Increased numbers of CRMP/watershed efforts progressing.

c) Access to necessary assistance is readily available rn all areas.

4) Provide adequate assistance, both educational materials and program funding, to allow full participation by landowners in all aspects of rangeland water quality efforts.

a) Adequate funding levels for technical assistance programs.

b) Recognition of private and association programs.

5) Encourage research into the magnitude of water quality impairments, causes, methods for designations and appropriate solutions to different problems.

a) Develop database of pertinent information.

b) Prioritize research needs and adequately fund top priorities.

## APPENDIX A: GLOSSARY OF TERMS

**Assessments –** Refers to the biennial Water Quality Assessment required by Sec. 305(b) of the Clean Water Act in even years. Assessments are conducted by each Regional Water Quality Resources Control Board, are aggregated by the State Water Resources Control Board for a California Assessment, and further aggregated by the Environmental Protection Agency for a nationwide report to Congress.

**Basin Plan –** One of 16 designated water quality control plans defining beneficial uses, water quality objectives, water quality threats and corrective measures for a specific hydrologic unit.

**Beneficial Uses –** Uses of the waters of the state that may be protected against quality degradation include, but are not necessarily limited to: domestic, municipal, agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves. (Porter-Cologne Act).

**BMP (Best Management Practices) –** A BMP "is a practice or combination of practices that is determined by a state to be the most effective means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals" (Federal Clean Water Act. 1977).

**CFSA – (Consolidated Farm Services Agency) –** Formerly known as ASCS (Agricultural Stabilization and Conservation Service), this branch of the US Department of Agriculture is responsible for delivery of various USDA program to farmers.

**Cease and Desist Order (C & D order) –** issued by regional Boards for violation of waste discharge requirements and NPDES permits, or illegal discharge without waste discharge requirements.

**Cleanup and Abatement Order (C & A order) –** An order which requires a discharger to clean up a waste, abate its effects, and in a case of threatened pollution, take necessary remedial action.

**CRMP -- (Coordinated Resource Management Planning) –** CRMP is a resource planning, problem solving, and management process that allows for direct participation of everyone concerned with natural resource management in a given planning area. The concept underlying CRMP is that coordinating resource uses results in Improved resource management and minimized conflict among land users, landowners, government agencies, and interest groups. Using this approach, resource problems are addressed and solved much more effectively because they are based on resource boundaries; they are not constrained by individual, agency, or political boundaries.

**CWA – (Clean Water Act) ––**CWA, also known as the Federal Water Pollution Control Act, was adopted by Congress in 1972. Early efforts focused on point sources; reauthorization amendments in 1987 placed more emphasis on controlling nonpoint sources.

**CZARA —(Coastal Zone Act Reauthorization Amendments) —CZARA,** adopted in 1990, places additional requirements on the coastal states to address nonpoint source pollution in several categories. The State Water Resources Control Board is revising the Statewide Nonpoint Source Management Plan to incorporate the additional requirements.

**EPA —(Environmental Protection Agency) —**EPA is a federal agency charged with administration of 11 Congressional Acts, including protection of air, water, wildlife and natural resources.

**Erosion —**Detachment and removal of soil particles by running water, glaciers, winds, and waves. The term erosion is usually preceded by a definitive term denoting the type or source of erosion such as gully erosion, sheet erosion, etc. (Brakensiek et al., 1979).

**HRM – (Holistic Resource Management) –** HRM is a continuing, dynamic process of goal-setting, decision-making and monitoring for sustaining communities that is based on the concept that there is only one ecosystem in which there are no parts, only wholes within wholes.

**MAA – (Management Agency Agreement) – An** agreement between two, or more, agencies defining the responsibility of the respective agencies in the administration of a regulatory program for which one of the signatory agencies is responsible.

**Management Measure –** A goal for management of nonporn source pollution for a state water basin, a watershed, or a ranch.

**Management Practice –** A practice applied alone or in combinations to address the goals stated as management measures.

**MOU – (Memorandum of Understanding) –** An agreement between two. or more, agencies defining the responsibility of the respective agencies in the administration of programs, planning or delegated responsibilities.

**NPS – (Nonpoint Source) –** Diffuse discharges of waste throughout the natural environment which are a major cause of water pollution. Difficult to pinpoint physically, but often classified by type: urban runoff, agriculture, mining, septic tank leach fields, silviculture, construction, etc..

**NPDES – National Pollutant Discharge Elimination System —**A nationwide system administered by EPA, but managed under California law. Issues and monitors permits regulating discharge of pollutants into waterbodies.

**NRCS – (Natural Resource Conservation Service) –** Formerly known as SCS (Soil Conservation Service), this branch of the US Department of Agriculture is responsible for providing technical assistance to aid in natural resources management.

**Pasture –** Grazing lands planted primarily to introduced or domesticated native forage species that receives periodic renovation and/or cultural treatments such as tillage, fertilization, mowing, weed control, and irrigation. Not in rotation with crops.

**Point source –** A discernible, confined and discrete conveyance such as a pipe, ditch or channel, tunnel, conduit, well container, concentrated animal feeding operation or vessel, from which pollutants are or may be discharged. Does not include agricultural stormwater discharges and return flows from irrigated agriculture.

**Pollutant –** Dredged spoil, solid waste, incinerator residue, sewage, garbage, sewer sludge, ammunrtions, chemical wastes, biological materials, radioactive materials. heat, wrecked or

discarded equipment. rock. sand, cellar dirt and industrial, municipal, and agricultural waste discharged into water.

**Pollution –** An alteration of the quality of state waters by a pollutant, to a degree which unreasonably affects their beneficial uses or facilities which serve their beneficial uses.

**Quality of the Waters** – Refers to the chemical, physical, biological,, bacteriological. radiological, and other properties and characteristics of water which affect its use.

**Rangeland –** Rangeland is land on which the existing vegetation, whether growing naturally or through management, is suitable for grazing and browsing of domestic livestock at least part of the year. Rangeland includes any natural grasslands, savannas, shrublands, deserts, woodlands, and wetlands which support a vegetative cover of native grasses. grass-like plants, forbs, shrubs or other naturalized species. (Board of Forestry, 1980)

**RCD – (Resource Conservation Districts) –** RCDs are special districts governed by Division 9 of the State's Public Resources Code that administer programs to conserve natural resources. They are governed by locally elected directors and financed by various funding sources including **local** property tax, grants, and contracts.

**Riparian area –** Vegetated ecosystems along a waterbody through which energy, materials, and water pass. Riparian areas characteristically have a high water table and are subject to periodic flooding and influence from the adjacent waterbody.

**RMAC – (Range Management Advisory Committee) –** Members are appointed by the Board of Forestry upon nominations from representative organizations and/or the public.

**RMS – (Resource Management System) –** A generic term that includes any combination of conservation practices and management that achieves a level of treatment of the five natural resources – soil, water, air, plants, and animals – as well as human resources, such as economic and social needs, that satisfies criteria contained in the Field Office Technical Guide (FOTG), such as a resource management system or an acceptable management system (Part 506, Glossary, NRCS General Manual).

**RWQCB -- (Regional Water Quality Control Board) —** Nine Boards, appointed by the Governor, which oversee water quality in each of California's nine major hydrologic units

**RWQMP -- (Range Water Quality Management Plan) --** The RWQMP is being developed pursuant to Section 319 of the Federal Clean Water Act. It is being administered by the RMAC, in cooperation with the State Water Resources Control Board, The California Association of Resource Conservation Districts and other agencies, landowner and conservation organizations. Upon completion, the RWQMP will be considered for adoption into the State Water Resources Control Board's Nonpoint Source Management Plan.

**Sediment –** The product of erosion processes; the solid material both mineral and organic, that is in suspensions, is being transported, of has been moved from its site of origin by air, water, gravity, or ice (USDA-SCS, 1991).

SWRCB – **(State Water Resource Control Board) –** The SWRCB administers all water quality related programs in California, including the Porter-Cologne Water Quality Control Act and the federal Clean Water Act. The five member board is appointed by the Governor.

**Turbidity –** A measure of the extent to which light passing through water is reduced due to suspended materials. Excessive turbidity may interfere with light penetration and minimize photosynthesis thereby causing a decrease in primary productivity. It may interfere directly with essential physiological function of fish and other aquatic organisms, making it difficult for fish to locate a good food source and altering water temperature.

**UCCE – (University of California Cooperative Extension) –** UCCE is part of the state's land grant university system, operating on three campuses, several research field stations, and 52 county offices. UCCE is responsible for extension of research for application in the field as well as conducting applied research in natural resource management and is funded cooperatively at the federal, state and **local** levels.

**USDA – (United States Department of Agriculture) --** federal agency responsible for all farm-related programs including the Natural Resources Conservation Service (NRCS), Consolidated Farm Services Agency (CFSA), Agricultural Economic and Research Service, Agricultural Experiment Stations, Cooperative Extension and the Forest Service as well as several non-farm programs (WIC, Food Stamps, School Lunches, etc.).

**USDI -- (United States Department of the Interior) --** federal agency responsible for management of lands and natural resources with the US. Includes the Bureau of Land Management (BLM), and the Fish and Wildlife Service.

**Waste Discharge Requirement –** The order adopted by the regional Boards regulating discharges of waste.

**Water Quality Control –** The regulation of any activity or factor which may affect the quality of the waters of the state and includes the prevention and correction of water pollution and nuisance.

**Water Quality Control Plan –** Defines beneficial water uses, establishes water quality objectives to protect those uses. identifies water quality threats and outlines corrective measures. It is used to develop discharge limits and guide regional board decisions on specific cases There is a plan for each of California's 16 major water basins. (See Basin Plans)

**Water Quality Objective (Standards) –** The limits or levels of water quality constituents or characteristics which are established for the reasonable protection of beneficial uses of water or the prevention of nuisance within a specific areas. (Porter-Cologne Act)

**Watershed –** A drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation.

## APPENDIX B: SAMPLE MANAGEMENT PLANS

This Appendix provides a guide to developing management plans to deal with a self-initiated approach to water quality management on rangelands and other grazing lands. Included are a general plan outline which contains elements found in most management plans and examples ranging from simple to more complex:

1) General Outline and Components of a Ranch Plan
**2)** Sample: Letter of Intent
3) Sample: Ranch Non Point Source Plan (Short Form)
4) Sample: USDA/NRCS Conservation Plan -- Rangelands and Croplands
5) Sample: UC RWQMP for Sierra Foothill Research and Extension Center

## 1) Ranch Plan Outline

a. **Ranch Description:** This section should describe the ranch's natural resources and describe potential problems (steep slopes, highly erodible soils, improperly built roads, wildlife Impacts, etc.), as well as positive contributions (wildlife habitat. open space, groundwater recharge, property tax, etc.). Much of the information can be depicted on a ranch map.

**Environmental Setting:** This section should describe the ranch and its natural resources and describe potential problems such as steep slopes, highly erodible soils, etc. Much of the information can be placed on a ranch map.

Location
Land ownership
History
Physical improvements
Climate
Geology
Topography
Soils
Vegetation types (communities)

Watershed hydrology
Wildlife

**Livestock and Grazing Operations:** This section should describe the ranch s operations. This should include a description of ranch enterprises and agricultural operations. The description may include the following:

Calendar of operations
Number of Livestock (stock flow)
Location and size of pastures
Pasture use calendar (on-off dates)
Irrigation practices
Pasture and hay production practices
Lease agreements

**b. Ranch Goals:** This section should state what the management plan strives to achieve.

Production goals
- Type and quantity of livestock
- Business plan
- Long-range management plan

Landscape goals
- Water quality
- Type and spatial arrangement of vegetation
- Wildlife habitat

Life-style goals
- Family quality-of-life
- Community activity
- Economic returns and investments

**c. Assessment of Current Conditions:** This section should assess the current soil, water. vegetation, and wildlife habitat conditions and may include some of the following components.

Nonpoint pollution sources

Erosion/sedimentat ton (photos)

Nutrient loadrng

Pathogen loading

Pesticide/toxic loading

Heating water

Impaired beneficial uses of water

Riparian vegetation/habitat (photos)

Stream morphology

Streambank stability

Fish habitat

Fish/aquatic habitat & populations

Management practices

Grazing practices

Water use/drainage practices

Fertilizer/agrichemical practices

Livestock health practices

Endangered Species

County list

Present on the ranch

**d. Management Practices for Implementation:** This section should review and evaluate alternative practices and specify practices to be implemented to address potential impacts identified in the assessment above. This section should also Indicate BMPs already implemented. 'Discussion should include the reason or rationale for the practices selected and what the practices(s) are expected to accomplish. This might include the system of grazing implemented and why it was selected. Practices selected should help you reach short- and long-term goals.

**e. Monitoring/Evaluation:** This section should describe monitoring plans to assess whether desired results are achieved.

## 2) Letter of Intent

**RANCH: Riparian Ranch**

**LOCATION/ADDRESS: 1551 Highway 25**

**Philo, CA**

**EVALUATION OF WATER QUALITY STATUS**

Streams drain into Prize Creek which drains into the Fast River and on to the Ocean. These streams are not listed as impaired in water quality assessments nor in the County Genera! Plan. Some are spawning areas. Attention is given to the protection of existing conditions and improvements in some places.

**CURRENT MANAGEMENT AND PROPOSED CHANGES**

The ranch is divided into 8 fields of which 2 are calving or holding fields. Care is taken to not use the other fields the same time each year. A ranch goal is to leave adequate feed for the fall and winter, which takes care of the residue for protection of the fields. Most of the water sources have troughs. We feed away from the streams. We plan to develop three springs, which now feed into stockponds, and pipe water to troughs. Road grading and culvert replacement will be done to minimize erosion.

**MONITORING STRATEGY**

Working with U.C. Cooperative Extension and the Soil Conservation Service, we have located 10 photo monitoring locations that represent stream and field conditions. These will be photographed three times each year, during high water flows, late spring and late summer.

**OWNER: Dr. Lazy Daizy** **DATE: Nov.** 15, 1994

**PREPARER:** Same

**(IF DIFFERENT FROM OWNER)**

## 3) Ranch Plan

### Ranch Operation

This ranch consists of 856.34 acres located west of Philo, Mendocino County. It is a cow/calf operation, with 75 cows, 3 bulls, and associated heifers and horses. Calving begins in October and ends in early December. Supplemental feed is provided first calf heifers in October and later to the rest of the herd until the spring growing season begins.

Facilities include a 50-ton capacity barn, working corrals, two holding pastures next to the corrals and six additional fields. Two pastures are on steep north facing slopes, one is in the low lands and remains wet until late summer, and the other three are a mix of north and south slopes. The two holding fields are used heavily in the fall during calving, so dry feed is left for this use. (see pasture map - Appendix A)

### Resource Inventory

**Climate:** Annual precipitation averages 56.8 inches where 80% falls between November 1 and March 31. Rainfall intensities of 2 to 3 inches in six hours and 3 to 6 inches in 24 hours occur in one out of every two years. Most soil erosion occurs during peak run-off periods of high intensity storms. (from Booneville weather records)

**Soils:** Yorkville-Yorktree-Squawrock complex, Pinole gravelly loam, Cole loam, Casbonne-Wohly loams, Hopland-Sanhedrin-Kekawaka complex.

**Topography:** Varies from areas of less than 15% slope to areas classed as 30 - 50% slope.

**Watershed:** The entire ranch drains at various points into Prize Creek which flows west to Fast River and onto the Pacific Ocean. At this time no impairments are listed, however salmon spawning levels are of concern.

**Vegetation:** The ranch is dominated by hardwood rangelands Interspersed with redwood forest lands. Brush is present on the steeper north slopes.

**Wildlife:** Columbia Blacktail Deer, Valley Quail, wild pig, wild turkey, occasional duck. coyote, Salmon and occasional summer trout.

## Water Quality Assessment

**Sources** of sediment were identified during a reconnaissance of the ranch following the methods suggested by U.C. Cooperative Extension. Livestock concentration in and near Prize Creek was identified as a potential source of upland and streambank erosion.

## Goals

To work jointly with USDA Soil Conservation Service, UC Cooperative Extension, and Department of Fish and Game to produce a suitable plan which is compatible with a working cattle operation and which will improve the rangeland watershed, water quality, and fish and wildlife habitat.

To improve a pasture rotation system which will increase the carrying capacity of the ranch from 75 to 85 cows.

To identify areas of possible erosion and other nonpoint sources of pollution for development of corrective procedures.

## Management Practices

Prescribed Grazing: To protect against upland erosion, grazing practices which ensure adequate residual dry matter will be continued. This will be accomplished by retaining 30 to 40% carryover of range feed. Split pastures or alternate use so that no pasture is used at the same time every year.

Spring Development: Develop three springs and pipe water to troughs to help with pasture rotation and provide a clean water source

Critical Area Planting: Stabilization of six head cuts by seeding grasses, breaking up hay bales, and installing small check dams.

**Monitoring**

Ten photo stations were set up in 1994 for the purpose of monitoring upland and riparian/stream conditions.

**Owner:** Dr. Lazy Dazy **Date: Nov. 15. 1994**

**Preparer:** Same
(If **different from owner)**

Appendix A: County Map with Ranch Location

Appendix B: Soil map and or aerial photo

Appendix C: Location of monitoring stations

## 4) USDA/NRCS Conservation Plans

**UNITED STATES DEPARTMENT OF AGRICULTURE777 Sonoma Ave., Rm. 212{PRIVATE }**
**SOIL CONSERVATION SERVICE** **Santa Rosa, CA 95404**
**(707) 575-1409**

(Date)

Conservation Plan
for

(Name)

CROPLAND

Goal: Protect soil and water resources while providing sustained, profitable production of agricultural crops; maintain or improve biologic diversity.

Specific objectives:

1. Reduce sheet and rill erosion to within NRCS Technical Guide standards. Stabilize active gullies and streambank erosion.
2. Avoid developing cropland on active landslides.
3. Provide for safe conveyance of stormwater runoff to stable channels.
4. Apply pesticides only as per label directions and applicable laws to prevent surface and groundwater pollution.
5. Apply fertilizers and soil amendments only as needed to meet crop requirements and prevent surface and groundwater pollution.
6. Apply irrigation water to conserve water, prevent irrigation induced erosion, and prevent surface and groundwater pollution (nutrients and pesticides).
7. Access roads will be constructed and maintained to minimize erosion. Drainage, culverts, shaping, water-bars, and surfacing will be incorporated as needed to minimize annual road surface grading and repair activities.

8. Maintain or increase bologic diversity where crops grow as follows.
   a.
   b.
9. Maintain or increase biologic diversity adjacent to crops as follows:
   a.
   b.
10. Control noxious pests as practical or required.

GRAZING LAND

Goal: Protect soil and water resources while providing for sustained, profitable production of animals or animal products; reduce wildfire hazard and meet local fire district policies: maintain or improve biological diversity.

Specific objectives:

1. Reduce sheet and rill erosion to within NRCS Technical Guide standards by maintaining or improving vegetative cover. Stabilize active gullies and streambank erosion.
2. Provide adequate rest periods during the growing season to promote health and vigor of perennial grasses.
3. Utilize cross-fencing, water development, supplements, or herding to control distribution as needed to achieve cover and vigor objectives above. Avoid locating fences and water sources in locations which might aggravate erosion or pollution from animal wastes.
4. Apply fertilizers and soil amendments only as needed to meet pasture requirements and prevent surface and groundwater pollution.
5. Prevent surface runoff from manured areas from polluting surface waters downstream. Keep animals out of live streams as necessary to prevent pollution, protect streambank stability, and protect vegetative cover.
6. Access roads will be constructed and maintained to minimize erosion. Drainage, culverts, shaping waterbars, and surfacing will be incorporated as needed to minimize annual road surface grading and repair activities.

7. Apply pesticides only as per label directions and applicable laws to prevent surface and groundwater pollution.
8. Maintain or increase biologic diversity (in addition to grazing control above) as follows:
   a.
   b.
9. Control noxious pests as practical or required.

SPECIAL BIOLOGICAL RESOURCE LANDS

Goal: Protect high value habitats from degradation or conversion to other uses.

Specific objectives:

1. Protect stream corridor habitats as shown on attached map.
2. Protect high value wetland areas as shown on attached map.
3. Protect upland sites as recommended by professional plant ecologists (and where required by law) as shown on attached map.
4. Manage above areas using fencing or other means for controlling grazing, mechanical disturbance, soil erosion, or disturbances from pollution/pesticides. Note: Excluding all disturbance for prolonged periods may damage populations of certain high value species if excessive thatch or shading develops in grassland areas. Some species require habitats which are occasionally burned. grazed (or mowed), or trampled.
5. Control noxious pests as practical or required.

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*NOTE: Site-specific written plans will be developed, implemented, and maintained if needed to meet the above landowner objectives. They will be developed by the landowner, NRCS, consultants, or other qualified persons to meet or exceed USDA-NRCS standards.

Implementation Strategy

To successfully carry out this conservation plan, I recognize that I need to:

1. Understand the types and sources of pollutants on or leaving my property.
2. Understand the general requirements of endangered species and other species or habitats of public concern on my property.
3. Obtain proper permits for activities regulated by federal, state, or local environmental laws.
4. Know how to achieve each specific objective.
5. Know when I plan to achieve each specific objective.
6. Strive to implement this plan and achieve the objectives as quickly as possible.
7. Seek technical or financial assistance as needed to address public concerns.
8. Monitor progress and results.
9. Replan as necessary.

Accepted by: _____ Date: _____

(owner/operator)

Name

Address (mailing)

Phone No.

Acres

Property address:

Attachments:

Assisted by:

## 5) UC RWQMP for Sierra Foothill and Extension Center

**RANCH: Sierra Foothill Research and Extension Center**
**LOCATION/ADDRESS: 8279 Scott Forbes Road, Browns Valley, CA**

The Sierra Research and Extension Center (SFREC) is one of nine research and extension centers owned by the University of California Division of Agriculture and Natural Resources. The University of California purchased the **5720-acre** property in the early 1960s as a facility for studying beef cattle production and range management practices.

A Rangeland Water Quality Management Plan (RWQMP) has recently been proposed to the State Water Resources Control Board to control nonpoint source pollutants such as sediments and nutrients from rangelands. The RWQMP requests voluntary nonpoint source plans from ranch managers and owners to control or reduce water quality impacts from grazing activities. This nonpoint source management plan was prepared according to RWQMP guidelines and represents a proactive step by the University of California to protect the Center's water quality.

### CENTER DESCRIPTION

#### Environmental Setting

Climate: The SFREC has a Mediterranean climate characterized by hot, dry summers and mild, rainy winters. Annual precipitation ranges from 10 to 44 inches with an average of 28 inches. Most precipitation occurs as rainfall between October and May. The coolest months are December and January, averaging temperatures in the low 50s°F. The hottest months are July and August, average temperatures in the low 90s°F. Rainfall limits forage growth more than temperature. Historic precipitation and 1993-94 weather data are included in Appendix A.

Soils and Topography The Soil Conservation Service lists four soil series as the most common at the Center: Auburn, Sobrante, Argonaut, and Timbuctoo. The Auburn series is the most extensive and almost always intermingled with the other three series. All four soil series developed from greenstone and are now covered with annual grasses, forbs, and

woodland-grass vegetation SFREC topography IS typical of the rolling Sierra Nevada foothills Most slopes range from 15 to 50 percent though steeper slopes are found in the southern part of the Center bordering the Yuba River. Small scattered areas are also more gently inclined, with slopes ranging from 2 to 15 percent. Appendix A includes a soil map, brief soil descriptions, and a topographic map.

Veaetation: Three vegetation types exist at the SFREC: annual grassland, oak woodlands, and riparian corridors. Common annual grass species include soft chess, annual bromes, and wild oats; common forb species include filaree, rose and subterranean clover, and yellow star thistle. Grasslands also house some perennial grasses such as purple stipa and California melic. Common oak woodland species include blue oak, live oak, black oak, and foothill pine. Woodland shrub species Include buck brush, poison oak. toyon, and white leaf manzanita. Riparian areas commonly include such species as valley oak, cottonwood, sycamore, fig, Sierra plum, willow, cattail. and blackberry.

Watersheds: The SFREC contains almost the entire watersheds of six small permanent streams within its boundaries: Haworth Creek, Forbes Creek, Slicks Creek, Schubert Creek, Campbell 1, and Campbell 2. A seventh larger permanent stream, Porter Creek, passes through the Center. Englebright Reservoir lies on the southeast corner of the SFREC, and the Yuba River forms the Center's southern boundary. Dry Creek lies just beyond the northwest boundary and flows to the southwest.

Both Campbell creeks empty directly into Englebright Reservoir. Schubert and Haworth Creeks meet the Yuba River downstream of the reservoir dam. Slicks and Forbes Creeks flow into Porter Creek which joins Dry Creek outside of the Center boundaries. Dry Creek meets the Yuba River west of the SFREC. Appendix A includes a map of stream locations with areas where cattle have stream access noted.

Wildlife: Past research at the Center has documented an assortment of birds and wildlife: 145 bird species, 12 reptile species, 4 amphibian species, and 35 mammal species. Common wildlife include black-tailed deer, wild turkey, California quail, red fox. turkey vultures, acorn woodpeckers, rattlesnakes, and cottontail rabbits.

Endangered Species: No plants listed as threatened or endangered are known to exist at the SFREC. The Center does house valley oaks which have been listed by the California Native Plant Society as a “species of limited distribution." Three bird species found at the SFREC have been listed by federal or state agencies as threatened or endangered: the bald eagle, the bank swallow, and the California black rail.

Phvsrcal Improvements: The SFREC contains 5,720 acres including approximately 4,945 acres of dry annual rangeland and about 150 acres of irrigated pasture fenced into 81 fields. About 353 acres are developed with facilities, roads, and housing, and 272 acres have been designated as natural areas where no livestock grazing occurs.

Some rangeland has been improved for forage production including various degrees of clearing and some seeding. About 1,550 acres are totally cleared, approximately 1.365 are partially cleared or thinned, and roughly 2,805 acres remain unmodified oak woodlands. Appendix A includes a map of cleared, partially cleared, and uncleared areas. Fifty-two troughs and five ponds have been developed to provide stock water away from streams. These watering sites are indicated on the stream map provided in Appendix A.

**Livestock and Grazing Operations**

Livestock Numbers: The SFREC maintains a fall-calving herd of about 475 head including commercial cows, bulls, replacement heifers, and stockers (unweaned calves are not counted as head). The herd is managed to fulfill range management and research needs: herd size may vary but is expected to remain on average at about 475 head. Appendix B includes a table of cattle numbers for the last ten years.

Field Use: Cattle are rotated between summer and winter fields and fields used for special purposes such as calving and breeding. Appendix B includes a general grazing rotation map. Both estimated carrying capacities and actual field use are also presented in Appendix B for each grazing unit. **Carry** capacities are estimates calculated by a method proposed by the Cooperative Extension using canopy cover and slope.’ Field use figures are based on past

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**University of California. Department of Agronomy and Range Science. Cooperative Extension. “Estimating Livestock Grazing Capacity on California Annual Rangeland” Range Science Report No. 29. April 1991.**

grazing intensities and estimates of future forage availability. Actual field use and time of use may vary depending on research needs, weather, forage, and unforeseen events such as fire.

Fields are managed to leave a minimum of 750 pounds per acre residual dry matter (ROM)*. Occasionally, some fields may contain less than 750 pounds per acre RDM for any single year depending on rainfall, forage availability, experimental requirements, and/or weed control measures.

Weed Control: Weed control primarily consists of local spraying for star thistle, verbana, poison oak, and California blackberries with LV-4 (2,4D, a low volatile ester). Spraying for blackberries occurs only in permanent pastures, not in riparian areas. Spraying occurs in February, March, and April. Occasional light spraying may continue in May, June, and July. Round-Up™ is also used around headquarters and in ditches to control weeds. In 1993, Forbes field (a cleared area) was burned and, in 1994, grazed below 750 pounds per acre RDM to control medusahead, a weed species that had infested the area.

Irriaation Practices: Irrigated pasture is used primarily in the summer months but may be used in the fall if feed remains. During the summer, pasture is both flood and sprinkler irrigated. Cattle use is rotated every 10 to 12 days on average. Pastures may be replanted every 7 to 10 years. "Resting" pasture is disced and planted in oats in October, grazed in February and again in April or May, and turned under and left dry until September. In September, the land is disced again, fertilized, and replanted to irrigated pasture. Established pastures are usually fertilized twice a year: in May with about 200 pounds of 16-20-0 per acre and in August with 100 pounds of 46 percent urea per acre.

## GOALS

This nonpoint source management plan is intended to achieve the following goals:

Production Goal: To maintain, on average, a 475-head herd for beef cattle and range management research.

*Residual dry matter is the dry weight of biomass per acre present at the beginning of a new growth cycle.

Landscape Goal: To protect and/or enhance existing water quality to prevent future impairments to beneficial uses from grazing-related activities by proper management of uplands and promotion of riparian vegetation where feasible.

Lifestyle Goal: To promote sustainability of Center resources to provide for long-term educational and research needs.

## ASSESSMENT OF CURRENT CONDITIONS

### Impaired Beneficial Uses of Water

The State Water Resources Control Board (SWRCB) recently issued the 1994 Draft Water Quality Assessment[3] which catalogs the state's water bodies and their water quality. All streams at the Center eventually flow into Englebright Reservoir or the lower Yuba River. Englebright Reservoir is listed as having intermediate water quality. The lower Yuba River is listed as having good to intermediate water quality. Good or intermediate water quality indicates no impairment of beneficial uses.

### Nonpoint Pollution Sources

Because no impairment of beneficial uses exists in water bodies receiving Center waters, a nonpoint source management plan is not required by the Regional Water Quality Control Board. However, possible nonpoint sources were assessed to achieve the stated landscape goal of protecting or enhancing existing water quality through a voluntary program.

Erosion/sedimentation: In 1984, the Soil Conservation Service prepared a Soil Conservation Plan for the SFREC. The plan states that soil erosion should not be of concern as long as 500 to 700 pounds per acre RDM remains after grazing. Current management leaves a minimum of 750 pounds per acre RDM; erosion is not believed to be an extensive problem. Localized erosion is a concern in some areas of the SFREC including the corral, areas below culverts, some roads, supplemental feeding areas, minor trampling of some stream banks by cattle, and a firebreak in the Campbell area.

Nutrient loading: Nutrient loading is a greater concern for impounded water bodies (e.g., lakes and reservoirs) than for flowing streams or rivers. Two streams in the Campbell area

3/State Water Resources Control **Board** "Draft Water Quality Assessment." May 24. 1994.

flow directly into Englebright Reservoir Both these streams have dense riparian vegetatton along their banks. Current grating management ensures that a minimum of 750 pounds per acre RDM remains after grazing upland fields and pastures. Both riparian and upland vegetation act as filters to reduce nutrtent-loading to the streams and subsequently Englebright Reservoir.

**The Schubert Watershed Study**

The SFREC is fortunate to have over 10 years of water quality monitoring data from the Schubert Creek watershed. Monitoring results indicate an initial rise in nitrate levels when the first storms of the rainy season flush nutrients out of the watershed, but then nitrate levels return to normal. Researchers concluded that grazing has no long-term impact on water quality.'

The corral near Center headquarters drains into a ditch that allows flow directly into Porter Creek. Because of the length of Porter Creek and heavy riparian vegetation along its lower reaches, excess nutrients would likely be removed before the stream joins Dry Creek and subsequently the Yuba River. However, diverting corral runoff to filter through adjacent fields before reaching the creek is a relatively simple matter. and drainage modifications would reduce the potential for future water quality impairments.

Pathogen loading: Water-borne pathogens are primarily a concern where water is used for drinking or water-contact recreation. Englebright Reservoir is used for water-contact recreation, and the lower Yuba River supplies drinking water though municipal intakes are several miles downstream of the Center.

Defecation by cattle directly into streams is the primary grazing-related source of pathogens. Cattle are excluded by fencing from some stream reaches. Supplemental feeding and salting areas are located to discourage cattle from concentrating near streams. Fifty-two troughs and five ponds provide stock water away from streams. Many fields containing streams are not grazed in summer when green riparian vegetation encourages cattle to congregate in and near creeks. The SFREC also has an active livestock health program to reduce the level of

'Singer. M. and Dahlgren. R.. "The Schubert Watershed Study," Annual Report. U.C. Sierra Foothill Range Field Station. 199 1.

pathogens in cattle that may be released into streams (see "Livestock Health Practices: section for more detail). The management measures described above are believed to be effective at minimizing pathogen loading into the Center's streams.

Temperature Impacts: SFREC streams are too small and shallow to support cold-water fish. Both the Yuba River, which bounds the Center to the south, and Dry Creek, which is dammed just north of the SFREC by the Browns Valley Irrigation District, support many cold-water fish species including salmon and steelhead. Englebright Reservoir, with the help of cold water releases from the upstream New Bullard's Bar Reservoir, also supports cold-water fish species. These reservoirs are the primary influence on water temperature in the Center's vicinity. In addition, the small volume of water entering the Yuba and Englebright from Center streams (especially in summer months) and shading by riparian vegetation along most stream stretches indicate that temperature impacts due to grazing-related activities at the SFREC are insignificant.

**Manaaement Practices**

Grazing Practices: A comparison of estimated carry capacities and actual field use indicate that upland range is near capacity but not overgrazed. Obvious signs of overgrazing (e.g., networks of gullies, pedestaling of plants, etc.) are also absent at the Center.

Rioarian Corridors: Some riparian areas are fenced to prevent cattle access but most are managed as part of adjacent fields (see Appendix A). Past clearing in the Forbes, Slicks, and Porter areas have left streams in these fields denuded of riparian vegetation along significant stretches. Forbes Creek is completely bare of riparian vegetation along many stretches except for intermittent trees and shrubs. Slicks Creek is currently the site of a stream restoration project that includes planting of willows, cottonwoods, and oaks along the lower 2000 feet of this creek. Areas clear of riparian vegetation along lower Porter Creek are located in irrigated pasture. Cattle are moved frequently in and out of these fields, and heavy growth would impede cattle management. Understory brush was removed along a short stretch of Porter Creek bordering dry rangeland.

Livestock Health Practices: Good livestock health practices reduce the level of pathogens in livestock, thus reducing pathogen loading into rangeland water bodies. The SFREC has a very active program for prevention and cure of disease in the Center's cattle herd. Calves are inoculated against seven (eight for heifers) bacterial or viral diseases. Mature animals annually receive protection against eight infectious diseases and internal parasites. Other prevention includes frequent health checks by trained personnel. For the relatively few animals that become ill, protocols exist for prompt treatment. Treatment includes the use of antibiotics, and veterinarians are consulted when necessary.

**Endanaered Species**

The SFREC houses one listed endangered species (bald eagle) and two listed threatened species (bank swallow and California black rail). Current management is not believed to impact any of these species or their habitat. Bald eagles are only incidental users of the Center, and bank swallow burrows are likely located in areas too steep for cattle grazing. The black rail population appears to have thrived at the SFREC under current cattle management.

MANAGEMENT PRACTICES FOR IMPLEMENTATION

As discussed in the previous sections, the SFREC already has many "best management practices" in place as described by RWQMP and Soil Conservation Service documents. If existing management measures were considered insufficient to meet planning goals, possible alternative measures were evaluated with respect to feasibility, effectiveness, compatibility with current management, and cost.

Four alternative management measures were selected for implementation: 1) diverting corral drainage through adjacent pastures to reduce nutrient and sediment loading to nearby Porter Creek; 2) restoring and revegetating Forbes Creek; 3) controlling localized erosion with gravel placement and other structural measures; and 4) controlling localized erosion by critical area planting. Existing and alternative management measures addressing identified concerns are outlined on the next page.

| Management Category | Existing Management Measures | Alternative Management Measures | Source(s) Addressed |
|---|---|---|---|
| Grazing Management | Minimum RDM 750 pounds/acre (528A)[5] | | Upland erosion and sediments |
| | Animal exclusion from some ripanan areas (472) | | Pathogens |
| Structural Improvements | Troughs and ponds (614) | | Pathogens |
| | Revegetation of lower Slicks Creek (580) | | Streambank erosion: upland sediments and nutrients; water temperature |
| | | Divert corral drainage | Erosion/sediments and nutrients |
| | | Gravel placement and measures to control localized erosion (410) | Erosion/sediments |
| Land Treatments | Allow understory brush to return along part of Porter Creek (314) | | Upland sediments and nutrients |
| | | Critical **area** planting for localized eroded areas (342) | Erosion/sediments |
| | | Restore and revegetate Forbes Creek (204) | Streambank erosion; upland sediments and nutrients; water temperature |
| Livestock Management | Livestock health practices | | Pathogens |
| | Supplemental feeding and salting | | Nutrients and pathogens |

**MONITORING**

Monitoring efforts are aimed at documenting current upland and riparian conditions as well as documenting changes over time. Three monitoring methods will be used: 1) photo monitoring of riparian and upland areas, 2) an annual streambank stability and cover survey, and 3) residual dry matter assessments. Monitoring results will be evaluated annually. The effects of short-term weather and management actions will be acknowledged. If monitoring indicates downward trends in riparian or upland areas, or unsatisfactory progress toward

'Numbers in parentheses refer to Soil Conservation Service Field Office Technical Guide Practice numbers.

specific objectives on this plan, management changes will be considered Monitoring protocols and a map of monitoring site locations are included in Appendix C.

Photo Monitoring: The SFREC has a set of 24 photo points which have been maintained since 1962. Photos are taken at these locations every two or three years. The photos are mostly mid- to long-distance and include few riparian areas. Nevertheless, they can indicate major vegetation changes and possible erosion, and they will be reviewed periodically as part of the monitoring process.

Twenty-one photo points were recently established along the Center's seven streams and riparian zones, including a control photo point in the ungrazed Schubert natural area. Photo points include short-, mid-, and long-range views. Locations were chosen by walking the streams and noting any specific problem areas (e.g., trampled streambanks, steep cutbanks, areas bare of vegetation). Photo points were established at specific problem areas; if no such areas were noted, photo points were selected for easy access and best view of the riparian area. Three locations were chosen to document vegetation height in typical grazed upland areas. Photo points were marked with specially painted and numbered fence posts. Photos will be retaken twice a year: in May, near the end of winter grazing, and in September, near the end of summer grazing.

Streambank Stability and Cover Survey: To identify any new problem areas, an annual visual survey of streambank stability and cover will be performed. Six streambank stability monitoring sites were established near photo points and were permanently marked. In May of each year, streambank stretches at these sites will be classified into one of four categories based on a method suggested in an Environmental Protection Agency (EPA) publication? covered and stable; covered and unstable; uncovered and stable; and uncovered and unstable.

Residual Dry Matter Assessments: Residual dry matter (RDM) estimates will be recorded annually after winter or summer grazing in twelve fields. RDM will be determined using a comparative analysis technique whereby the RDM in the entire field is approximated by estimating the percentage of the field in various RDM classes.

**Owner:** University of California **Date:** January 3, 1995

**Prepared by:** Mike Connor, Superintendent

[6] Idaho Water Resources Institute for the Environmental Protection Agency, "Monitoring Protocols to Evaluate Water Quality Effects of Grazing Management on Western Rangeland Streams." Streambank Stability, p. 96-107.

Melissa Joyce, DANR Summer Intern

Appendix **A:** Environmental Setting Information
- Historical Precipitation Records
- 1993-94 Weather Data
- Soil Map
- Topographic Map
- Map of Stream Locations and Watering Sites
- Map of Cleared, Partially Cleared, and Uncleared Areas

Appendix B: Livestock Management Information
- Historical Cattle Numbers
- Grazing Rotation Map
- Field Use and Carry Capacity Estimates

Appendix C: Monitoring Information
- Monitoring Protocols
- Monitoring Site Locations

## APPENDIX C: DETAIL ON MANAGEMENT PRACTICES

### Best Management Practice, Management Measures, and Management Practices

The term "best" is subject to interpretation and point of view. In recognition of this. the Coastal Zone Act Reauthorization Amendment uses the new terms 'management measures and management practices'.

- Best Management Practice (BMP) "is a practice or combination of practices that is *determined by a state to be the most effective means of preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with water quality goals"* (Federal Clean Water Act, 1977).

- Manaaement measures are goals for management of nonpoint source pollution for a state basin, watershed, or ranch. They describe what we want to happen in the long-term and they should be linked to impaired beneficial uses of water. An example of a ranch management measure might be to *"increase streambank vegetation along the portion of Deer Creek that runs through the ranch".* Under voluntary compliance these goals or management measures are determined by the rancher. If voluntary compliance is unsuccessful, the regional Water Quality Control Board (RWQCB) may require specific management measures and/or practices.

- Management practices applied alone or in combinations address the goals stated as management measures.

### Developing Management Practices

**Ranchers:** Many of the range management practices currently used by ranchers and range managers will become water quality management practices. Water quality management practices should be planned and applied just like any other business decision on a ranch. Management practices must be technically and economically feasible.

**Professionals:** Management practices can be designed by range management professionals using the most technically sound research and management information available. For that reason, as technology, environmental or financial conditions change, management practices should be updated to reflect those changes.

**Regional Water Quality Control Boards:** EPA delegates water quality regulations, including management measures and practices to the State Water Resources Control Board (SWRCB). Legally, a practice must be certified by the SWRCB. The SWRCB may delegate this authority to the Regional Water Quality Control Boards (RWQCB). They may accept the practices in the SCS Field Office Technical Guides or they may require management practices unique to the situation under Tier Three enforcement. Prior to Tier Three, the Porter-Cologne Water Quality Control Act prohibits the RWQCB from requiring specific practices; they may only require that standards be met.

**Field Office Technical Guides: The** Natural Resource Conservation Service (formerly SCS) has conducted a program of voluntary soil and water conservation planning with private landowners and resource managers for over 50 years. The NRCS relies upon a Technical Guide, localized to the geographic area of a Field Office, and a National Planning Manual as guides for technical assistance. The Field Office Technical Guides may be revised as needs and techniques change.

**Implementation of Management Practices**

The rancher may seek technical assistance from UC Cooperative Extension, USDA Natural Resource Conservation Service, Resource Conservation Districts or other agencies to help identify water quality problems, develop management statements of water quality goals or objectives and select management practices. The amount or extent to which a practice is applied must be consistent with national, state, and basin water quality goals and should reflect the relative contribution of that type of land use activity toward water quality problems within the basin. This technical assistance will result in a plan, typically known as ranch plan or conservation plan. Because writing a ranch plan is the landowner's first tangible step in voluntarily reducing nonpoint pollution sources, ranch planning is listed as the first management practice in the next section.

**Management Practices for California Rangelands**

Following are example management practices suitable for California's privately owned rangelands. Additional practices, which may apply to water quality protection but are not listed here, are found in the NRCS Field Office Technical Guide and may be of use to and individual situation. The number in parentheses refers to the practice number in the NRCS Field Office Technical Guide.

1. **RANCH PLAN:** The goal of maintaining or improving the quality of water should be included in ranch management plans for livestock operations. Ranch water quality goals need to be linked to water quality problems (impaired beneficial uses) identified by the Regional Water Quality Control Boards for the local basin or sub-basin. Ranch plans may follow several formats.
   - Natural Resources Conservation Service Conservation Planning.
   - UCCE Ranch Planning Short Course Outline.
   - Holistic Resource Management.
   - Any organized planning process conducted by the landowners, agencies, or private consultants.

   Appendix B outlines the contents of ranch plans that address water quality as well as other aspects of the ranch operation.

2. GRAZING MANAGEMENT PRACTICES: Prescribed grazing may be achieved by controlling season, intensity, frequency and distribution of grazing.

**Practices**

**2.1 Prescribed Grazing (528A)** The controlled harvest of vegetation with grazing or browsing animals, managed with the intent to achieve a specified objective, such as:

- Improve or maintain the health and vigor of selected plants and to maintain a stable and desired plant community,
- Provide or maintain food, cover and shelter for animals of concern,
- Improve or maintain animal health and productivity,
- Maintain or improve water quality and quantity,

Reduce accelerated soil erosion and maintain or Improve soil condition

2.2 Use **Exclusion** (472) Use exclusion of animals, people or vehicles from an area to protect. maintain, or improve the quantity and quality of the plant, animal, soil, air, water. and aesthetics resources and human health safety.

**3. STRUCTURAL** RANGE IMPROVEMENTS: Structural range improvements may be used to facilitate proper grazing use. These practices should be planned, constructed, and utilized in a manner to enhance or maintain water quality. These management practices should be linked in the ranch plan to proper grazing use, and other ranch water quality goals.

**Practices**

3.1 **Access Roads (560)** Roads constructed to provide access to farms, ranches and fields. Used for moving livestock, produce, equipment and supplies and to provide access for management of ranch resources.

3.2 **Fencing (382)** Enclosing or dividing an area of land with a suitable permanent structure that acts as a barrier to livestock, big game, or people (does not include temporary fences). Fencing may protect riparian areas which act as sediment traps and filters along water channels and impoundments.

3.3 **Grade Stabilization (410)** A structure used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation and advance of gullies, and to enhance environmental quality and reduce pollution hazards.

3.4 **Pipelines (516)** Pipeline installed for conveying water for livestock or for recreation. Pipelines may decrease sediment, nutrient, organic, and bacteria pollution from livestock by providing water sources other than streams and lakes.

3.5 **Ponds (378)** A water impoundment made by constructing a dam or an embankment or by excavation of a pit or dugout. Ponds may provide alternate water sources away from stream. Ponds are often used in conjunction with pipelines and troughs and tanks. Ponds may trap nutrients and sediment which wash into the basin.

3.6 **Sediment Basins (350)** A basin constructed to collect and store debris or sediment. Sediment basins will remove sediment and associated materrats and other debris from the water which IS passed downstream. Stockwater ponds often act as sediment basins.

3.7 **Spring Development (574)** Improving springs and seeps by excavating, cleaning, capping, or providing collection and storage facilities. There will be negligible long-term water quality impacts with spring developments. Erosion and sedimentation may occur from any disturbed areas during and immediately after construction, but should be short-lived. The stream source will usually be fenced.

3.8 **Stock Trails or Walkways (575)** A livestock trail or walkway constructed to improve grazing distribution and access to forage and water. This practice may be used to reduce livestock concentrations, facilitate proper grazing use and planned grazing systems.

3.9 **Streambank Protection (580)** Using vegetation or structures to stabilize and protect banks of streams, lakes, estuaries, or excavated channels against scour and erosion.

3.10 **Troughs and Tanks (614)** Installation of a trough or tank may facilitate improved distribution of livestock. Troughs and tanks are often an effective means of providing stock water away from streams.

3.11 **Landslide Treatments (453)** Treatments to prevent or stabilize landslides to protect life and property and to prevent excessive erosion and sedimentation.

3.12 **Well (642) A** well may be constructed or improved to provide stockwater away from streams and other critical areas. As a new water source it will improve livestock distribution.

3.13 **Stream Crossing (interim)** A stabilized area to provide access across a stream for livestock and farm machinery. The purpose is to provide a controlled crossing or watering access point for livestock along with access for farm equipment.

4. **LAND TREATMENTS:** Land treatments to manage vegetation, practices to reduce erosion or improve wildlife habitat should be planned, implemented and maintained to minimize adverse impacts on water quality.

**Practices**

**4.1 Brush Management (314)** Managing and manipulating stands of brush (and weeds) on forest, range, pasture land by mechanical, chemical, or biological means or by prescribed burning. The purpose of brush management is to increase ground cover, reduce fire hazard, improve water quality in the long term, improve forage production and quality, increase runoff and other objectives depending on landowner goals. Brush management may temporarily impair water quality by increasing sediment yields because of soil disturbances and reduced vegetative cover.

**4.2 Prescribed Burning (338)** Applying fire to predetermined areas under conditions for which the intensity and spread of the fire are controlled. Prescribed burning is a brush management practice.

**4.3 Critical Area Planting (342)** Planting vegetation, such as trees, shrubs, vines, grasses, or legumes, on highly erodible or critically eroding areas. (Does not include tree planting mainly for wood products.) This practice may reduce soil erosion and sediment delivery to surface waters. During grading, seedbed preparation, seeding, and mulching, sediment may impair surface water quality prior to plant establishment.

**4.4 Range Seeding (550)** Establishing adapted plants by seeding on native grazing land. (Range does not include pasture and hayland planting.) Increased erosion and sediment yield may occur during the establishment of this practice. This is a temporary situation which diminishes when the reseeded area becomes established.

**4.5 Grazing Mechanical Treatments (548)** Renovating, contour furrowing, pitting or chiseling native grazing land by mechanical means to improve plant cover and water quality by aerating the soil, increasing infiltration and available moisture, reducing erosion and protecting low lying land or structures from siltation.

**4.6 Stream Corridor Improvement (204)** Restoration of a modified or damaged stream to a more natural state using bio-engineering techniques to protect the banks, and to re-establish the riparian vegetation. It does not apply to short

reaches of stream that should be treated by Practice 580 (Streambank Protectton) or Practice 584 (Stream Channel Stabilization).

**4.7 Wildlife Wetland habitat Management (644) or Woodland Development or Restoration** Retaining, creating or managing woodland habitat for wildlife. The construction or restoration of a woodland facility to provide the hydrologic and biologic benefits of a wetland.

**4.6 Wildlife-Upland Habitat Management (645)** Creating, maintaining or enhancing areas for food and cover for upland wildlife.

5. LIVESTOCK MANAGEMENT PRACTICES: Livestock management practices such animal health, feeding and salting should be done in a manner to protect water quality.

**Practices**

**5.1 Livestock Parasite Control** ( ) Livestock health and other management practices used to reduce parasites and pathogens.

5.2 **Supplemental Feeding and Salting** ( ) Feeding practices that minimize livestock concentration near water bodies and facilitate more uniform livestock distribution.

6. **Facility Siting/Design Criteria:** Not included as a NRCS practice, but involves the consideration of the location and/or design of feeding, working, holding, chemical storage and shipping facilities in proper proximity for water quality protection.

## APPENDIX D: MONITORING INFORMATION SOURCES

The following self-analysis check lists and photo point procedures are included as **examples** of a number of such approaches being used with in California. Most require some training to be effectively utilized.

Watershed Evaluation Checklist (Fact Sheet #22)

Photo Points as a Monitoring Tool (Fact Sheet #16)

Stream Quality Survey (Izaak Walton League of America Save our Streams)

Standard Checklist (from BML TR 1737-9 1993)

Additional information and technical assistance can be obtained from local offices of University of California Cooperative Extension, USDA Natural Resource Conservation Service and many RCDs. Other state and federal agencies can provide monitoring assistance within the limits of the agency responsibility. Other monitoring materials are in development and testing process within California and nationally which will be available from many of the above sources as they are completed. **It is important to check possible local sources for materials and approaches suitable for your location and situation.**

The following sources represent the type of information available for monitoring the waterbody, riparian area, and uplands that are associated with a rangeland watershed. These references are particularly adaptable to many California situations. Most SCS and Cooperative Extension offices will have reference copies on hand.

Holistic Resource Management. Allan Savory, 1988. Island Press, 1718 Connecticut Ave., N.W., Suite 300, Washington, D.C. 20009.

"How To" Monitor Range/and Resources. Univ. of Calif. Cooperative Extension, Northern Region, November 1994. Available from: UC Cooperative Extension, 1205 Main Street, Susanville, CA 96130, $10. Focus on deciding why and what to monitor and photo monitoring.

*Monitoring California Annual Range/and Vegetation.* December 1990 Leaflet No *21486.* Univ of Calif. Division of Agriculture and Natural Resources, Oakland, CA

*Monitoring Guidelines to* Evaluate *Effects of Forestry Activities on Streams in the Pacific Northwest and* Alaska. Environmental Protectron Agency publication EPA/91 0/9-91 - 001. May 1991. EPA Region 10. 1200 Sixth Ave., Seattle, WA 98101. A keystone document for water quality monitoring in the west and is composed of two major sections: 1) developing a monitoring plan, and 2) a review of monitoring parameters

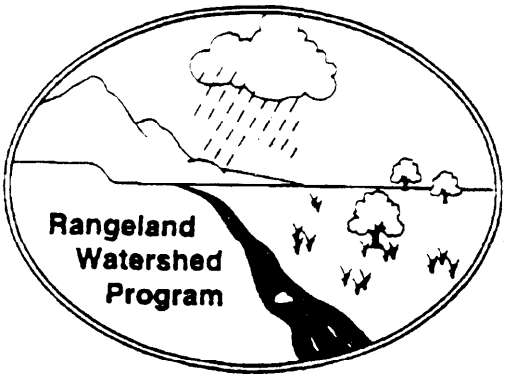
*Monitoring Primer for Range/and Watersheds.* T.E. Bedell and J.C. Buckhouse. Environmental Protection Agency publication EPA 908-R-94-01, September 1994. EPA Region 8, 999 18th Street, Denver CO 80202-2644. EPA publication dealing with rangeland monitoring to be used as a companion to EPA 91 O/R-93-01 7. Uses a matrix to establish how parameters, methods, characteristics and references all tie together.

*Monitoring Protocols to Evaluate Water Quality Effects of Grazing Management on Western Range/and Streams.* Environmental Protection Agency publication EPA 190/R-93-017, October 1993. EPA Region 10, 1200 Sixth Ave., Seattle. WA 98101. Details planning and monitoring attributes within the water column. A companion to EPA 908-R-94-01.

*Range/and Health: New Methods to Classify, inventory, and Monitor Rangeiands.* National Research Council, 1994. National Academy Press, 2101 Constitution Ave., N.W., Washington, D.C. 20418. Provides new concepts to evaluate rangeland health including approaches to monitoring.

*Riparian Area Management: Process for Assessing Proper Functioning Condition.* USDI/BLM Publication TR 1737-g. 1993. USDI/BLM Service Center, P.O. Box 25047, Denver, CO 80225-0047

*The Volunteer Monitor* (Newsletter). 1318 Masonic Ave., San Francisco, CA 94117




# Rangeland Watershed Program

Water Quality Education & Technical Assistance Program for California Rangelands

# *FACT SHEET*

**U.C. Cooperative Extension and U.S.D.A. Soil Conservation Service**

**No.** 22 **March, 1994**

## Watershed Evaluation Checklist

An awareness **of the influences of land** management activities and their impacts on water quality is becoming increasingly important to all persons concerned with beneficial uses of water downstream. This checklist is intended to provide a method to conduct an initial reconnaissance and voluntary evaluation by ranchers, landowners, property managers and lessees for the identification of locations and impacts which may be causing or lead to water quality impairment by nonpoint source pollution. The evaluator should see as much of the watershed as possible and **check all items which** may possibly apply to the conditions described in the following. **This** reconnaissance could be the basis **for** a water quality element of a land management plan, including management practices and monitoring activities.

**Evaluator's Name** _____ **Date** _____
**Property Name** _____ **Owner** _____
**Location: County** _____ **Township** _____ **Range** _____ Sec _____

### GENERAL DESCRIPTION

**PRINCIPAL VEGETATION COVER:**
**Forest/Trees** ☐ **Chaparral/Shrubs** ☐ **Grassland/Meadow** ☐ **Mixed Types** ☐

**PRIMARY LAND USES:**
**Grazing** ☐ **Farming** ☐ **Forestry** ☐ **Recreation** ☐ **Wildlife** ☐

**PRIMARY BENEFICIAL USES OF WATER:**
**Domestic** ☐ **Industrial** ☐ **Agricultural** ☐ **Recreational** ☐ **Fisheries** ☐

**POTENTIAL WATER POLLUTANTS:**
**Sediment** ☐ **Nutrients** ☐ **Pesticides** ☐ **Pathogens** ☐ **Toxics/Chemicals**

**GENERAL WATERSHED CONDITION:**

☐ **Stable: little disturbance, no significant problems, water leaving the property appears as clean as that entering, adequate cover, no evidence of** erosion

☐ **Uncertain: some or few indications of problems such as localized sheet or** rill **erosion or streambank damage**

☐ **Unstable: severely disturbed, obvious problems such as bare soil areas, gully erosion, streambank erosion and drainage channel headcuts**

## POTENTIAL LOCATIONS OF IMPACTS ON WATER QUALITY

**HEADQUARTERS :** Septic system, barns, sheds, storage areas, working corrals, feedlots
- May be impactlng domestlc well or ground water supplies wlth nutrlents, pathogens or toxics
- Possible source of surface flow of nutrients and pathogens into creeks or ponds
- Possible source of nutrients and pathogens from direct anlmal access to water

**CONCENTRATED USE AREAS**: Holding, feeding, salting, supplementation and watering areas
- Possible source of surface flow of nutrients and pathogens into creeks or ponds
- Erosion and sedimentation from streambank disturbance by animals
- Increased runoff and reduction of infiltration due to soil compactlon by animals
- Possible source of nutrients and pathogens from direct animal access to water

**ROADS AND TRAILS**: Unsurfaced accsss or haul roads, stock and recreatlon trails
- Erosion and sedimentation on or adjacent to road and trail surfaces
- Erosion of or below culvert outlets or overside road drains
- Erosion at drainage crossings without culverts
- Erosion and sedimentation or possible nutrient or pathogen sources at stream crossings

**RANGE, PASTURE, FOREST AND CROPLAND**: Dryland and irrigated lands
- Erosion due to inadequate range plant cover density or residual dry matter
- Possible nutrient or pesticide sources from irrigation drainage
- Erosion or sedimentatlon resultlng from farming, forest or range practlces

**RIPARIAN AND WETLAND AREAS:** Stream channels, marshes, meadows, ponds, and lakes
- Sedimentation from streambank or shoreline disturbances
- Apparent increase of width or depth of stream channels due to active erosion
- Possible increase of nutrients and pathogens from direct livestock access
- Pprobable increase of water temperature from reduced woody and herbaceous vegetation
- Decrease of quality and quantity of fisheries or wildlife habitat
- Potential inmapct on sensitive plant or animal species

**OTHER USE AREAS**: Oil, gas, mineral and aggregate extraction, logging utility easements
- Erosion or sedimentation associated with disturbance due to extraction
- Contamination by chemicals, fuels, toxics associated with extraction processes
- Heavy metals or other pollutants resulting from land application of wastes

COMMENTS OR AREA SKETCH

MANAGEMENT ACTIONS
- Changes in management are not justified
- Further examination of the watershed is needed
- Consider prompt changes in the kind, degree and time of land use
- Request visitations and advice by resource specialists
- Develop water quality management plan or element of ranch management

Prepared by John V. Stechman for the Morro Bay Watershed Education Program

Rangeland Watershed Program

A Water Quality Education & Technical Assistance Program for California Rangelands

FACT SHEET

U.C. Cooperative Extension md U.S.D.A. Soil Conservation Service

No. 16 November 1992

# Photo Points as a Monitoring Tool

Establishing a photographic collection to monitor vegetation changes does not generate the kinds of intense data that are gathered using methods to determine cover, density, production, etc. However, they do surpass these data in their ability to pomay changes on a large scale and to transfer this information to audiences of different backgrounds.

The strengths of repeated photographs in monitoring vegetation changes are: (1) a complete inventory of the landscape is encapsuled in the picture; (2) rates of vegetation change and events associated with that change are documented; and (3) the field portion of the process can be executed rapidly and easily.

The weaknesses of repeated photographs in monitoring vegetation are: (1) observable changes in species composition are limited to obvious species such as woody plant invasion, large herbaceous species replacing small species, etc.; (2) photographs can represent a biased selection of the conditions present in the entire area when photographed; and (3) alterations in the photographs to enhance the artistic aspect of the image can misrepresent conditions.

Establishment of **a** basic photo point requires a steel fence post, a two- to five-pound hammer, a set of metal letters and number stamps, a compass, and a camera.

**The** post can be cut in half for ease of handling. The photo point number, date, and observers' initials **are** stamped into the spade. The bottom of the post will be inverted so that the spade will be exposed when the post is driven into the ground. The top half of the post can then be used to locate the close-up photo center.

**The** long view photo should be a representative view of the area and have a distinctive landmark in the background (peak, rock outcrop, tree, etc.) to aid in repeating the photo in the future. The remaining top of the steel post will act as the center of focus for **the** close-up photo. If the vegetation is relatively complex, additional steel post tops may be needed as reference close-up photo centers. A compass bearing from the photo point to the center of focus must be recorded for both long view and close-up photos.

A 35-mm camera with color slide film is the best combination for taking photos, but any camera with appropriate film, used carefully, will produce useful photos.

The process of developing a photograph collection includes: (1) the retrieval of old images and the relocation of photo points, (2) the establishment of new photo points, (3) a systematic method of recording information about each photo, and **(4)** methods for the storage and use of the collection.

One difficult obstacle to rephotographing photo points is the lack of accompanying records describing the location, time of year, and time of **day the** photograph was taken. Develop a field data **form to** systematically record this and other information concerning the photograph and the photo point.

**For** each pboto point there should be **a** description of each photo point, including:

- Photo point number or name
- Name of photographer
- Date of photograph
- Date established
- Time of day
- Magnetic declination
- Location: Specify, if possible, township, range, 1/4 of 1/4 section, altitude, and description of area, **including** notation of prominent **landmarks so that the plot can be found easily by others.**
- **Comments and notations on vegetation and other conditions.**

Have a place for keeping photos This could be an envelope or prints attached to notebook sheets. Each photo must be identified on back of the print or on the edge of the slide. Successful storage can be measured by ease of retrieval.

To determine the **location for** photo points for water quality monitoring consider the following:

. Locations that capture the perceived problem and/or landscape.
. Locations that are easily relocatable with easy access.
. In areas where you **have knowledge of what you** are photographing:
  - to show cause and effect
  - to show change over time
  - to show impact of a major event (fire flood, etc.)

Established photo points and direction insure the consistency of the photographic record.

Source: Monitoring California's Annual Rangeland Vegetation, UC/DANR Leaflet 21486, Dec. 1990.

This project has been funded wholly or in part by the United States Environmental Protection Agency using grant funds under Assistance Agreement C900963l-91-0 to the State Water Resources Control Board and by Grant Agreement No. 1-133-250-0 in the amount of $150,000.00 for the implementation of the Nonpoint Source Management Program. The contents of this document do not necessarily reflect the views and policies of the Environmental Protection Agency or the State Water Resources Control Board, nor does mention or endorse trade names or commercial products constitute endorsement or recommendation for use.

# Save Our Streams

## *Stream Quality Survey*

APRIL 1994

Name of reviewer: _____

Date reviewed: _____

Data sent to: _____

The purpose of this form is to aid you in gathering and recording Important data about the health of yow stream. By keeping accurate and consistent records of **your** observations and data from your macroinvertebrate count, you can document changes in water quality. Refer to the SOS **insect card** and monitoring Instructions to learn how to trap and identify stream macroinvertebrates and **how to** complete this form.

Stream _____ Station # _____ # of participants _____

County _____ State _____ ***Group of*** individual _____

Location _____

Weather conditions (last 72 hours) _____

Date _____ Average stream width _____ ft Average stream depth _____ ft.

Start Time _____ End Time _____ Flow rate: High _____ **Normal** _____ Low _____ Negligible _____

If conducting rocky bottom sampling, select a riffle where the water is not running too fast, the water depth is between 3-12 inches, and the bed consists of cobble-sized stones or larger. Monitored riffle area (3' x 3' square) _____ Water depth in. _____ in riffle Water temperature _____ F° ? C° ? **Take 3 samples in the same general area. Count each separately and report the highest-scoring sample below. Sample _____ reported** of 3.

**If conducting muddy bottom sampling, take the required number of scoops from each habitat type: steep banks/vegetated margin (10** scoops), woody **debris with organic** matter **(4 scoops), rock/gravel/sand substrates** (3 **scoops),** and silty **bottom with organic** matter (3 scoops).

## MACROINVERTEBRATE COUNT

**Use the stream monitoring instructions to conduct a macroinvertebrate count. Use letter codes (A = 1-9, B = 10-99, C = 100 or more) to record the numbers of organisms found in a 3 foot by 3 foot area. Add up the number of letters in each column and multiply by the indicated index value. The following columns are divided based on the organism's sensitivity to pollution.**

| SENSITIVE | SOMEWHAT SENSITIVE | **TOLERANT** |
|---|---|---|
| _____ caddisfly larvae | _____ beetle larvae | _____ **aquatic worms** |
| _____ hellgrammite | _____ **clams** | _____ **blackfly larvae** |
| _____ mayfly nymphs | _____ **crane fly larvae** | _____ **leeches** |
| _____ gilled snails | _____ **crayfish** | _____ **midge larvae** |
| _____ riffle beetle adult | _____ **damselfly nymphs** | _____ **pouch (and other) snails** |
| _____ stonefly nymphs | _____ **dragonfly nymphs** | |
| _____ water penny larvae | _____ **scuds** | |
| | _____ **sowbugs** | |
| | _____ fishfly larvae | |
| | _____ alderfly larvae | |
| | _____ atherix | |
| _____ # letters times 3= | _____ # letters times 2= | _____ #letters times 1 = |
| _____ index value | _____ index | _____ index value |

Now add together the three index values from each column for your total index value. Total index value = _____

**Compare this total index value to the following ranges of numbers to determine the water quality of your stream. Good water quality is indicated by a variety of different kinds of organisms, with no one kind making up the majority of the sample. Although the A, B, and C ratings do not contribute to the water quality rating, keep track of them to see how your macroinvertebrate populations change over time.**

## WATER QUALITY RATING

(>22) Excellent _____ Good (17-22) ( 1 1 Fair1 6 ) _____ Poor(<11)

**Fish water quality indicators:**
- ☐ scattered individual
- ☐ scattered schools
- ☐ trout (pollution sensitive)
- ☐ bass (somewhat sensitive)
- O catfish (pollution tolerant)
- ☐ carp (pollution tolerant)

**Barriers to fish movement:**
- 0 beaver dams
- ☐ man-made dams
- ☐ waterfalls (>1 ft.)
- 0 other
- ☐ none

Stream _____

Station #: _____

Date: _____

**Surface water appearance:**
- ☐ clear
- ☐ clear. but teacoiored
- ☐ colored sheen (oily)
- ☐ foamy
- ☐ milky
- ☐ grey
- 0 other _____

**Stream bed deposit (bottom):**
- ☐ grey
- 0 orange/red
- 0 yellow
- 0 black
- 0 brown
- ☐ silt
- ☐ sand
- 0 other _____

**Odor.**
- ☐ rotten eggs
- ☐ musky
- 0 oil
- 0 sewage
- 0 other _____
- 0 none

**Stability of stream bed:**
Bed sinks beneath your feet in:
- 0 no spots
- 0 afewspots
- 0 many spots

| % bank covered by plants, rocks and logs (no exposed soil) is: | Good >70% | Fair 30%-70% | Poor <30% |
|---|---|---|---|
| Stream banks (sides) | - | - | - |
| Top bank (slope and floodplain) | - | - | - |

**Algae color:**
- 0 light green
- 0 dark green
- 0 brown coated
- 0 matted on stream bed
- 0 hairy

**Algae located:**
- U everywhere
- 0 in spots
- _____ % of bed covered

**Stream channel shade:**
- 0 >80% excellent
- ☐ 50%-80% high
- ☐ 20%-49% moderate
- ☐ <20% almost none

**Stream bank composition (=100%):**
- _____ % trees
- _____ % shrubs
- _____ % grass
- _____ % bare soil
- _____ % rocks
- _____ % other _____

**Stream bank erosion:**
- 0 >80% severe
- ☐ 50%-80% high
- 0 20%-49% moderate
- ☐ <20% slight

**Riffle composition (=100%):**
- _____ % silt (mud)
- % sand (1/16"-1/4"grains)
- _____ % gravel (1/4"-2" stones)
- _____ % cobbles (2"-10" stones)
- _____ % boulders (>10" stones)

MUDDY BOTTOM ONLY: Record the number of scoops taken from each habitat type. Provide any details (mostly sand, little silt, etc.) to best describe the habitat.

0 Steep bank/vegetated margin _____ 0 Rock/gravel/sand substrates _____

☐ Woody debris with orgamc matter _____ ☐ Silty bottom with organic matter _____

**Land uses in the watershed:** Record all land uses observed in the watershed area upstream and surrounding your sampling site. Indicate whether the following land uses have a high (H), moderate (M), slight (S). or none (N) potential to impact the quality of your stream_ Refer to the *SOS* stream survey instructions to determine how to assess H, M, S, or N. If the land use is not present in your watershed. leave the space blank.

- ☐ Oil & gas drilling
- ☐ Housing developments
- ☐ Forest
- ☐ Logging
- 0 urban uses (parking lots. highways, etc.)
- 0 sanitary landfill
- ☐ Active construction
- ☐ Mining (types) _____
- ☐ Cropland (types) _____
- ☐ Trash dump
- ☐ Fields
- ☐ Livestock pasture
- ☐ Other _____ _____ _____

Are there any discharging pipes? ☐ no ☐ yes If yes, how many? _____

What types of pipes are they? ☐ runoff (field or stormwater) describe: _____

☐ sewage treatment _____ 0 industrial: type of industry _____

Did you test above and below the pipes to determine any change In water quallty? Were changes noticed? NOTE if you answer *Yes*, you must submit two different survey forms, one for above the pipe and one for below the pipe, to document your claim.

Describe amount of litter in and around the stream as % of ground cover. Also describe the type of litter in and around the stream.

Comments indicate what ycu think are the current and potential future threats to you stream's health. Feel free to attach additional Pages or photographs to better describe the condition of your stream. _____

From: Riparian Area Management
TR1737-9 1993 BLM
"Process for Assessing Proper Functioning Condition"

## Standard Checklist

Name of Riparian-Wetland Area: _____

Date: _____ Segment/Reach ID: _____

Miles: _____ Acres: _____

ID Team Observers: _____

| Yes | No | N/A | HYDROLOGIC |
|---|---|---|---|
| | | | Floodplain inundated in 'relatively frequent" events (1-3 years) |
| | | | Active/stable beaver dams |
| | | | Sinuosity, width/depth ratio, and gradient are in balance with the landscape setting (i.e., landform, geology, and biocfimatic region) |
| | | | Riparian zone is widening |
| | | | Upland watershed not contributing to riparian degradation |

| Yes | No | N/A | VEGETATIVE |
|---|---|---|---|
| | | | Diverse age structure of vegetation |
| | | | Diverse composition of vegetation |
| | | | Species present indicate maintenance of riparian soil moisture characteristics |
| | | | Streambank vegetation is comprised of those plants or plant communities that have root masses capable of withstanding high streamflow events |
| | | | Riparian plants exhibit high vigor |
| | | | Adequate vegetative cover present to protect banks and dissipate energy during high flows |
| | | | Plant communities in the nparian area are an adequate source of coarse and/or large woody debris |

| Yes | No | N?A | EROSION DEPOSITION |
|---|---|---|---|
| | | | Floodplain and channel characteristics (Le., rocks, coarse and/or large woody debris) adequate to dissipate energy |
| | | | Point bars are revegetating |
| | | | Lateral stream movement is associated with natural sinuosity |
| | | | System is vertically stable |
| | | | Stream is in balance with the water and sediment being supplied by the watershed (i e excessive erosion or deposition) |

Remarks

## Summary Determination

**Functional Rating:**

Proper Functioning Condition _____
Functional-At Risk _____
Nonfunctional _____
Unknown _____

**Trend for Functional-At Risk:**

Upward _____
Downward _____
Not Apparent _____

**Are factors contributing to unacceptable conditions outside BLM's control or management?**

Yes _____
No _____

**If yes, what are those factors?**

___ Flow regulations ___ Mining activities Upstream channel conditions
___ Channeiization ___ Road encroachment Oil field water discharge
___ Augmented flows ___ Other (specify) ___ _____

## APPENDIX E: SOURCES OF FUNDING AND TECHNICAL ASSISTANCE

### 1. Technical Assistance

Delivery of technical assistance is supplied primarily from:

1) the USDA Soil Conservation Service (SCS) working through 67 Field Offices and 114 Resource Conservation Districts; and

2) the state's land-grant institution working through the University of California Cooperative Extension's (UCCE) network on 3 U.C. campuses, various research field stations and 52 county offices.

Resource conservation in California has historically been a three-way partnership between the RCDs, the Soil Conservation Service (SCS), and the state. Division 9 of the Public Resources Code defines the partnership between the state and RCDs, while a national Memorandum of Understanding (MOU) defines the relationship between the SCS and RCDs. The primary role of the SCS is to provide direct technical assistance to the constituents of the RCDs. Each RCD operates according to a set of policies adopted in its long-range work plan, providing technical advice, product information, and education services to landowners and the general public on issues related to resources conservation.

Other state and federal agencies also provide some assistance, as do nongovernmental organizations, such as: peer groups, consultants, associations, etc. Partnerships formed to implement watershed management programs (e.g. CRMP) can be successful approaches for sharing technical and financial assistance.

## 2. Funding **Sources**

COASTAL ZONE HABITAT ENHANCEMENT

**California Coastal Conservancy**

PURPOSE: To enhance and restore habitat through a variety of measures and physical enhancement of the sites either through grants or directly by the Conservancy.

LIMITATIONS: Sites must be in the California coastal zone or in the jurisdiction of the San Francisco Bay Conservation and Development Commission.

INFORMATION: Type – Grants, loans, and project development by the Conservancy

**Range – $100,000** maximum for enhancement for enhancement plan preparation with at least 50% funding match.

CONTACT: State Coastal Conservancy
Reed Holderman, Program Manager
1330 Broadway, Suite 100
Oakland, CA 94612-2530

INLAND FISHERIES DIVISION GRANT PROGRAM

California Department of Fish and Game

PURPOSE: Grants for fishery restoration work to enhance, develop or restore flowing waterways for the management of fish and outside the coastal zone.

**LIMITATIONS:** Anyone may apply, action projects preferred to studies, evaluations or monitoring. Approximately $250,000 will be available FY 1994/95.

CONTACT: Inland Fisheries Division
Department of Fish and Game
1416 9th Street
Sacramento, CA 95814

| | | |
|---|---|---|
| Forrest Reynolds | Kathryn Adcock | Harvey Reading |
| (916) 6534729 | (916) 654-5628 | (916)654-6505 |

**STEWARDSHIP INCENTIVE PROGRAM**

**California Department of Forestry and Fire Protection**

**PURPOSE:** Assist landowners improve forest land.

**LIMITATIONS:** Landowners cannot have more than 5,000 acres. Most grants are given to owners of 1,000 acres or less. Not available to large corporations.

**INFORMATION: Type –** Cost-share grants, 75% to 25%

**Total Amount – $300,000** in 1993, 1994 funding not completed

**CONTACT:** Department of Forestry and Fire Protection.
Resource Management Section
John Carter or Jim Geiger
1415 9th Street. Room 1516-22
Sacramento, CA 95814
(916) 6539446

**HABITAT CONSERVATION FUND PROGRAM**

**California Department of Parks and Recreation**

**PURPOSE:** Provide funds for a variety of habitat conservation projects. Eligible projects include: deer and lion habitat, including oak woodlands; habitat for rare and endangered, threatened and fully protected species; wildlife corridors and urban trails; wetlands; aquatic habitat for spawning and rearing anadromous salmonids and trout species; and riparian habitat.

**LIMITATIONS: 50/50** matching program and the match must come from a non-state source.

**INFORMATION: $2** million available through FY 2020

**CONTACT:** California Department of Parks and Recreation
Local Assistance Section
Odel King
1416 Ninth Street, Room 1449-1
Sacramento, CA 94296-0001

## CALIFORNIA RIPARIAN HABITAT CONSERVATION PROGRAM

**California Wildlife Conservation Board**

**PURPOSE:** Protect, preserve. restore and enhance riparian habitat throughout California.

INFORMATION: The program can use fee acquisition, easements, management agreements, exchanges, gifts. and grants to meet the program goals

CONTACT: Scott Clemons
Riparian Program Manager
Wildlife Conservation Board
801 K Street, Ste. 806
Sacramento, CA 95814
(916) 4451072

## AGRICULTURAL CONSERVATION PROGRAM

United **State Department of Agriculture, Consolidated Farm Services Agency**

PURPOSE: To protect farmland from erosion and provide cover or food for wildlife.

**INFORMATION:** Participants receive cost-share payments up to 64% of projects on eligible land with a maximum of $3500 annually. Landowner's match may be in labor, materials, or cash.

CONTACT: Local Consolidated Farm Services Agency (CFSA) Office. In Sacramento: Robert Moehler, Information Off ice,
1303 J Street,
Sacramento, CA
(916) 551-1801.

**WATER BANK PROGRAM**

**United State Department of Agriculture, Natural Resource Conservation Service**

**PURPOSE:** Preservation, maintenance and improvement of important migratory waterfowl, nesting breeding and feeding wildlife habitat areas in flyways through long-term agreements with landowners.

**INFORMATION:** Land eligible for the program must be privately owned inland fresh wetlands suitable for migratory waterfowl habitat. Adjacent privately owned land may be included in program. Participants agree not to burn, fill or destroy wetland character of area, or use for agricultural purposes.

**CONTACT:** Local Resource Conservation District or NRCS office.
In Davis: Helen Flach, Asst. State Conservationist, Programs
2121 -C 2nd Street, Suite 102
Davis, CA 95616
916-757-8200

**WETLANDS RESERVE PROGRAM**

**United State Department of Agriculture, Natural Resource Conservation Service**

**PURPOSE:** Restoration and protection of farmed wetlands on private property. Through this program, the Department of Agriculture plans to restore and protect one million acres in the 1991-1995.

**INFORMATION:** This a voluntary program offering farmers an opportunity to retire marginal cropland by establishing permanent or 30 year conservation easements on farmed wetlands and wetlands converted to cropland prior to December 23, 1985. Farmers receive cost share payments equal to **75%** of the cost of restoring wetlands on farmland.

**CONTACT:** Local Resource Conservation District or NRCS office.
In Davis: Helen Flach, Asst. State Conservationist, Programs
2121 -C 2nd Street, Suite 102
Davis, CA 95616
916-757-8200

**CLEAN WATER ACT**
**United State Environmental Protection Agency**

**Section 604(b) Title VI Water Quality Management Plannina:**

**PURPOSE:** To carry out water quality management planning.

**INFORMATION:** Funds can be used to determine the nature, extent, and causes of water quality problems. Funds can be used in identifying cost effective and locally acceptable facility and nonpoint measures to develop an implementation plan to implement such measures.

**Section 319(h) Nonpoint Source Implementation**

**PURPOSE:** To implement the nonpoint source management program.

**INFORMATION:** This section awards fund implementation of approved NPS Management Programs, and can be targeted at particular watersheds. Activities can include post-implementation monitoring. A portion of 319(h) grants may be used for ground water assessment as part of an approved comprehensive NPS pollution control program.

**Wetlands Protection Proaram**

**PURPOSE:** To protect and enhance wetlands

**INFORMATION:** Funds can be used to provide technical assistance on effective river corridor/watershed management planning. Wetlands protection funds can be used for activities involving targeted watershed such as advance identification, targeted Section 404 enforcement actions and education/outreach programs. Funds can be used for Section 404 compliance monitoring programs for specific priority watersheds.

**For information on all EPA Programs contact:**

Water Quality Branch, Region 9
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# California Rangeland
# Water Quality Management Plan

## Technical & Policy Advisory Committee

| Organization | Name | Title |
|---|---|---|
| CA. Cattlemen's Association | Mike Bennett | Water Quality Chair |
| CA. Cattlemen's Association | George Gough | Director, Gov. Affairs |
| CA. Cattlemen's Association | Marden Wilber Jr. | Rancher |
| CA. Cattlemen's Association | Mark Moore | Rancher |
| CA. Cattlemen's Association | Russell Rustici | Rancher |
| CA. Coastal Conservancy | Laurel Marcus | Project Manager |
| CA. Department of Conservation | Chuck Tyson | Soil Resource Specialist |
| CA. Department of Fish & Game | Mark Horshovsky | Natural Heritage Program |
| CA. Department of Fish & Game | Barry Garrison | Wildlife Management |
| CA. Department of Fish & Game | Jim Steele | Environmental Services |
| CA. Department of Fish & Game | Jane Vorpagel | Environmental Specialist |
| CA. Department of Forestry | Tom Randolph | Rangeland Programs |
| CA. Department of Forestry | Clay Brandow | Watershed Specialist |
| CA. Department of Forestry | John Munn | Soil Scientist |
| CA. Farm Bureau Federation | Clancy Dutra | RMAC Representative |
| CA. Farm Bureau Federation | Bruce Blodgett | Natural Resources |
| CA. Native Plant Society | Emily Roberson | Public Lands Planner |
| CA. Oak Foundation | Ginger Strong | Executive Committee |
| County Supervisors Association | Mary K. Shell | Chair, Ag. & Nat.Resource |
| County Supervisors Association | Tom Bamert | V.Ch., Ag. & Nat.Resource |
| CA. Watershed Management Council | Donna Lindquist | PG&E |
| CA. Woolgrowers Association | Steve Hackett | Rancher |
| CA. Woolgrowers Association | Jay Wilson | Executive Vice President |
| CalTrout Inc. | Tom Hesseldenz | Executive Director |
| CA Resource Conservation Districts | Chuck Pritchard | RMAC |
| Marin Agricultural Land Trust | Lisa Bush | Monitoring Specialist |

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|---|---|---|
| Natural Resources Defense Councli | Dr Tom Dudley | Pacific Institute |
| Nature Conservancy | Rich Reiner | Range Scientist |
| Range Management Advisory Comm. | Barbara Allen-Diat | U. C. Berkeley |
| Rangeland Consultant | Jim Clawson | Technical Writing |
| RWQCB - Central Coast | Howard Kolb | Water Resources Engineer |
| RWQCB - Central Valley | Dennis Heiman | Environmental Specialist |
| RWQCB - Central Valley | Larry Glandon | Soil Scientist |
| RWQCB - Lahontan | Fred Blatt | Environmental Specialist |
| RWQCB - North Coast | Mark Neely | Engineering Geologist |
| RWQCB - San Diego | Greig Peters | Environmental Specialist |
| Sierra Club | Dave Fullerton | Water Chair |
| Society for Range Management | Cathy Bleir | President |
| Soil & Water Conservation Society | Bea McCamy | President |
| State Water Resources Control Board | Jack Hodges | NPS Chief |
| State Water Resources Control Board | Gaylon Lee | NPS Forest Programs |
| U.C. Cooperative Extension | Mel George | Range Specialist |
| U.C. Cooperative Extension | Neil McDougald | Watershed Specialist |
| U.C. Cooperative Extension | Stephanie Larson | Livestock Advisor |
| U.C.D. Agricultural Issues Center | Dr. Eric Bradford | Animal Science |
| US Army Corps of Engineers | c/o Calvin Fong | Chief, Regulatory Branch |
| US Environmental Protection Agency | Jovita Pajarillo | NPS Coordinator |
| US Environmental Protection Agency | Sam Zieglar | NPS Projects, California |
| US Environmental Protection Agency | Tim Hatton | SCS/EPA Liasion |
| US Fish & Wildlife Service | Tom Mauer | Contaminants Division |
| USDA Consolidated Farm Services | Larry Plumb | State Cons. Specialist |
| USDA Forest Service | Ralph Giffen | State Range Cons. |
| USDA Forest Service | John Rector | Watershed Planning |
| USDA Natural Resource Service | Richard King | District Conservationist |
| USDA Natural Resource Service | Dennis Nay | Range Conservationist |
| USDA Natural Resource Service | Gary Bullard | Water Quality Coordinator |
| USDA Natural Resource Service | Joe Thompson | District Conservationist |
| USDA Natural Resource Service | Leonard Jolley | State Range Cons. |
| USDI Bureau of Land Management | Jim Morrison | State Range Cons. |
| USDI Bureau of Land Management | John Willoughby | Ecosystem Specialist |
| USDI National Park Service | Karl Striby | Range Conservationist |