

Redwood National and State Parks

Parklands Restoration and Private Lands Erosion Control Programs Redwood Creek Watershed



CALIFORNIA STATE PARKS

Prepared for Joint Legislative Committee on Fish and Aquaculture, Redwood
Creek Field Trip, October 21, 1999.

Index of Major Sections

Aquatic Conservation Strategy for the Redwood Creek Watershed

- Location Map
- Recommended Elements of an Aquatic Conservation Strategy

Parklands Restoration Program, Redwood National and State Parks

- Goals, History and Status

Private Lands Erosion Control Program, Redwood Creek Watershed

- Private Lands Erosion Control Program - Goals and Objectives
- Map - Existing Roads in the Redwood Creek Watershed
- Map - History of Road Construction in the Redwood Creek Watershed
- Land Ownership in the Redwood Creek Watershed
- Memorandum of Understanding between National Park Service and Private Landowners - [A Framework for Cooperative Erosion Control](#)
- Interagency Agreement Between U.S. Fish and Wildlife Service and National Park Service - [A Funding Source](#)
- Cooperative Agreement between National Park Service and Humboldt County Resource Conservation District - [A Contracting Mechanism](#)

Road Inventory and Assessment Methods

- Example of Road Inventory Form
- Example of Potential Erosion Sites Map

Progress with Road Inventory and Treatment Projects in Redwood Creek

- Map showing the status of road inventories in the Redwood Creek basin
- Table showing *completed* road inventory and treatment projects and costs
- Table showing *current* and *proposed* road inventory projects and costs

National Park Service and U.S. Geological Survey Partnership

Article from the George Wright Society Biennial Conference Describing Cooperative Erosion Control on Private Lands in Redwood Creek with Background and History

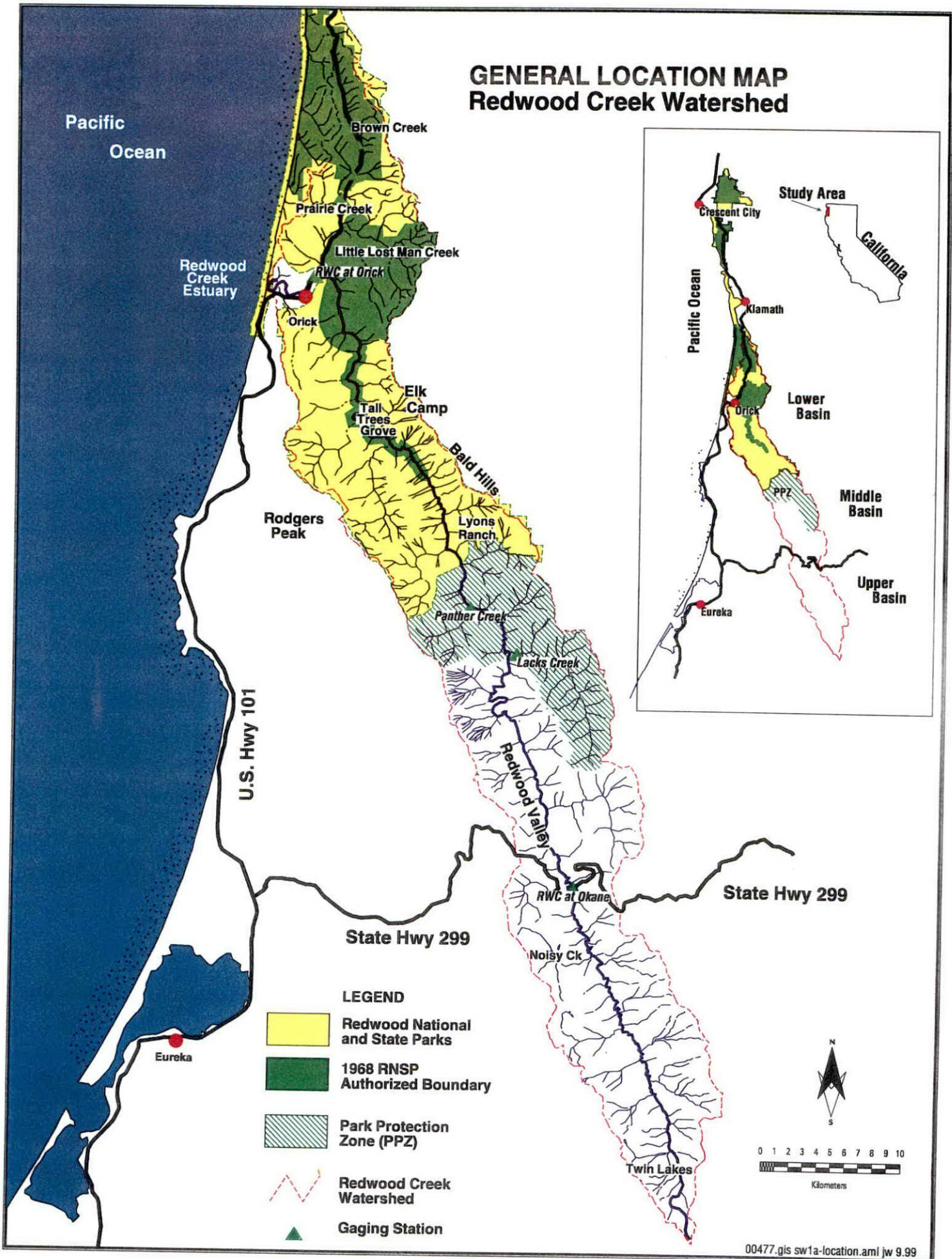
Examples of Redwood National and State Parks' GIS Data Layers

For downloading data and other items, visit the Parks' web site at
<http://164.159.17.69/redwpub/>

Aquatic Conservation Strategy for the Redwood Creek Watershed

- Location Map
- Recommended Elements of an Aquatic Conservation Strategy

GENERAL LOCATION MAP Redwood Creek Watershed



National Park Service's Recommended Elements of an Aquatic Conservation Strategy for Redwood Creek, Humboldt County

- ***Prevent Road Related Erosion***
 - Conduct road inventories and assessments
 - Perform a road analysis and develop long-term transportation plan
 - Implement identified erosion prevention measures (remove, decommission or upgrade roads)
 - Work with county and state transportation agencies to identify fish migration barriers, if they exist, and reduce erosion from public roads
- ***Improve Forest Practice Rules***
 - Retain greater numbers of large conifers in riparian areas (WLPZ's)
 - Improve protection of inner gorge and unstable streamside areas
 - Provide long-term maintenance of roads and erosion control structures
 - Improve cumulative watershed effects analysis
- ***Restore the Redwood Creek Estuary*** to a naturally functioning ecosystem
- ***Establish a Redwood Creek Watershed Group*** to address watershed issues
 - Develop a Redwood Creek CRMP
 - Establish a Redwood Creek data repository
- ***Commit to and Fund Long-Term Monitoring In Redwood Creek***
 - Evaluate the effectiveness of State and Federal efforts to protect and recover habitat
 - Collect baseline salmonid data and establish a trend monitoring program for salmonids in Redwood Creek basin

Parklands Restoration Program, Redwood National and State Parks

- Overview, Goals and Progress

Redwood National and State Parks Parklands Restoration Program

Redwood National Park was established in 1968 (PL 90-545):

... to preserve significant examples of the primeval coastal redwood (Sequoia sempervirens) forests and the streams and seashores with which they are associated for purposes of public inspiration, enjoyment, and scientific study

Congress expanded the national park in 1978 (PL 95-250), in part:

... to provide a land base sufficient to insure preservation of significant examples of the coastal redwood in accordance with the original intent of Congress, and to establish a more meaningful Redwood National Park for the use and enjoyment of visitors.

The expansion area included approximately 50,000 acres of private timber lands, previously harvested and roaded, and authorized \$33 million for rehabilitation work.

GOALS:

- To restore and preserve the natural ecosystems of the parks.
- To minimize human-induced erosion and related threats to park resources within Redwood National and State Parks and encourage the return of native plant species, their abundance, diversity and distribution. Ultimately the efforts should restore naturally functioning ecosystems similar to what would have persisted without disturbance by man.
- To re-establish, wherever possible, the pre-disturbance geomorphic and hydrologic foundation of lands in Redwood National and State Parks which were severely impacted by past land use practices. This physical restoration lays the foundation for biological components of ecosystem recovery.

PROGRESS

- 430 miles of roads existed in the parks at the time of expansion in 1978.
- Approximately 205 miles of roads within the parks have been treated or removed.
- 150 miles of roads are currently slated for removal in the near future
- Approx. 75 miles of roads are currently used for administrative and public access and will be reevaluated for need in the future.

Private Lands Erosion Control Program Redwood Creek Watershed

- Program Goals and Objectives
- Map - Existing Roads in the Redwood Creek Watershed
- Map - History of Road Construction in the Redwood Creek Watershed
- Land Ownership in the Redwood Creek Watershed
- Memorandum of Understanding between National Park Service and Private Landowners - A Framework for Cooperative Erosion Control
- Interagency Agreement between U.S. Fish and Wildlife Service and National Park Service - A Funding Source
- Cooperative Agreement between National Park Service and Humboldt County Resource Conservation District - A Contracting Mechanism

See article from George Wright Society Biennial Conference for background and history of private lands erosion control program.

Redwood National and State Parks' Private Lands Erosion Control Program

GOAL:

Protect the parks' aquatic and riparian resources (Tall Trees Grove) in Redwood Creek from accelerated erosion associated with logging roads and large storms.

The Parks' goal is grounded in scientific studies and in the legislation that expanded the park in 1978 that recognizes erosion from logging roads as a significant *external* threat to park resources.

...for the development of a program for the rehabilitation of areas within and upstream from the park contributing significant sedimentation ... to reduce risk of damage to streamside areas adjacent to Redwood Creek...(P.L. 95-250)

OBJECTIVES:

- **Cooperative Erosion Control from Logging Roads on Private Lands**
 - ***During the next 3 years*** and in cooperation with private landowners, inventory active and potential erosion sites on all private logging roads in the Redwood Creek basin.
 - ***Within 4 years***, develop a single basin-wide erosion control/prevention plan for all private lands upstream of the park.
 - ***Over the next 15 years***, use the erosion control/prevention plan to secure additional funding and complete the implementation of the plan.
- **Local Timber Harvest Activities and Forest Practices**
 - Review timber harvest plans in areas upstream and adjacent to the park.
 - Cooperate with other agencies and industry groups for design of scientific watershed studies, data collection and management.
- **State Forest Practice Rules and Water Quality Attainment Strategies**
 - Work with the Board of Forestry
 - Work with the Regional Water Quality Control Board
 - Contribute to science committees to improve the state's forest practice rules

PROGRESS:

- *See Progress with Road Inventory and Treatment Projects in Redwood Creek*

Pacific
Ocean

Map of Existing Roads in the Redwood Creek Watershed, 1992

Redwood National
and
State Parks



-  Redwood National
and State Parks
-  Watershed Divide
-  Existing Road Network
-  Redwood Creek



0 5 10 15 20
Kilometers

HISTORY OF ROAD CONSTRUCTION Redwood Creek Watershed Upstream of Redwood National Park

LEGEND

-  Roads
-  Redwood Creek
-  Upper Basin Watershed Divide
-  Redwood National Park

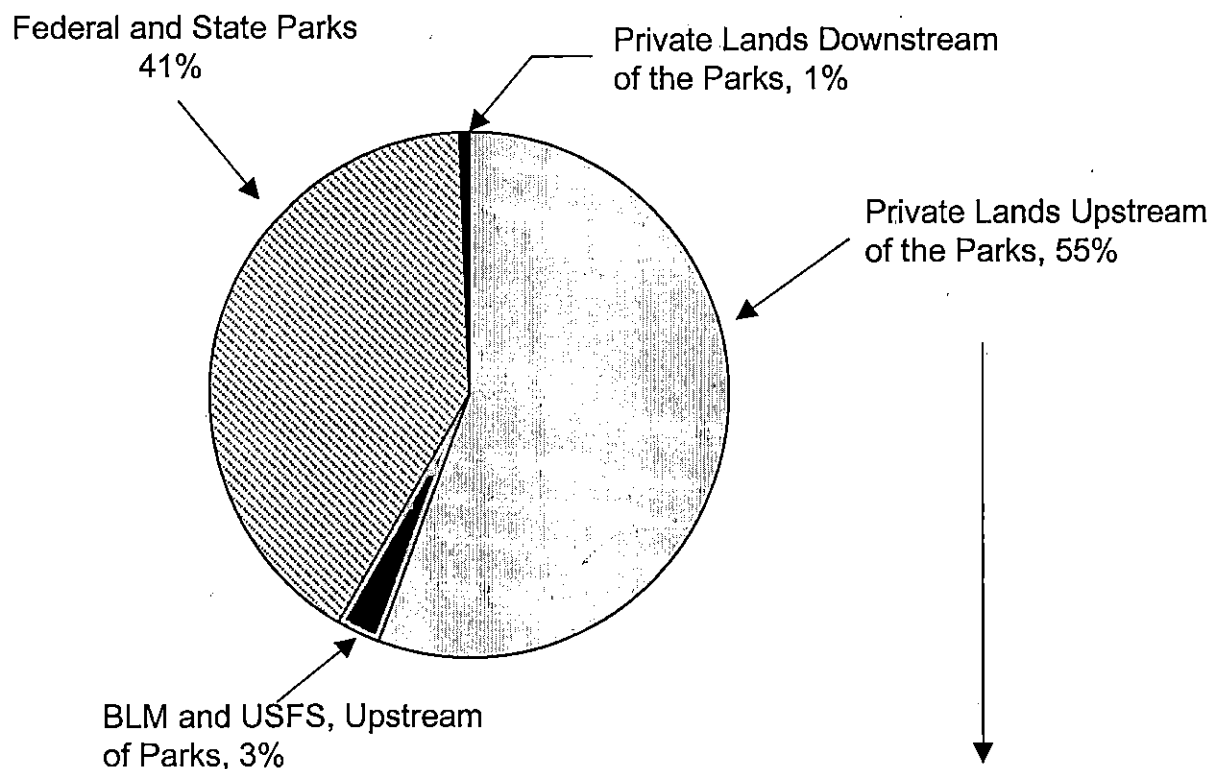
0 5 10 15 20
Kilometers



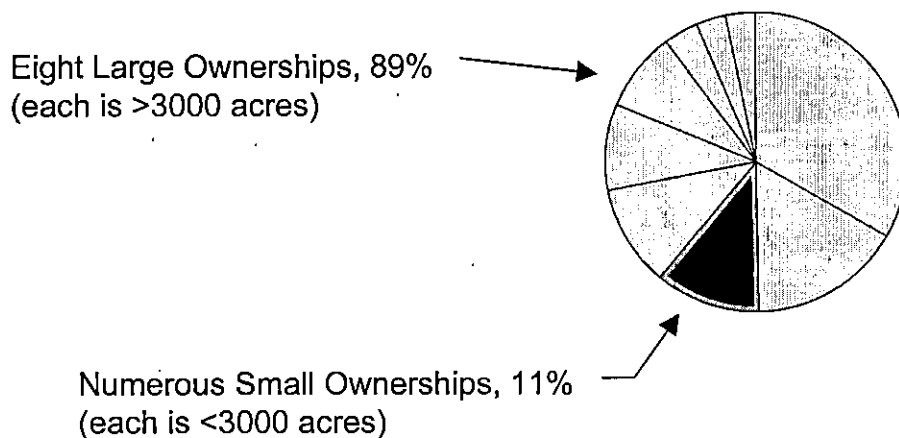
CONSTRUCTED: (A) PRIOR TO 1964 (66%) (B) 1964 - 1978 (14%) (C) 1978 - 1992 (20%)

Land Ownership in the Redwood Creek Watershed

Total Watershed Area about 180,000 acres



Private Lands Upstream of the Parks about 104,000 acres



MEMORANDUM OF UNDERSTANDING

between

NATIONAL PARK SERVICE

REDWOOD NATIONAL PARK

and

PRIVATE LANDOWNERS

REDWOOD CREEK BASIN, HUMBOLDT COUNTY

to

PROVIDE A FRAMEWORK FOR COOPERATIVE
EROSION CONTROL IN THE REDWOOD CREEK BASIN

MEMORANDUM OF UNDERSTANDING

between

NATIONAL PARK SERVICE
REDWOOD NATIONAL PARK

and

PRIVATE LANDOWNERS
REDWOOD CREEK BASIN

to

provide a framework for cooperative
erosion control in the Redwood Creek basin

Article I. Background and Objectives

The National Park Service (hereinafter the SERVICE) administers Redwood National Park, established as a unit of the National Park System, United States Department of the Interior, pursuant to Public Law 90-545, as amended (16 USC 79). Established in 1968 to preserve significant examples of primeval coastal redwood forest and the streams and seashore with which they are associated, the park now occupies the lower-third of the Redwood Creek basin. Lands upstream from the park are primarily industrial timberlands managed by private landowners (hereinafter the LANDOWNER) for long-term timber production and ranching.

Timber operations on private lands are regulated by the State of California and the Z'berg-Nejedly Forest Practice Act of 1973. Since passage of this Act, timber harvest rules have been shaped by new state and federal laws, and court decisions. Critics of the forest practice rules suggest the rules fall short of adequate resource protection, while private landowners believe the rules have grown exceedingly complex and burdensome.

Cooperative efforts between the SERVICE and LANDOWNER can provide increased protection to park resources and economic stability to the timber industry. The SERVICE'S objective is to protect park resources from the potential impacts associated with timber harvest activities, like road construction, and large storms. The LANDOWNER'S objectives are to ensure long-term timber production from private lands and other management goals without additional state regulation. These objectives can be reached through cooperative efforts.

Section 101(a)(6) of Public Law 95-250 (16 USC 79c(e)) authorizes the National Park Service to enter into cooperative agreements with private landowners in the Redwood Creek basin for implementing a program for the rehabilitation of areas upstream from Redwood National Park contributing significant sedimentation.

Section 101(a)(6) of Public Law 95-250 (16 USC 79c(e)) also directs the National Park Service to undertake and publish studies on erosion and sedimentation originating within the hydrographic basin of Redwood Creek.

Both parties therefore understand and agree as follows:

Article II. Statement of Work

The SERVICE and LANDOWNER shall voluntarily cooperate to identify, prioritize, and correct, where economically feasible, potential sediment sources in the Redwood Creek basin.

This Memorandum of Understanding shall not be construed as a grant of permanent access to or interest in LANDOWNER'S lands or roads. Written permission shall be obtained from the LANDOWNER prior to entry.

The SERVICE shall summarize annual accomplishments as related to this Memorandum of Understanding, and distribute it to the LANDOWNER by January 31 of each year.

Article III. Term of Agreement

This Memorandum of Understanding shall terminate December 31, 1999, at noon, California time, unless prior thereto it is relinquished, abandoned, or otherwise terminated pursuant to the provisions of this agreement or of any applicable Federal law or regulation. This Memorandum of Understanding may be renewed or otherwise amended by the mutual written agreement of the parties. The effective date of the Memorandum shall be the date of its execution by the Director (or his/her delegate).

Article IV. Key Officials

Superintendent
Redwood National Park
1111 Second Street
Crescent City, California 95531

Trustees

[REDACTED]
[REDACTED] on
[REDACTED] 247
[REDACTED] 01

Article V. Property Utilization

Not applicable

Article VI. Prior Approval

Not applicable

Article VII. Reports

The Service shall provide data, maps, and summaries of conditions to the LANDOWNER when inventories for potential sediment sources are performed by the SERVICE at the request, or by permission, of the LANDOWNER.

Article VIII. Termination

Either party may terminate this Memorandum of Understanding prior to the expiration of its term by providing sixty (60) days written notice to the other.

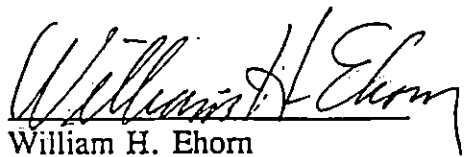
Article IX. Required Compliance

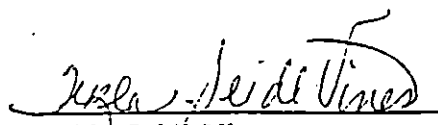
During the performance of this Memorandum of Understanding, the participants agree to abide by the items of Executive Order 11246 on nondiscrimination and will not discriminate in employment opportunities against any person because of race, color, religion, sex or national origin. The participant will take affirmative action to ensure that applicants are employed without regard to their race, color, religion, sex or national origin.

No member or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this Memorandum of Understanding, or to any benefit that may arise therefrom, but this provision shall not be construed to extend to this Memorandum if made with a corporation for its general benefit.

IN WITNESS WHEREOF, the Superintendent of Redwood National Park acting on behalf of the United States, in the exercise of the delegated authority from the Secretary of the Department of the Interior, has caused this Memorandum of Understanding to be executed this 31st day of March, 1995.

NATIONAL PARK SERVICE
Redwood National Park


William H. Ehorn
Superintendent


Tekla Seidl Vines
Agreement Officer

INTERAGENCY AGREEMENT
between
U.S. FISH & WILDLIFE SERVICE
REGION 1
and
NATIONAL PARK SERVICE
REDWOOD NATIONAL PARK

ORIGINAL

FWS NO: 14-48-0001-95 669
Charge Code: 11420-1126-0000
DCN: 11420-5-0349
Amount Obligated: \$144,500
NPS NO: 14431A8480950001

INTERAGENCY AGREEMENT

between

U. S. Fish & Wildlife Service

Region 1

and

National Park Service
Redwood National Park

I. INTRODUCTION

The U.S. Fish and Wildlife Service has a shared responsibility with Redwood National Park and a variety of other federal and state agencies for the conservation of fish and wildlife, and their habitats. The U.S. Fish and Wildlife Service and Redwood National Park have a common goal of protecting, conserving, and restoring these natural resources held in the public trust. This Interagency Agreement acknowledges that fish and wildlife need healthy functioning ecosystems and that the sharing of personnel, expertise and other resources is necessary in order to be successful and effective in reaching this goal.

As cooperating agencies in the Record of Decision for the Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species within the Range of the Northern Spotted Owl (also known as President Clinton's Forest Ecosystem Management Plan), the U.S. Fish and Wildlife Service and Redwood National Park also recognize the need to work cooperatively towards ecosystem restoration and facilitation of employment opportunities in the Redwood Creek watershed.

Under the guidance of President Clinton's Forest Ecosystem Management Plan and Congressional appropriations, this Interagency Agreement provides for limited interchange of services, personnel, equipment, facilities and funds to implement watershed-based restoration projects on private lands upstream of Redwood National Park, using labor secured from timber-dependent communities to the greatest extent possible.

II. AUTHORITY

This Interagency Agreement is hereby made and entered into by and between Redwood National Park, U.S. Department of the Interior, hereinafter referred to as the Park, and the Fish and Wildlife Service, U.S. Department of the Interior, hereinafter referred to as the Service, under the authority of Section 1 of the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq*) and Section 7 of the Fish and Wildlife Act of 1956 (16 U.S.C. 742 (a)(4)).

The National Park Service is authorized under Section 101(a)(6) of Public Law 95-250 (16 U.S.C. 79c(e)) to enter into agreements with other agencies and any political and governmental subdivision thereof to initiate, provide funds, equipment, and personnel for implementing a program for the rehabilitation of areas upstream from Redwood National Park contributing significant sedimentation because of past logging disturbances and road conditions.

III. PURPOSE

This Interagency Agreement is entered into between the Service and the Park for the purpose of funding the Park to design, engineer, implement, and monitor watershed restoration projects under the guidance of President Clinton's Forest Ecosystem Management Plan and employing workers from timber-dependent communities, to the greatest extent possible, in the Redwood Creek watershed.

IV. PERIOD OF PERFORMANCE

The period of performance of this Agreement is from June 1, 1995 through June 1, 2001.

V. OBLIGATION OF THE PARTIES

A. OBLIGATIONS OF THE SERVICE:

1. The Service shall provide funds in the amount of \$144,500 to the Park to design, engineer, implement, and monitor watershed restoration projects on privately owned lands in the Redwood Creek watershed
2. The Service shall allow up to 15% (overhead rate) of the total funding for costs associated with project administration, environmental compliance, monitoring, and applicable permits.
3. Service field staff will assist in the selection of watershed restoration projects.

4. The Service will provide technical assistance on contaminants, federal permits and federally listed threatened/endangered species issues. It should be noted, however, that the Park is ultimately responsible for compliance with and obtaining all applicable federal, state, and local permits for project work.

5. The Service will assist the Park in accessing a labor force from timber-dependent communities in Northwestern California, to the greatest extent possible.

B. OBLIGATIONS OF THE PARK:

1. The Park will use the funding for contract labor, equipment rentals, and materials through an existing Cooperative Agreement with the Humboldt County Resource Conservation District, hereinafter referred to as the District, to perform watershed restoration activities under this Interagency Agreement.

2. The Park will provide technical oversight for monitoring of watershed restoration projects.

3. The Park will provide a budget identifying activity categories and associated costs.

4. The Park, in cooperation with the District and private landowners, shall utilize labor obtained from timber-dependent communities in Northwestern California, to the greatest extent possible, to perform watershed restoration activities pursuant to this Interagency Agreement.

5. The Park will provide periodic progress reports to the Service documenting overall program activities and accomplishments, efforts to utilize labor from timber-dependent communities, and cost breakdown by activity. The Park will submit a final report to the Service within 90 days of completion of each project.

C. SERVICE/PARK COOPERATIVE OBLIGATIONS:

1. The Service, in cooperation with the Park, will ensure that all projects are consistent with the principles in President Clinton's Forest Ecosystem Management Plan and Congressional appropriations.

2. The Service and the Park will cooperate and share responsibilities for developing project specifications, estimating project costs, conducting land surveys, obtaining permits, and responding to information requests about watershed restoration activities under President Clinton's Forest Ecosystem Management Plan.

3. The Service, in coordination with the Park, will develop a public outreach program. The Service and the Park will inform each other of opportunities for tours and media events with: Congressional delegations, other dignitaries, members of scientific and academic communities, and the general public.

VI. PROJECT OFFICERS

A. PROJECT OFFICER FOR THE SERVICE

Bruce G. Halstead
Project Leader
U.S. Fish and Wildlife Service
Coastal California Fish and Wildlife Office
1125 16th Street, Room 209
Arcata, CA 95521

Phone: (707) 822-7201

B. PROJECT OFFICER FOR THE PARK

Andrew T. Ringgold
Park Superintendent
Redwood National Park
1111 Second Street
Crescent City, California 95531

Phone: (707) 464-6101

VII. FUNDING

1. Funds in the amount of \$144,500 are obligated to reimburse the Park for the work performed pursuant to this Interagency Agreement. A Standard Form 270 Request for Advance Payment or Reimbursement should be mailed to the Service Project Officer.

2. Method of Payment:

a. Following an advance payment equal to \$32,000.00 the Park hereafter, shall present to the Service requests for payment on a quarterly basis.

VIII. SPECIAL PROVISIONS

Nothing herein shall be considered as obligating the Service to expend funds or otherwise obligate the Service for the future payment of money in excess of appropriations authorized by law and administratively allocated for the watershed restoration activities associated with President Clinton's Forest Ecosystem Management Plan.

IX. MODIFICATIONS

Modifications to the Interagency Agreement may be proposed by either party and shall be effected by issuance of a written instrument using Standard Form 30 Amendment of Solicitation/Modification of Contract.

FOR THE U.S. FISH AND WILDLIFE SERVICE

Gerry A. Jackson

H. Dale Hall

JUL 11 1985

Gerry A. Jackson 7/11/95 H. Dale Hall
ARD-North Pacific Coast Ecoregion Date ARD-Klamath & Coastal CA Ecoregion Date

SERVICE CONTRACT SUFFICIENCY REVIEW

By: Robert M. Baker Date: 7/10/95

Title: Contracting Officer

FOR REDWOOD NATIONAL PARK

By: Cindus L. Schild Date: 7/18/95

Title: Superintendent

CONTRACT SUFFICIENCY REVIEW

By: Karla Seidelined Date: 7/18/95

Title: Agreement Officer

COOPERATIVE AGREEMENT
between
U.S. DEPARTMENT OF INTERIOR
NATIONAL PARK SERVICE
and
HUMBOLDT COUNTY RESOURCE CONSERVATION DISTRICT
for
EROSION CONTROL, WATERSHED REHABILITATION AND FISHERIES
ENHANCEMENT ON PRIVATE LANDS IN THE REDWOOD CREEK
BASIN

COOPERATIVE AGREEMENT
BETWEEN
U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
REDWOOD NATIONAL PARK
AND
HUMBOLDT COUNTY RESOURCE CONSERVATION DISTRICT
FOR
EROSION CONTROL, WATERSHED REHABILITATION AND FISHERIES
ENHANCEMENT ON PRIVATE LANDS IN THE REDWOOD CREEK BASIN

ARTICLE I. BACKGROUND AND OBJECTIVES

WHEREAS, Section 101(a)(6) of Public Law 95-250 (16 U.S.C. 79c(e)) directed Redwood National Park to undertake and publish studies on erosion and sedimentation originating within the hydrographic basin of Redwood Creek; and

WHEREAS, Section 101(a)(6) of Public Law 95-250 (16 USC 79c(e)) authorized the National Park Service to enter into agreements with agencies of the State of California and any political or governmental subdivision thereof to initiate, provide funds, equipment, and personnel for implementing a program for the rehabilitation of areas upstream from Redwood National Park (hereinafter the PARK) contributing significant sedimentation because of past logging disturbances and road conditions; and

WHEREAS, the PARK has qualified personnel to conduct erosion control, watershed rehabilitation, and fisheries enhancement projects; and desires to implement a program for the rehabilitation of areas upstream from the PARK which contributes significant sedimentation because of past logging disturbances and road conditions; and

WHEREAS, the Humboldt County Resource Conservation District (hereinafter referred to as the DISTRICT) is organized under Division 9 of the Public Resource Code of the State of California as a special district of the State; and

WHEREAS, the DISTRICT is responsible for providing assistance to private landowners for the development and implementation of programs for the conservation and protection of soil, water, and associated biological resources within its area of consideration; and

WHEREAS, the DISTRICT is an ideal mechanism for bringing together various individuals from the Government and private sectors to affect conservation and rehabilitation; and

WHEREAS, the PARK and the DISTRICT are mutually interested in and desire to enter into this Agreement to affect resource conservation and rehabilitation through sediment reduction and habitat improvement efforts; and

WHEREAS, cooperative efforts in watershed rehabilitation on private lands in the Redwood Creek basin are valuable and necessary for the protection and enhancement of resource found in the PARK in particular and throughout the Redwood Creek basin in general.

NOW THEREFORE, in consideration of the above premises and in the interest of the mutual advantage in attainment of common objectives, the parties hereto desire to cooperate and therefore mutually agree as follows:

ARTICLE II. STATEMENT OF WORK

A. The PARK agrees to:

1. Identify willing landowners in the Redwood Creek basin who are interested in performing erosion control, watershed rehabilitation and fisheries enhancement projects on their lands.
2. Perform the necessary work to plan, design and specify erosion control; watershed rehabilitation and fisheries enhancement work in cooperation with willing landowners.
3. Prepare with landowners mutually agreed upon work plans, technical specifications, costs or cost-share arrangements that can be reduced, verbatim, into a contract between the DISTRICT and private landowners.
4. Serve as the technical representative for the DISTRICT to ensure work plans and technical specifications are adhered to.
5. Inspect completed work for authorization of DISTRICT payments to landowners or contractors/sub-contractors as described in the contract(s).
6. Facilitate project review by the DISTRICT Board of Directors and its employees before and after project completion.

B. The DISTRICT agrees to:

1. Develop and administer contracts between the DISTRICT and private landowners and contractors/sub-contractors that incorporate, verbatim, the work plans, technical specifications, costs or cost-share arrangements developed by the PARK and the landowners.
2. Disburse funds to landowners or contractors/sub-contractors for completion of erosion control, watershed rehabilitation and fisheries enhancement projects in the Redwood Creek basin as described in the contract(s).
3. Encourage private landowners and contractors/subs-contractors to utilize workers from timber-dependent communities, to the greatest extent possible, in accordance with President Clinton's Forest Ecosystem Management Plan and Congressional

appropriations (Option Nine funds).

4. Specify in each contract, charge a 10% (maximum) administrative fee, payable to the DISTRICT, from funds for erosion control, watershed rehabilitation and fisheries enhancement contracts, excluding any form of monetary or in-kind services committed by the private landowners.
5. Depend solely on the PARK technical representative for reports of satisfactory work completion and authorization for payments prior to issuing payments for work completed under the terms of the contract(s).
6. Keep adequate financial records to permit audit or review as in accordance with Articles XI and XII.

ARTICLE III. TERM OF AGREEMENT

This Agreement shall become effective upon the date the Agreement Officer's signature and shall remain in effect for a period of five (5) years from the effective date hereof, at noon, California time, or until terminated as provided in Article IX. The approximate five year term notwithstanding, this Agreement shall be subject to annual review, on or about June 1, of each year during the term of this Agreement to reconsider benefits, costs and possible modifications. The term of each erosion control, watershed rehabilitation or fisheries enhancement project will be set forth in each modification to the Agreement. This Agreement may be renewed or otherwise modified by the mutual written agreement of the parties.

ARTICLE IV. KEY OFFICIALS

A. The personnel listed below are identified as key staff and considered essential to the effort being performed under this Agreement.

1. PARK Personnel:

Superintendent
Redwood National Park
1111 Second Street
Crescent City, CA 95531

Gregory J. Bundros, Geologist
Redwood National Park
1125 - 16th Street
Arcata, CA 95521

Tekla Seidl Vines, Agreement Officer
Redwood National Park
1111 Second Street
Crescent City, CA 95531

2. DISTRICT Personnel:

Humboldt County Resources Conservation District
Mark Meissner
Acting District Conservationist
Eureka, CA 95503

B. Upon any changes in the DISTRICT'S key officials, the DISTRICT shall notify the Agreement Officer in writing.

ARTICLE V. AWARD, PAYMENT/INVOICES

A. Nothing in this Agreement shall be construed as obligating the PARK or the DISTRICT to expend any funds in excess of appropriations as authorized by law.

B. The financial assistance amount shall be specified in subsequent modifications.

C. The DISTRICT shall require landowners and contractors/sub-contractors to provide financial records documenting all project related expenditures. Records shall include, at a minimum, invoices containing the following information:

- A. Invoice date, landowner and sub-contractor names
- B. Cooperative Agreement Number
- C. Modification No.
- D. Description of work completed, unit price, and extended totals

D. Invoices for reimbursement shall be submitted upon acceptance of each Modification or no more frequently than monthly, as applicable, and addressed to:

Redwood National Park
Attention: Agreement Officer
1111 Second Street
Crescent City, CA 95531

E. Prior to issuing payment, the DISTRICT shall send all contractor/subcontractor vouchers to the PARK technical representative identified in each Modification for review and authorization of payment.

F. The PARK will issue a bill of collection to the DISTRICT for the return of funds in excess of those needed to complete any particular erosion control project.

ARTICLE VI. PRIOR APPROVAL

DISTRICT must be in accordance with OMB Circular A-102 "Uniform Administrative Requirements for Grants-in-Aid to State and Local Governments" and the "Common Rule", 43 CFR Part 12., Subpart C, Paragraph 12.70.

ARTICLE VII. REPORTS

A. Reports shall be submitted as required by the "Common Rule", 43 CFR Part 12., Subpart C, Paragraphs 12.80, 12.81 and 12.09.

B. Time of Delivery:

Delivery is required by the Government in accordance with the following schedule:

1. Special Technical Reports and/or Synthesis shall be submitted as set forth in each modification.

C. Correspondence

Copies of all correspondence and written notices between the PARK and the DISTRICT shall be sent to the cognizant Agreement Officer at the following address:

Tekla Seidl Vines, Agreement Officer
Redwood National Park
1111 Second Street
Crescent City, CA 95531

ARTICLE VIII. PROPERTY UTILIZATION AND DISPOSITION

Any tools, equipment, material, or other property supplied by the PARK shall remain the property of the Government.

ARTICLE IX. TERMINATION

Termination of this Agreement shall ONLY be in accordance with OMB Circular A-102 and the "Common Rule", 43 CFR Part 12, Subparts 12.83 and 12.84.

ARTICLE X. GENERAL AND SPECIAL/ADDITIONAL PROVISIONS

A. General Provisions:

1. OMB Circulars A-87 and A-102 and the "Common Rule", 43 CFR Part 12 are incorporated into this Agreement.

B. Special/Additional Provisions:

1. Drug-Free Workplace Requirements, 43 CFR Part 12, Subpart D, Chapter 12.600 through 12.630.
2. Restrictions on Lobbying Disclosure Requirements, for agreements over \$100,000.00 (43 CFR Part 12).
3. MBE/WBE Utilization Under Federal Grants, Cooperative Agreements, and other Federal Assistance Agreements, 505 DM 3.6(E)(2).
4. Limitations on Payments to Influence Certain Federal Transactions, FAR 52.203-12.
5. Civil Rights Assurance Requirements.

C. Certifications:

The following certifications are required in accordance with the above additional provisions and are attached hereto and made a part of this Agreement:

1. Drug-Free Workplace, DI-1956.
2. Lobbying Certification for all agreements which will total over \$100,000.00, SF-LLL.
3. MBE/WBE Utilization Under Federal Grants, Cooperative Agreements and Other Federal Assistance Agreements, SF-334.
4. Certification and Disclosure Regarding Payments to Influence Certain Federal Transactions, DI-1963.
5. USDI - Civil Rights Assurance Certificate, DI-1350.

Section 1. Civil Rights

During the performance of this Agreement, the participants agree to abide by the terms of Executive Order 11246 on non-discrimination and will not discriminate against any person on the basis of race, color, religion, sex or national origin. The participants will take affirmative action to ensure that applicants are employed without regard to race, color, religion, sex or national origin.

Section 2. Officials Not To Benefit

No member or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this Agreement if made with a corporation for its general benefit.

In connection with and including the performance of work under this Agreement, the DISTRICT agrees not to employ, enter into any contract with, or provide any benefit arising from this Agreement to employees of the United States Government.

Section 3. Promotions

DISTRICT shall not publicize, or otherwise circulate, promotional materials (such as advertisements, sales brochures, press releases, speeches, still and motion pictures, articles, manuscripts or other publications) which states or implies Governmental, Departmental, bureau or Government employee endorsements of a product, service, or position which the DISTRICT represents. No release of information relating to this Agreement may state or imply that the Government approves of the DISTRICT'S work product, or considers the DISTRICT'S work product to be superior to other products or services.

Section 4. Public Information Release

DISTRICT must obtain prior Government approval from the Park Superintendent for any public information releases which refer to the Department of the Interior, any bureau, park unit, or employee (by name or title), or this Agreement. The specific text, layout, photographs, etc., of the proposed release must be submitted with the request for approval.

ARTICLE XI. FINANCIAL MANAGEMENT SYSTEMS

A. The DISTRICT shall maintain acceptable financial systems during the term of this Agreement. Such systems shall provide: accurate, current and complete disclosure of the financial activity under this Agreement; effective control over and accountability for all funds, property and other assets; comparison of actual outlays with budgeted agreement amounts; accounting records supported by source documentation.

B. The DISTRICT shall arrange for an annual examination by an independent accountant in order to ascertain the effectiveness of the DISTRICT'S financial management systems and the internal procedure established to meet the terms of this Agreement.

ARTICLE XII. RECORDS RETENTION AND AUDIT

A. The DISTRICT shall retain pertinent books, documents, and papers including transactions and supporting documents, general accounting systems, internal controls, management practices, policies and procedures. Such books, documents, papers and records shall be retained by the

DISTRICT for a period of three years following the date of final payment under this Agreement.

ARTICLE XIII. LIABILITIES

A. The Government agrees to cooperate, to the extent allowed by law, in the submission of claims pursuant to the Federal Tort Claims Act against the United States by third parties for personal injury or property damage resulting from the negligent act or omission of any employee of the Government in the course of his/her employment (28 U.S.C., 2671, et seq.)

ARTICLE XIV. LAWS GOVERNING

A. This Agreement shall be governed by and construed in accordance with the laws of the United States Government and the State of California.

ARTICLE XV. ENTIRE AGREEMENT

A. This Agreement contains the entire agreement of the parties, and no representation, provision, warranty, term, condition, promise, duty or liability, expressed or implied, shall be binding upon or applied to either party, except as herein stated. No amendment or modification of any term, provision or condition of this Agreement shall be binding or enforceable unless in writing and signed by each of the parties.

IN WITNESS HEREOF, the parties hereto have signed their names and executed this Agreement.

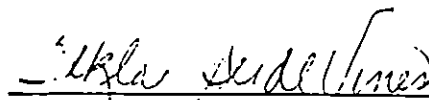
NATIONAL PARK SERVICE



William H. Ehorn, Superintendent
Redwood National Park

3-31-95

Date

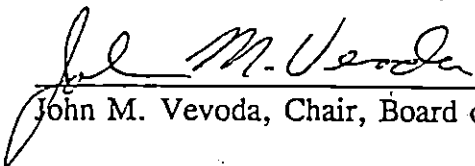


Tekla Seidl Vines, Agreement Officer
Redwood National Park

3-31-95

Date

HUMBOLDT COUNTY RESOURCE CONSERVATION DISTRICT


John M. Vevoda, Chair, Board of Directors

4/27/95

Date

Road Inventory and Assessment Methods

- Example of Road Inventory Form
- Example of Potential Erosion Sites Map

Reviewed by : _____
ID No.: _____

REDWOOD CREEK BASIN ROAD INVENTORY FORM
Redwood National and State Parks / Pacific Watershed Associates
Version 7/28/99

Check _____
ASAP _____

SECTION I: GENERAL SITE INFORMATION

Road Name: _____ Site # _____ Date: _____ By: _____
Watershed: _____ Ownership _____ Year built: _____
Quad ID: _____ Photo# _____ Photo date: _____
Current road condition: Drivable Maintained Abandoned Decommissioned
The road surface is: Native Rocked Paved
Proposed Treatment: Maintain Upgrade Decommission

SECTION II: FLUVIAL SITE (CROSSINGS, RELIEF CULVERTS, GULLY, ETC.)

FEATURE: Stream crossing *Ditch/road relief Road reach Spring
EROSIONAL PROCESS: None Gully Streambank/channel eros. Collapsing Fill failure
DRAINAGE STRUCTURE: Bridge *Culvert (*metal *concrete *plastic)
Humboldt Fill Ford Armored fill Pulled
Critical dip@xing? Y N Left ditch/road length _____ ft. Right ditch/road length _____ ft.
DIVERSION POTENTIAL: DP? Y N Now diverted Past diverted Rd grade _____ %
CONDITION OF FILL: Intact removed _____ % washed-out _____ %
CULVERT INLET INFORMATION:
*Diameter _____ in. Headwall height _____ in. Rust line: width _____ in. depth _____ in.
Upstream channel: width _____ ft; depth _____ ft; grade _____ %
Stream class: I, II, III, or IV
Sediment transport: H M L Does culvert look undersized? Y M N
*Inlet condition: OK Rust/holes Band separation Trash rack Drop inlet
*crushed _____ % *plugged _____ % Plug potential: H M L
CULVERT OUTLET INFORMATION:
*Condition: OK Rust/holes Functional downspout %crushed _____ % Shotgun
Fish-outlet drop: now _____ ft. @bankfull _____ ft. Culvert grade _____ %
Pool dim.: length _____ ft. depth _____ ft. @bankfull: length _____ ft. depth _____ ft.

Comments: _____

SECTION III: LANDSLIDE SITE

FEATURE: Swale Road fill Landing fill Cutbank Hillslope
PROCESS: Slow, deep seated Fast, shallow debris slide Will it debris torrent? Y M N
SETTING: Streamside (<55%) Inner gorge (>55%) Headwall Break-in-slope Hillslope
Distance to stream _____ ft. Slope _____ %
ACTIVITY: Failed in past? : Y N %failed _____ %
ASSOCIATION(S): Road related Water onto feature Spring Stream undercutting

SECTION IV: TREATMENTS (Circle those that apply)

Critical dip@xing Install culvert Replace culvert Larger culvert: dia. _____ in.
Drop inlet Flared inlet Trash rack Remove sed@CMP inlet Brush inlet
Reconstruct fill Excavate fill Ford Bridge Other None
Armor fillslope: @inlet _____ ft²; Downstream face _____ ft² Downspout _____ ft.
Armored fill: sill height _____ ft. sill width _____ ft. Check culvert size _____
..... **URGENCY:** H M L **COMPLEXITY:** H M L
Clear/est. IBD _____ ft. Remove IBD _____ ft. Rock road _____ ft². Remove berm _____ ft.
Rolling dips: # _____ OS w/out IBD _____ ft. OS w/IBD _____ ft. Inslope road _____ ft.
Cross-road drains # _____ Ditch relief culvert # _____, _____ ft.

SECTION V: FILL AND FUTURE EROSION VOLUMES

Crossing fill volume: _____ yd³ (from worksheet on back)
Future erosion volume: _____ yd³ %delivery: _____ % Future yield: _____ yds³
Dimensions of feature: length: _____ ft. width: _____ ft. depth: _____ ft.
(Use Comment Section below to record dimensions of complex features)
Erosion Potential: H M L Potential for Extreme Erosion? Y N
Is the treatment likely to control or prevent erosion?: Y M N
Extreme Erosion Potential Volume (yds³): <500, 500-1000, 1K-2K, 2K-5K, >5K

[illegible]

Progress with Road Inventory and Treatment Projects in Redwood Creek

- Map showing the status of road inventories
- Table showing *completed* road inventory and treatment projects and costs
- Table showing *current* and *proposed* road inventory projects and costs

Status of Road Inventory Projects in the Redwood Creek Basin

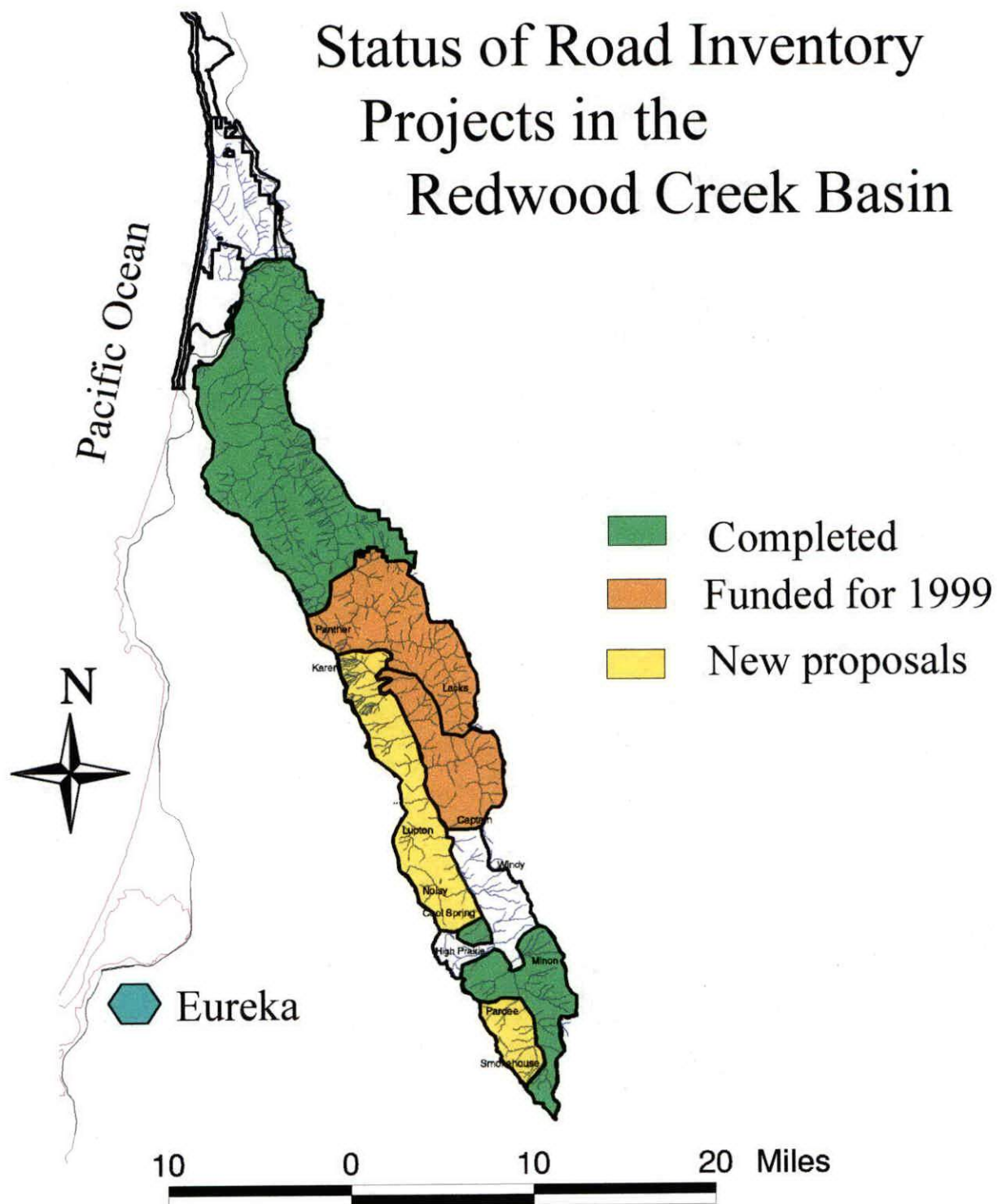


**Table 1. Completed Road Inventory and Treatment Projects and Costs
Private Lands, Upper Redwood Creek Basin**

Year	Projects	RNSP \$	Other Federal/State \$	Landowner \$	Project Total
1995	Coyote Creek Simpson Timber Company 2 mi. road decommissioned	\$8,000 In-kind services ¹ inventory, planning monitoring, supervision	\$17,260 USFWS, Jobs in the Woods heavy equipment	\$8,400 heavy equipment	\$33,660
1995-1996	Garrett Creek Stover Ranch 13.5 mi. upgraded; 1.5 mi. decom.	\$10,900 ¹ inventory, planning, monitoring, supervision	\$91,305 USFWS, Jobs in the Woods heavy equipment	\$11,400 rock supply/placement, fuel, labor, management	\$113,605
1996-1999	SPI Roads Sierra Pacific Industries 100 miles of roads inventoried 10 mi. upgraded; 5 mi. decom.	\$28,900 ¹ inventory, environmental compliance, planning, supervision	\$99,400 USFWS, Jobs in the Woods heavy equipment	\$94,000 heavy equipment	\$222,300
1997-1999	Russ Property Roads Herb Russ, NRM Corporation 7 mi. upgraded; 3 mi. decom.	\$11,000 cash contribution heavy equipment	\$119,500 USFWS, Jobs in the Woods inventory, planning, heavy equipment	\$16,400 rock supply/placement, labor, management	\$146,900
TOTALS	Miles = 52 miles @ \$9,932/mi.	\$58,800 (12%)	\$327,465 (63%)	\$130,200 (25%)	\$516,465

outside funds = 457,665 = 88%

¹ In-kind services include performing road inventories, planning, supervision and report writing.

**Table 2. Current and Proposed Road Inventory Projects and Costs
Private Lands, Upper Redwood Creek Basin**

Year	Projects	RNSP \$	Other Federal/State \$	Landowner \$	Project Total
1999-2000 Funded	Park Protection Zone, PPZ Mixed ownerships, but mostly Simpson Timber Company. 225 miles of road; 33,000 acres	\$50,000 cash contribution \$36,000 in-kind services ¹	\$121,082 Fish and Game, SB 271 ~\$10,000 USFWS, Jobs in the Woods Program	\$0	\$207,092
1999-2000 Funded NRM Corp.	East side of Redwood Creek , from PPZ to Highway 299. Mixed ownership, but mostly Barnum Timber Company 192 miles of road; 20,000 acres	\$4,000 in-kind services	\$50,000 Fish and Game, SB 271 ~\$5,000 USFWS, Jobs in the Woods Program	\$0	\$59,000
2000-2002 Proposal Submitted	West side of Redwood Creek , from PPZ through Highway 299. Mixed ownership, but mostly Simpson Timber Company 206 miles of roads; 22,000 acres	\$20,000 cash contribution \$36,900 in-kind services	\$125,600 Fish and Game, SB 271	\$13,000	\$195,500
2000-2002 Proposal Submitted	West side of Redwood Creek , from Highway 299 to Sierra Pacific Industries lands (completed) Primarily Simpson Timber Company 138 miles, 11,000 acres	\$20,000 cash contribution \$34,200 in-kind services	\$87,885 Fish and Game, SB 271	\$10,000	\$151,885
TOTALS	761 miles, 86,000 acres	\$201,100 (31%)	\$399,567 (65%)	\$23,000 (4%)	\$613,477

¹ In-kind services include planning, training field crews, field checking for quality control, data entry and analysis, GIS, report writing and materials such as maps and photos.

National Park Service and U.S. Geological Survey Partnership

- Effectiveness of Road Restoration in Reducing Sedimentation
- Disturbance History of Redwood Creek's Riparian Areas
- Monitoring Sediment Sources, Transport and Channel Trends
- Watershed Response to Land Use Change



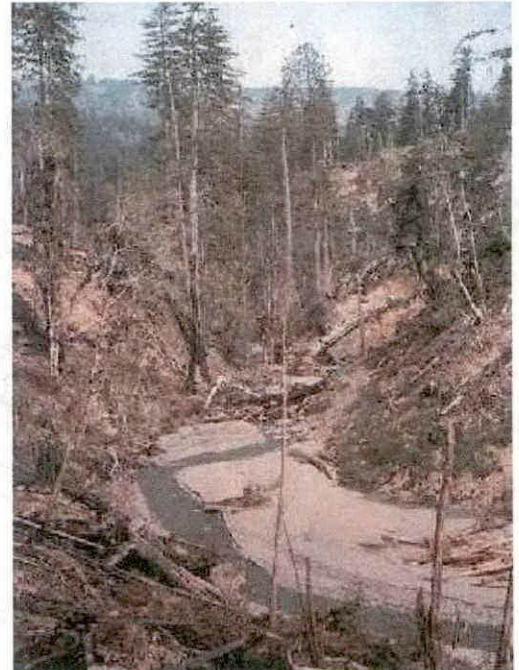
U. S. Department of the Interior
U. S. GEOLOGICAL SURVEY
BIOLOGICAL RESOURCES DIVISION
Western Ecological Research Center
1125 16th St. Room 207
Arcata, California 95521

<http://www.werc.usgs.gov/redwood/index.html>



The USGS-WERC Redwood Field Station,
Mary Ann Madej, Station Leader
(707) 822-7611 Ext. 5490 FAX (707) 822-8904

The USGS Western Ecological Research Center Redwood Field Station is located in coastal Northern California. Most of our operations and research are conducted in the Redwood Creek basin and within Redwood National and State Parks. Station scientists conduct research on issues related to timber harvest, effects of past watershed disturbances, watershed restoration, and recovery of disturbed ecosystems, such as in the disturbed stream channel seen in the image to the right. In addition, the station provides technical assistance to the National Park Service, U.S. Fish and Wildlife Service, Bureau of Land Management, and other client agencies on developing inventory and monitoring plans, hillslope and channel stability assessments, and other issues.



Current Research Projects

Effectiveness of Road Restoration in Reducing Sediment Loads and Improving Streams

Purpose: To assess the effectiveness of road restoration techniques in various watershed settings, to evaluate how much sediment loads are reduced following road removal, and to assess subsequent trends in stream health in restored areas.

Disturbance History of Redwood-Dominated Riparian Zones

Purposes:

- 1) To document how overstory riparian conditions changed along Redwood Creek and major tributaries since the advent of timber harvest and following large floods.
- 2) To measure the current distributions of young conifers (Douglas fir and redwood) and exotic plants in the understory riparian stands in the Redwood Creek basin.
- 3) To assess the implications of the changes in riparian composition for the long-term potential for shading and large woody debris recruitment to anadromous fish-bearing rivers.

Inventory and Monitoring of Sediment Sources, Sediment Transport, and Channel Trends

Purpose: To conduct long-term monitoring designed to evaluate erosional problems, channel stability, and sediment transport in a highly erodible watershed. A knowledge of the type, size, timing and causes of erosion and sedimentation problems is the first step in prioritizing restoration projects, implementing improved land use practices, and preventing future damage.

Evaluation of Watershed Response to Land Use Change

Purpose: To evaluate future damage to aquatic and riparian resources in north coastal California under different timber harvesting and road building scenarios, coupled with a probability analysis of floods of various magnitudes.

**Article from the George Wright Society
Biennial Conference Describing
Cooperative Erosion Control on Private Lands in
Redwood Creek with Background and History**

Protecting Resources at Redwood National and State Parks through Co-operation and Understanding

TERRY HOFSTRA & GREG BUNDROS, *Redwood National and State Parks, P.O. Box 7, Orick, California 95555*

BARRY HILL, *U.S. Geological Survey, 677 Ala Moana Boulevard, Honolulu, Hawaii 96813*

Introduction

The environmental and economic consequences of timber harvesting in the Pacific Northwest have provoked controversy for decades. No place symbolizes this controversy better than Redwood National Park (RNP) which was the focal point of a bitter debate over its creation and expansion.

Background

The original 1968 park boundary (Figure 1) encompassed a narrow 1/4-mile corridor along the lower reaches of Redwood Creek and was a compromise between intensely competing interests. On lands upslope and upstream of the park boundary the combination of timber harvest, logging road construction, and major storms greatly accelerated naturally high erosion rates. This resulted in a significant threat to the downstream park resources through increased sediment loads and accumulations in streams, elevated water levels, stream bank erosion, and impacts to biological resources (Ridenhour and Hofstra 1994). Conservation groups were concerned with loss of valuable park resources and filed a series of lawsuits demanding the Secretary of the Interior take action to protect park lands. After lawsuits, court decisions, contentious hearings, and considerable division among local communities, Congress expanded RNP in 1978. To reduce risk of damage to downstream park resources, this legislation authorized a program to rehabilitate areas within the park and to control erosion on private lands upstream of the park.

Erosion Control Program for Park Lands

Since park expansion, considerable progress has been made toward controlling erosion and sedimentation within the park. The focus has been on road removal because fluvial and mass wasting erosion associated with poorly located and designed logging roads are major contributors of sediment to aquatic systems. To date, approximately 173 miles of more than 445 miles of road within the Redwood Creek portion of the park have been removed. The program has gained national recognition, and methods developed at RNP (Spreiter et.al. 1995) have been applied on state and federal lands in many other locations.

Sediment Sources in Redwood Creek

Since 1978, scientific studies performed in the Redwood Creek basin have examined the quantity and origin of sediment transported by Redwood Creek and its tributaries. These studies revealed that for the period between 1981 and 1988, roughly 72 % of the total sediment transported by Redwood Creek originated from areas upstream of the park (Madej 1991). Other studies suggest that fluvial erosion of roads can account for 30 percent to more than 60 percent of all sediment entering a stream system, depending on the type of terrain and road (RNSP 1997; Best et.al. 1995; Hagans and Weaver 1987). Based upon inventories of road related erosional problems inside the park, the total erosion potential from all roads in the Redwood Creek basin is estimated at roughly 5,185,000 cubic yards of sediment. Of this total, 85 percent is associated with roads on upstream private lands (RNSP 1997). Clearly, the greatest human-influenced threat to park resources located along the mainstem of Redwood Creek is from the roads located upstream of the park.

Logging Roads in the Upper Redwood Creek Basin

Based on analysis of aerial photographs (RNSP 1997), roads upstream of the park totaled about 1,100 miles in 1992 (Figure 2). About 66 percent of these road miles were constructed before 1964, 14 percent were constructed between 1964 and 1978, and 20 percent were constructed between 1978 and 1992. Most of the upper basin roads, therefore, were built before enactment of the 1983 state forest practice rules which describe current-day road construction and erosion control standards.

Of the 1,100 miles of roads upstream of the park, about 340 miles were determined to be unmaintained and not driveable as of 1992. Another 180 miles were classified as unmaintained but still driveable. Almost half of the road network is therefore unmaintained in the upper basin. Unmaintained roads are more likely than the maintained roads to fail during a large storm as a result of plugged and rusted culverts, rotted woody debris contained in road fills, and diversion of streamflow. Current state forest practice rules do not require long-term road maintenance. Nearly 40 miles of new logging roads have been built since 1992.

Early Attempts at Erosion Control for Private Lands (Confrontation)

Since park expansion the timber industry, private landowners, environmental activists, and government agencies have remained at odds over timber harvesting and road building practices on private lands upstream from the park. Early attempts by the park to implement an erosion control program on private lands were largely unsuccessful because of the poor relations between the park and private landowners following park expansion. The threats to aquatic and riparian resources from abandoned or poorly constructed/maintained roads also had not yet been fully understood or accepted by the general public or timber industry. The park made \$400,000 available to the California Forest Improvement Program for erosion control projects on private lands in the Redwood Creek basin but little of this funding was used. During this period, field review of timber harvest plans on private lands by park geologists was restricted. Disagreements about protective measures were often confrontational and managed to reinforce prevailing feelings of distrust. The park's ability to influence land use practices was limited.

Relations between the park and private landowners began to improve in the early 1990's. Several technical reports and professional papers describing erosional processes, sedimentation, and erosion control in the Redwood Creek basin had been published by park staff. Efforts were made to improve our public relations by personal contact with several of the landowners. As a result, between 1991 and 1993 erosion control work was performed on approximately 10 miles of roads on Bureau of Land Management (BLM) and private lands. Park geologists were also allowed to attend more field reviews of proposed timber harvest plans. While progress had been made toward improving relations and implementing an upper basin erosion control program, progress was still slow and landowner cooperation remained inconsistent and unpredictable.

Recent Attempts at Cooperative Erosion Control and Resource Protection (Collaboration and Cooperation)

In 1994, in response to public comment and newly established California Board of Forestry (BOF) Forest Practice Rules, the park decided to nominate Redwood Creek as a "sensitive watershed." Pursuant to the new BOF rules, sensitive watersheds receive added protection during timber harvest by the development and implementation of special timber harvest rules tailored to protect specific resources in a particular basin. We believed that attaining sensitive watershed status for Redwood Creek would be a great leap forward in fulfilling our legislative mandate of park resource protection.

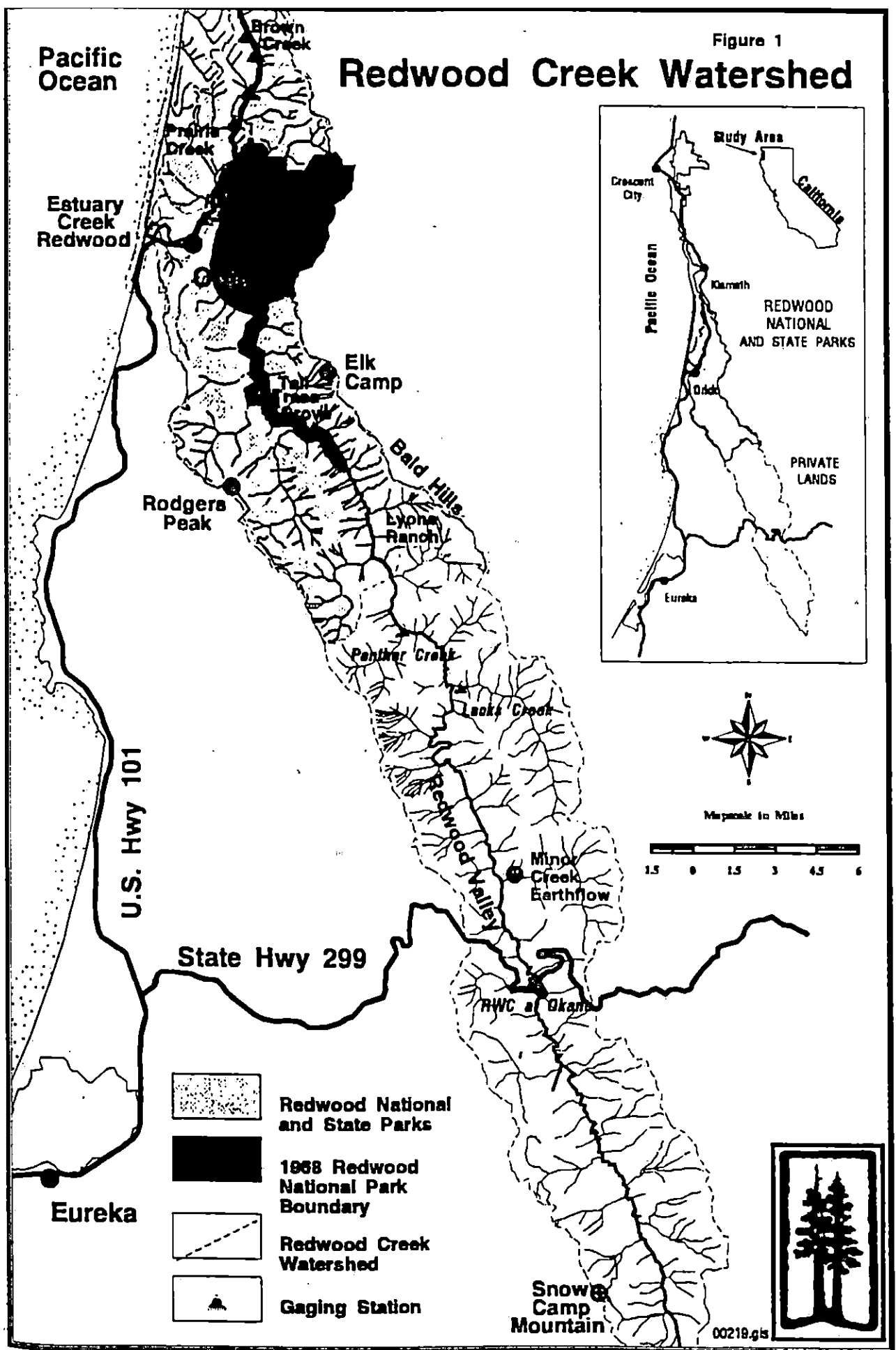
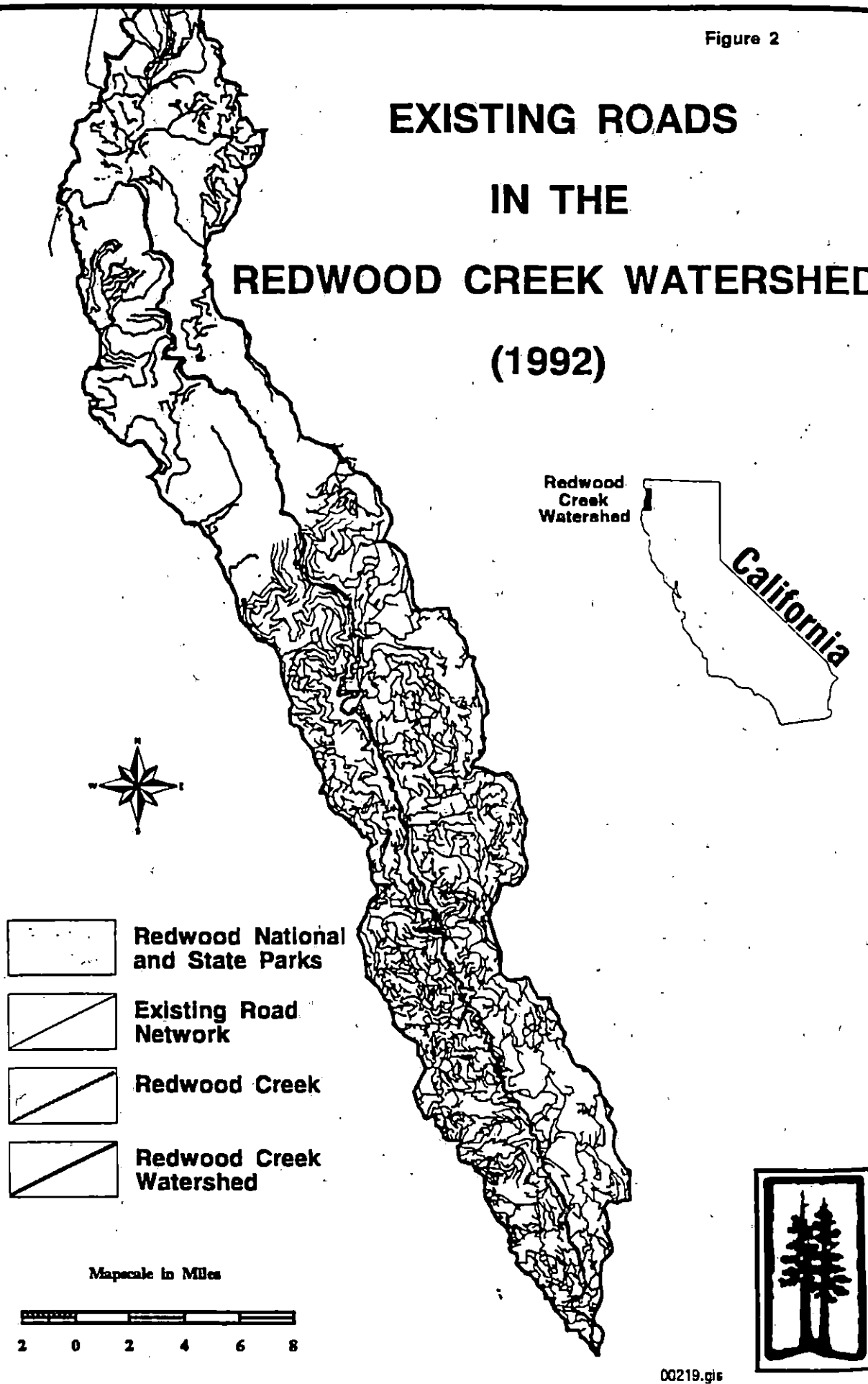


Figure 2

EXISTING ROADS IN THE REDWOOD CREEK WATERSHED (1992)



In 1994, the park initiated meetings with representatives of timber companies operating in the watershed. The purpose of these meetings was to inform them of our intention to nominate Redwood Creek as a sensitive watershed, and to solicit their involvement in the process. Because additional forest practice regulations would result from a successful nomination, company representatives were opposed to this effort. As an alternative, they suggested the park's goals for resource protection might be realized better through cooperative and voluntary projects.

This suggestion was discussed during subsequent meetings with timber company representatives and landowners in the watershed. General agreement was reached in November, 1994, and a Memorandum of Understanding (MOU) between the park and individual companies and landowners was signed in March, 1995. The MOU's state the park and private landowners will "..... voluntarily cooperate to identify, prioritize, and correct, where economically feasible, potential sediment sources in the Redwood Creek basin." Thus, the MOU's provided a basic framework for cooperative erosion control on private lands in the upper Redwood Creek basin. These agreements were complemented by cooperative agreements with the BLM, U.S. Fish and Wildlife Service (USFWS), and Humboldt County Resources Conservation District (RCD).

Current Program for Erosion Control on Private Lands Upstream of the Park

Most of the ingredients for a successful erosion control program in the upper basin are in place today. Park and private landowner relationships have greatly improved, official agreements have been signed by the primary stakeholders, and there is an increasing awareness of the importance to control or prevent erosion from roads, especially in light of declining salmonid populations.

Two significant projects have been completed recently on private lands upstream of the park. These were cooperatively planned and funded projects involving the park, landowners, USFWS, state, and RCD. Nearly two miles of roads have been completely removed from unstable streamside areas and, with the completion of an on-going project this year, erosion control work will have treated an additional 12 miles of roads. In 1996, park staff also inventoried over 90 miles of roads on nearly 9,000 acres of private lands for erosion potentials. This is remarkable progress considering this area represents 10 percent of the upper basin and air photos had previously been our only source of information for many years.

Our participation during field reviews of proposed timber harvest plans on private lands has become more widely accepted. Besides attending most pre-harvest inspections, park geologists now perform detailed field mapping of areas proposed for timber harvest while foresters prepare their harvest plans. By working together, resource concerns can be identified and protective measures incorporated into the harvest plan before it is submitted for filing and official review.

Continuing Obstacles

To date, funding to perform erosion control work on private lands has been provided primarily from the Jobs-in-the-Woods Program (administered by the USFWS as part of the Northwest Forest Plan (USDA and USDI 1994). While this funding has been useful, these opportunities are not always available, nor are they commensurate with the magnitude of problems found in Redwood Creek or in other watersheds throughout California and the Pacific Northwest. We believe monetary incentives for private industry in the form of tax credits or deductions for erosion control work are desperately needed to aggressively tackle the problems associated with the extensive road networks across the landscape. Tax incentives could create long-term jobs in the woods dedicated to the repair, removal and maintenance of roads on private forest lands.

There will seemingly always be some level of mistrust of government agencies among private landowners. Some landowners had lost land in the creation of Redwood National Park while others feel they have lost the use of their property through restrictive government regulation. However, much mistrust stems from overly officious, aggressive, and confrontational experiences landowners have had with government at all levels and on a daily basis.

Summary

The goal of our present program in the upper Redwood Creek basin is to minimize erosion from private lands upstream from the park through the review of timber harvest plans, cooperative studies, erosion control projects, and coordinated resource management efforts that recognize resource protection and the long-term productivity of commercial forest lands. These cooperative efforts recognize that prevention of resource damage is more cost-effective than repair. The building of trust among various groups remains a high priority. Joint projects are designed to demonstrate that mutual benefits can result from cooperation without government interference or additional regulation.

Erosion control work on private lands differs from restoration on park lands. Private lands operate under a system of economy, and management decisions are based on project cost and need. In contrast, park lands are held in public trust and are managed under a different set of principles. Therefore, partnerships and cooperative agreements must respect and help protect each participant's need to manage their lands as necessary to achieve their long-term goals and objectives.

References

- Best, D.W., H.M. Kelsey, D.K. Hagans and M. Alpert. 1995. Role of fluvial hillslope erosion and road construction in the sediment budget of Garrett Creek, Humboldt County, California. Pp. M1-M9 in K.M. Nolan, H.M. Kelsey, and D.C. Marron (eds.), *Geomorphic Processes and Aquatic Habitat in the Redwood Creek Basin, Northwestern California*, U.S. Geological Survey Professional Paper 1454.
- Hagans, D.K., and W.E. Weaver. 1987. Magnitude, cause and basin response to fluvial erosion, Redwood Creek basin, northern California, Pp. 419-428 in R.L. Beschta, T. Blinn, G.E. Grant, F.J. Swanson and G.G. Ice (eds.), *Erosion and Sedimentation in the Pacific Rim*, International Association of Hydrological Sciences Publication no. 165, p. 419-428.
- Madej, Mary Ann. 1991. Sediment and hydrologic monitoring in Redwood National Park. Unpublished progress report. 25pp.
- Ridenhour, R. L. and T. D. Hofstra. 1994. Fishery resources of the Redwood Creek basin. Redwood National Park. 46 pp.
- RNSP [Redwood National and State Parks]. 1997a. Erosion control and disturbed lands restoration plan, National Park Service, Orick, California. In press. 89 pp.
- _____. 1997b. Redwood creek watershed analysis, National Park Service, Orick, California. In press. 84 pp.
- Spreiter, T.A., J. F. Franke, and D. L. Steensen. 1995. Disturbed Lands Restoration: The Redwood experience. Pp.238-249 in *Sustainable Society and Protected Areas: Contributed Papers of the Eighth biennial Conference on Research and Resource Management in Parks and Public Lands*, R.M. Linn(ed.). Hancock, MI: The George Wright Society..
- USDA and USDI [U.S. Department of Agriculture and U.S. Department of Interior]. 1994. *Final Supplemental Environmental Impact Statement on Management of Habitat for Late-Successional and Old-Growth Forest Related Species Within the Range of the Northern Spotted Owl*. Volumes I & II.

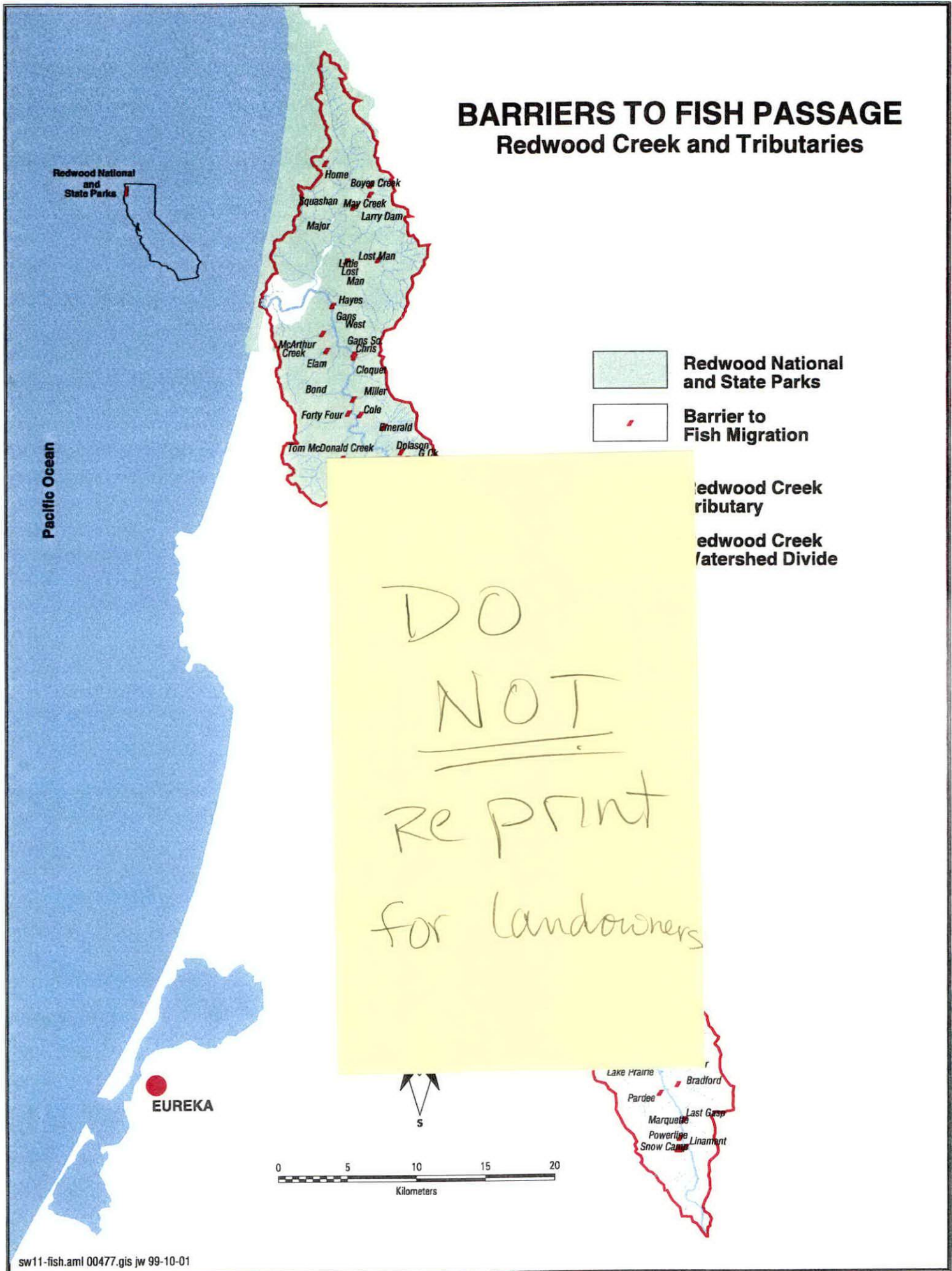
Examples of Redwood National and State Parks' GIS Data Layers

- Barriers to Fish Passage - Redwood Creek and Tributaries
- SINMAP Slope Stability Index Model
- General Geology, Lithology and Faults Redwood Creek
- Slope Class Map, Upper Redwood Creek Watershed
- Generalized Erosion Processes Based on Soil Types (2 maps)

For downloading data and other items, visit the Parks' web site at
<http://164.159.17.69/redwpub/>

BARRIERS TO FISH PASSAGE

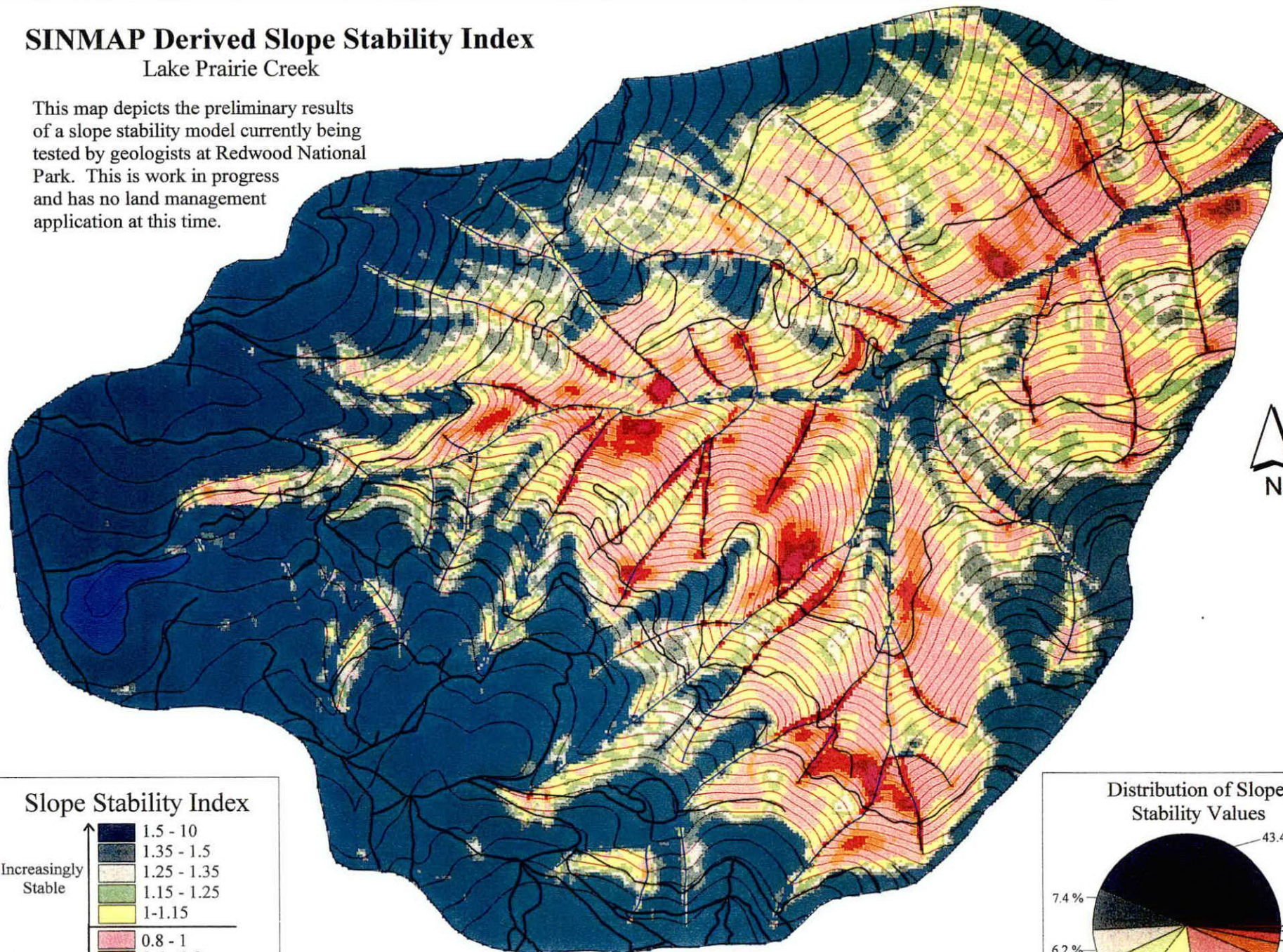
Redwood Creek and Tributaries



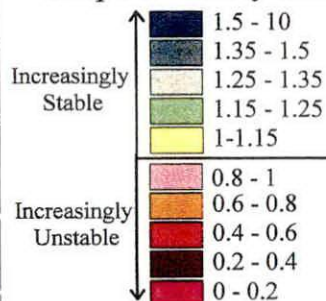
SINMAP Derived Slope Stability Index

Lake Prairie Creek

This map depicts the preliminary results of a slope stability model currently being tested by geologists at Redwood National Park. This is work in progress and has no land management application at this time.



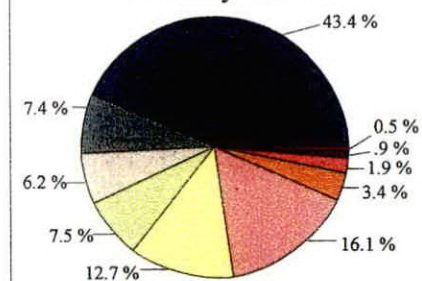
Slope Stability Index



SINMAP predicted stability given parameters (upper, lower bounds) :
 T/q (1600, 1600) meters Dimensionless Cohesion (0, 0.25)
 phi (30, 35) degrees Soil Bulk Density 2000 kg/cubic meter

0.2 0 0.2 0.4 Kilometers Contour Interval = 15m

Distribution of Slope Stability Values



GENERAL GEOLOGY

Lithology and Faults

Redwood Creek Watershed

DESCRIPTION of MAP UNITS

- [Qal] Modern Alluvium
- [Ql] Landslide Deposits
- [Qt] Stream Terrace Deposits
- [QTC] Coastal Plain Sediments
- [Ti] Tertiary Intrusive Rock
- FRANCISCAN ASSEMBLAGE**
Sandstone & Mudstone
- [Kjfl] Coherent Unit of Lacks Creek
- [Kjfc] Incoherent Unit of Coyote Creek
- [Kjfc] Sandstone and Melange Unit of Snow Camp
- [Kjfg] Metamorphosed Sandstone and Mudstone of the Grogan Fault Zone Schist
- [Kjfr] Schist of Redwood Creek
- [Kjfs] South Fork Mountain Schist
- [t] Tectonic Blocks
- [Sp] Serpentine
- KLAMATH MOUNTAIN ROCKS**
- [Ju] Serpentinites, Metavolcanics, and Metasedimentary Rocks

EXPLANATION

- Thrust Fault
- Approximately Located Fault
- Inferred Fault
- Concealed Fault
- Photo-geological Lineaments
- Approximately Located Contact
- Gradational and/or Sheared Contact
- Concealed Contact
note: Concealed Contact was not mapped in original manuscript
- Drainage Divide
- Area of common greenstone, chert, or sandstone
- Outcrops of metabasalt and metatuff
- Redwood Creek

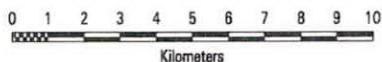
0 5 10 15 20
Kilometers



SLOPE CLASS MAP

Upper Redwood Creek Watershed

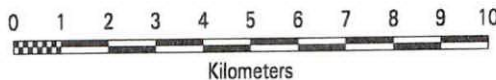
Redwood National
and
State Parks



GENERALIZED EROSION PROCESSES BASED UPON SOIL TYPES Lower Redwood Creek Watershed

This map integrates soils mapping within Redwood National Park (in house) with published maps (California Cooperative Soil Survey-Soil Vegetation Survey) in the upper Redwood Creek basin. Soil types were grouped according to dominant geomorphic process, which are displayed here. Soil mapping in the upper basin is older, less detailed and less spatially accurate than that in the lower basin.

-  Existing Landslide
[Soil-Veg: 700S]
-  Susceptible to Fluvial Erosion
[Soil-Veg: 812, 821, 840]
[RNP: 121, 124, 125, 135, 224, 227, 228, 235, 238, 324, 327, 328, 338, 335, 424, 428, 438, 325]
-  Contains Active Earthflows
[Soil-Veg: 752, 823]
[RNP: 122, 123, 133, 323, 423]
-  Susceptible to Slumps and Soil Creep
[Soil-Veg: 839, 855, 91x, 849]
[RNP: 112, 120]
-  Relatively Resistant to Fluvial Erosion and Mass Movement (Older Landforms, Upper Surfaces, More Resistant to Erosion) [Soil-Veg: 813 - 816]
[RNP: 101, 115, 136, 200, 208, 214, 218, 318, 418, 308, 315, 414, 418, 312, 300, 307, 309, 329, 229, 219, 209, 319]
-  Susceptible to Debris Slides
(Course Soils having impaired drainage formed on Schist)
[Soil-Veg: 823m] [RNP: 421, 431]
-  Alluvial Soils
(Susceptible to inundation, deposition and re-working)
[Soil-Veg: 700w, 100 200 200w]
[RNP: 100, 102, 119, 213, 400, 401, 402 999]
-  Other
[Soil-Veg: 835, 834, 847, 7118] [RNP: 302]
-  No Data
-  Watershed Divide
-  Redwood Creek



GENERALIZED EROSION PROCESSES BASED UPON SOIL TYPES Upper Redwood Creek Watershed

-  Existing Landslide [Soil-Veg: 700S]
-  Susceptible to Fluvial Erosion
[Soil-Veg: 812, 821, 840]
[RNP: 121, 124, 125, 135, 224, 227, 228, 235, 238, 324, 327, 328, 338, 335, 424, 428, 438, 325]
-  Contains Active Earthflows
[Soil-Veg: 752, 823]
[RNP: 122, 123, 133, 323, 423]
-  Susceptible to Slumps and Soil Creep
[Soil-Veg: 839, 855, 91x, 849]
[RNP: 112, 120]
-  Relatively Resistant to Fluvial Erosion and Mass Movement (Older Landforms, Upper Surfaces, More Resistant to Erosion) [Soil-Veg: 813 - 816]
[RNP: 101, 115, 136, 200, 208, 214, 218, 318, 418, 308, 315, 414, 418, 312, 300, 307, 309, 329, 229, 219, 209, 319]
-  Susceptible to Debris Slides
(Course Soils having impaired drainage formed on Schist) [Soil-Veg: 823m] [RNP: 421, 431]
-  Alluvial Soils
(Susceptible to inundation, deposition and re-working [Soil-Veg: 700w, 100 200 200w]
[RNP: 100, 102, 119, 213, 400, 401, 402 999]
-  Other
[Soil-Veg: 835, 834, 847, 7118] [RNP: 302]
-  No Data

 Watershed Divide
 Redwood Creek



This map integrates soils mapping within Redwood National Park (in house) with published maps (California Cooperative Soil Survey-Soil Vegetation Survey) in the upper Redwood Creek basin. Soil types were grouped according to dominant geomorphic process, which are displayed here. Soil mapping in the upper basin is older, less detailed and less spatially accurate than that in the lower basin.

