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Introduction

Goals and Objectives

The Wildland Resources Center seeks to stimulate research and to foster extension of knowledge on conservation, management, and utilization of wildland resources with a view to their optimum present and future use. Broad general goals are to:

• provide liaison among the University’s academic staff and key people in state and federal agencies and other organizations concerned with wildland resources and problems

• provide coordination among the University’s research and extension activities related to wildlands.

• enhance the image of the University’s research and extension work related to wildlands

Objectives for the Center are numerous and change as time passes. Current efforts of the Center focus on the following objectives:

• provide information about the Center to scientists and specialists concerned about terrestrial renewable natural resources

• make administrators and the academic staff of the University aware of the social, economic, and environmental importance of California’s wildlands

• augment financial support for the University’s programs in research and extension related to wildlands

• build and maintain directories to expertise and facilities related to wildland resources in California

• inform state and federal agencies and public utilities concerned with wildlands and associated resources about the role and activities of the Center and capabilities of the University to solve their problems

• provide facts and information about governmental agencies concerned with wildlands to aid the academic staff in contacting agencies for support and assistance

• assist in planning for research, development, and extension programs to solve wildland problems

• build an infrastructure to support watershed management research and extension

Organization

The Wildland Resources Center operates under the Division of Agriculture and Natural Resources of the University of California. As a multicampus organized research unit, it is supported by and reports to the Agricultural Experiment Station. However, the Center is charged to relate not only to research but also to extension and continuing education activities concerned with terrestrial renewable resources.

The Director of the Center, Dr. Dennis E. Teeguarden, of the Department of Forestry and Resource Management on the Berkeley campus, delegates nearly all responsibilities to the Program Coordinator, Dr. Robert Z. Callaham, who independently operates the Center. Leaders in the Agricultural Experiment Station are kept fully informed about all matters affecting the Center.

The Center is guided in fulfilling its goals and objectives by two kinds of committees. A Policy Board comprised of 12 members of the academic staff from several campuses is the primary advisory body for the Center. Technical panels are formed as needed to assist in guiding specific projects. During the past year a technical panel organized the first California Watershed Management Conference and another undertook a feasibility study for increased water production in the Sierra Nevada snow zone.
Program Coordinator's Report

California's wildland watersheds were the focus of most work by the Wildland Resources Center during the past year. After more than two years of planning, the Center joined with others in sponsoring the first California Watershed Management Conference, November 18-20, at West Sacramento. Nearly 300 specialists participated in a program that covered best management practices, water yield, and cumulative effects, plus special sessions devoted to posters and technical short courses.

As a result of recommendations made by the conference, the Center undertook the creation of the Watershed Management Council, a new organization to provide oversight and to conduct activities related to watersheds in California.

Interest generated by the second topic on the conference program, water yield, led to a study of potentials for producing more water from high-elevation forests of the Sierra Nevada. This study was completed in four months by a technical panel of nine specialists assembled by the Center.

The Center's attention to watershed management problems resulted in an augmentation of $400,000 in the 1987-1988 budget presented by the Regents of the University. Unfortunately, California's statutory limits on spending caused this item to be stricken from the governor's budget. In June 1987, UC's President Gardner returned this item to his budget for 1988-1989, and funds urgently needed for research and extension related to water quality may be available next year.

Late in 1986, the Center was asked by the California Advisory Committee on Salmon and Steelhead trout to turn its attention to problems of protecting and restoring this anadromous fish resource in California. On March 25-26, 1987, the Center's staff guided persons knowledgeable about salmon and steelhead trout through a workshop that identified problems and assigned priorities for a responsive program of research and extension. The resulting report should assist the Committee in decisions about research and extension to save these valuable resources.

California Watershed Management Conference

The quality and quantity of water flowing from California's wildlands present problems as well as important potentials for managers of lands and resources. The Center instigated and guided organization of the first California Watershed Management Conference, to provide a forum for discussion of issues related to water flowing from brush fields, grasslands, forests, and rocky alpine areas. The conference, held November 18-20, 1987, at West Sacramento, California, considered three issues: best management practices (BMPs), potentials for increasing yield of water from managed watersheds, and cumulative impacts of development in watersheds. A half-day session was devoted to each topic. From different perspectives, invited speakers collectively described both the state-of-science and the state-of-practice for BMPs, yield of water, and cumulative impacts. Sessions devoted to voluntary papers and poster presentations and five technical training sessions rounded out the conference. A 167-page proceedings was published by the Center within 5 months of the conference close.

Registered participants numbered 292, almost double the expected attendance.
Question-and-answer periods following paper presentations brought forth explanations and opposing viewpoints, creating an exciting and stimulating environment. Most important, people concerned with all aspects of watershed management had an opportunity to meet one another, many for the first time, and to exchange information.

Throughout the three-day meeting, participants expressed their favorable, strong feelings about the conference to an evaluation committee. Frequent comments were “thought provoking,” “stimulating,” “excellent format,” and “timely topics.” Suggestions were given for improving future conferences, and topics were suggested for future focus. Three recommendations were most emphatic:

- hold another meeting in approximately two years
- develop a newsletter or other means of communicating with persons interested in watershed management.
- create an ongoing organization for continuing the interest in watershed management

A steering group brought together by the Center to organize this conference responded immediately to these recommendations. The Wildland Resources Center and the Water Resources Center of the University of California jointly agreed to sponsor a second conference during the fall of 1988. First steps were taken toward a newsletter on watershed management. The most important outcome of the Center’s initiatives and work will be the formation later in 1987 of the first Watershed Management Council for California. Through a questionnaire sent to all persons who attended the conference, the Center had received an overwhelming endorsement for creation of such an organization. More than 50 persons offered to work on committees of the council.

More Water from Sierra Nevada Forests

Yield of water from managed watersheds emerged as a major topic of concern at the California Watershed Management Conference. Authors of six invited papers had discussed potentials for increasing water yield from forested lands. These papers showed that, where climate, scope for management, and economic conditions are favorable, forest management can substantially increase flow of water. Several of the papers identified conifer forests in the snow zone of the Sierra Nevada as the most likely region to be managed profitably for increased water production.

Following the conference, the Center brought together a technical panel of specialists to examine the feasibility of increasing water yield from specific watersheds in the Sierra Nevada. On February 10, 1987, planners from USDA Forest Service, Pacific Gas and Electric Company, and the University of California met as a team. Their objective was to analyze existing conditions and, if warranted, propose a program to increase water yield through management of forests in the high Sierra Nevada.

By June 1987, their draft report was being edited for publication. The report analyzes demands for more water and potentials for augmenting water yield through salvage of water otherwise lost by forests. The report includes a review of past research and a discussion of technology for managing forests to boost the yield of water. Needs for additional research to solve institutional and hydrological problems are outlined. Finally, the report suggests that a demonstration and research program be undertaken at an estimated cost of $700,000 annually for a period of 10 years.
Salmon and Steelhead Trout

In the fall of 1986, the California Advisory Committee on Salmon and Steelhead Trout asked the Center to organize a workshop to identify and establish priorities among researchable problems related to restoration of salmon and steelhead trout resources in California. The Center asked Dr. Bruce Vondracek, at the Department of Wildland and Fisheries Biology, University of California, Davis, to assist with preparations for the workshop. Dr. Vondracek located and researched more than 30 sources of information to compile a draft list of 139 problems.

These problem statements were sharpened and rated for priority during two sessions of a workshop on March 25, 1987, at the University of California, Davis. At the first session, more than 40 technical experts and users of technology worked in small groups to amend the list of problems and to rate priorities of problems. At the second session, 30 users of technology—commercial and sport fishermen, managers of public and private resources, employees of state regulatory or service agencies, and representatives of professional societies—rated the priorities of 116 problems. Eighteen problems were rated urgent to critical and sixty problems were rated important to urgent.

Following the users' priority ratings, small teams of specialists met to outline research, development, and extension problems and estimate costs to solve top-priority problems within 10 years. Solutions to just the 35 highest priority problems would cost an estimated $8.4 million the first year and $90.9 million during 10 years for the program.

The report of this workshop, to be released early next fiscal year, will provide a firm base for decisions about research and extension directed at salmon and steelhead trout. An expanded program of research and extension should be included in the plan produced by the Advisory Committee to reverse declines in populations of salmon and steelhead trout.

Report on Streambank Zones

The 1986 workshop on streambank management, described in the preceding annual report, generated a comprehensive technical report entitled "Management of Streambank Zones in Northeastern California," published in April, 1987. Managerial activities and output expected from dominant use of each resource are discussed. A following section shows how dominant use of each resource would significantly affect uses of other resources, and includes a table comparing these impacts. Resolution of conflicts and negotiated trade-offs among resources were evident in the chapter describing management for multiple uses. Priorities for research in northeastern California emerged from a list of almost 100 resource-oriented needs. Some conclusions from the workshop were:

- multiresource and multidisciplinary approaches to management are vital in streambank zones
- whole-watershed approaches to management are necessary but do not currently exist
- conflicts between public water rights and private land rights have not been identified, let alone resolved
- means are needed to recompense upstream landowners for activities that benefit downstream water users
too few scientists are seeking solutions to the numerous complex problems that hinder management of streambank zones

applicable information and technology exist, but much of what is available is underutilized or not utilized at all.

Further Support from PGandE

Continuing the cooperation started in 1985, representatives of Pacific Gas and Electric Company (PGandE) and this Center identified many problems where scientific investigations by University of California faculty members would help PGandE’s land managers. Negotiations produced a list of four problems to be addressed this year under a gift of $60,000 from PGandE to the Center. The Center transferred PGandE’s funds to the Department of Geology and Geophysics and the Department of Forestry and Resource Management, where they are being used for

development and use of a radiocarbon dating tool to evaluate background rates of sedimentation from hillslopes (Dr. William E. Dietrich, $8,500)

validation of habitat relationships for summer-resident wildlife in mixed conifer forest (Dr. Reginald H. Barrett, $11,000)

use of smaller tributaries by spawning fish from larger streams in northeastern California (Dr. Don C. Erman, $20,500)

models and a case study on use of inventories to improve efficiency and profitability of short-term timber sales (Dr. Lawrence S. Davis, $20,000)

Funding Generated by the Center

One of the Center’s 12 objectives is to secure funds from extramural sources for support of research and extension projects. During the past two years considerable success has been achieved through work toward this objective, as evidenced by $1,064,400 becoming available for research and extension to work on wildland problems. An annual budgetary augmentation of $650,00 to UC’s Division of Agriculture and Natural Resources made possible the creation of the Integrated Hardwood Range Management Program.

Conifer germplasm conservation has benefited from two increments of funding, totaling $270,000, from the California Environmental Conservation Project (Environmental License Plate Fund).

Pacific Gas and Electric Company has provided three increments totaling $115,00 for a workshop, planning, and research by individual faculty members,

California state agencies have provided $31,400 for three specialized contracts.

Of course, such past results cannot be taken as predictive of the future, but expectations are that the Center will continue to be effective in catalyzing provision of additional financial resources for research and extension.

Conifer Germplasm Conservation Project

A second year of funding in the amount of $90,000 was provided by the California Environmental Protection Program (Environmental License Plate Fund) through a contract from the California Department of Forestry for research on Port-Orford-cedar (POC) and bigcone Douglas-fir (BCDF). The goal of the new project was to investigate the genetic composition of natural populations in order to provide genetic information necessary for conservation, monitoring, and management. Both POC and BCDF have narrow native distributions in California.

Port-Orford-cedar, a prized timber and ornamental species, is threatened in northeastern California by a fungus causing a fatal root rot. Spread of the fungus in the past two decades has been rapid. Now only two major drainages in California remain uncontaminated. One management suggestion for protecting POC is to establish in situ genetic reserves. Successful establishment of such reserves depends on
genetic knowledge of the species, which previously was nonexistent.

Bigcone Douglas-fir is valued as a conifer adapted to xeric conditions and as a relative of an important timber species, Douglas-fir. It differs from the latter in that BCDF grows in remote and rugged montane areas in southern California, where populations of BCDF have been decimated by wildfire. Nothing was known about genetic variation in this species, and little was known about its relationship to Douglas-fir.

Seed collections for *ex situ* conservation and genetic analysis of both species were completed during summer 1986. Twenty trees in each of nine populations of POC in its California range were sampled. Dr. D. Zobel, of Oregon State University, sent seed from Oregon to complete a rangewide collection. Cones were collected from 5 to 15 trees in six different populations of BCDF, and additional seeds were obtained from collections by USDA Forest Service.

Seed tissues were biochemically assayed by enzyme electrophoresis. Since neither of these species had been studied previously by electrophoresis, procedures had to be established for each species.

Laboratory analyses of POC and BCDF continued throughout winter, into spring 1987. Although not yet formally analyzed, review of the data indicates considerable within-population and between-population variation in both species. Evaluation, interpretation, and reporting of the results will continue into next year.

Projects from the first year of funding were completed, and a final report was submitted to the Environmental License Plate Fund. A computer-based forest gene-protection catalog, compiled and written by GENREC, a consulting contractor, designates sites in California where genetic resources of native trees have long-term conservation protection. GENREC’s report provides cross-referenced information on land use, ownership and management, vegetation, genetics, and ecology in these protected sites. Also available is a report with maps on the conservation status of California’s tree species, using the database as a reference. An announcement with details on obtaining a copy of the database will be distributed during summer of 1987.

Nursery work contracted to Applied Forest Genetics aims at restoring a valuable gene-conservation collection of Monterey pine clones. The number of plants now growing in the nursery is sufficient to establish two plantations. Several sites in Santa Cruz County are being evaluated to find places where long-term protection for this valuable germplasm can be assured.

Genetic analyses from first-year projects on ponderosa pine and Douglas-fir have been completed. A manuscript evaluating genetic variation in these species and interpreting the genetic variation in the context of genetic conservation has been prepared for *Conservation Biology*.

The project has sponsored activities at UC Berkeley on conservation biology to promote awareness of current issues in this field. A series of seminars entitled “Conservation Biology: From Genes to Ecosystems” was offered in fall 1986. A reading group continued in spring 1987, and another course, entitled “Conservation Biology: California Case Studies,” is scheduled for fall 1987. Articles based on several seminars will appear in a special conservation issue of the journal *Bioscience*.

A proposal for a third gene conservation project, directed at imperiled cypresses, was submitted to the California Department of Forestry and approved for funding from the California
Environmental Protection Program. A contract for $96,000 will be awarded during July 1987. Cones have been collected from 17 populations of four species and electrophoretic analyses of isozymes will begin during summer 1987.

**Directory to CSU’s Expertise**

More than 200 scientists in 74 departments on 19 campuses of the California State University system have expertise related to wildland problems. These important investigators were identified last year through a telephone survey conducted by volunteers working for the Center. Data describing their interests and expertise have been entered into a computer. The first draft entries for a directory to this expertise were mailed by the Center for verification by those to be listed. Expectations are that the directory to CSU’s expertise will be published in December 1987. Distribution of the directory throughout the state should be useful in improving communication among peers in the UC and CSU systems.

**Announcing Sources of Funds**

During the past year, 10 announcements of sources of funds for grants and contracts were distributed to 1,463 members of UC’s academic staff on 8 campuses. These announcements were derived from releases by the Sponsored Projects Office on the Berkeley campus. Some of the grant topics announced were remote sensing, methods to assess ecological risk, climatic variability, physical processes governing climate, energy conservation, renewable sources of energy, a broad array of items related to plants and animals, wildlife preservation, sewage and waste disposal, water resources, federal lands, and a broad array of items related to plants and animals.

Persons receiving the announcements have been appreciative of this service. Typical comments the Center has received are “Without your notification we would have missed it completely,” and “You help us to spot opportunities that otherwise fall through the cracks.”

**Wildland Resources Center Staff**

Dennis E. Teeguarden  
Director  
Robert Z. Callaham  
Program Coordinator (0.5 FTE)  
Shirley Stuart  
Program Assistant (0.75 FTE)  
Alan G. Stangenberger  
Associate Specialist (0.04 FTE)  
Constance I. Millar  
Assistant Research Geneticist (1.0 FTE)  
Kimberly A. Marshall  
Staff Research Associate (1.0 FTE)

**Policy Board**

The Center’s Policy Board met twice during the fiscal year to review the program, activities, and finances of the Center: at Berkeley, November 25, 1986, and at Los Angeles, June 14, 1987. Priorities were established among alternatives, and advice was given that channeled and expedited the Center’s program of work.

The 11 current Policy Board members represent 6 campuses plus Cooperative Extension. Retiring members from the Santa Cruz, Santa Barbara, and Los Angeles campuses were replaced by new members from those campuses.
## Policy Board Members

<table>
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<tr>
<th>Term Expires</th>
<th>Name, Title, Address</th>
<th>Telephone</th>
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<tbody>
<tr>
<td>1987</td>
<td>John W. Menke, Professor&lt;br&gt;Dept. of Agronomy &amp; Range Sciences&lt;br&gt;UC Davis, 95616</td>
<td>(916) 752-1703&lt;br&gt;ATSS 477-1703</td>
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<tr>
<td>1987</td>
<td>Peter C. Passof, Extension Forest Advisor&lt;br&gt;Cooperative Extension, Mendocino County&lt;br&gt;Agricultural Center/Courthouse, Ukiah, CA 95482</td>
<td>(707) 463-4495&lt;br&gt;ATSS 553-4495</td>
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<tr>
<td>1987</td>
<td>Dennis E. Teeguarden, Professor&lt;br&gt;Dept of Forestry &amp; Resource Management&lt;br&gt;145 Mulford Hall, UC Berkeley, 94720</td>
<td>(415) 642-0376&lt;br&gt;ATSS 582-0376</td>
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<tr>
<td>1988</td>
<td>W. James Clawson, Extension Range Specialist&lt;br&gt;Agronomy and Range Science Extension&lt;br&gt;UC Davis, 95616</td>
<td>(916) 752-3455&lt;br&gt;ATSS 477-3455</td>
</tr>
<tr>
<td>1988</td>
<td>Don C. Erman, Professor of Fisheries Ecology&lt;br&gt;Dept. of Forestry &amp; Resource Management&lt;br&gt;145 Mulford Hall, UC Berkeley, 94720</td>
<td>(415) 642-5285&lt;br&gt;ATSS 582-5285</td>
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<td>1988</td>
<td>Robert H. Twiss, Professor and Chair&lt;br&gt;Dept. of Landscape Architecture&lt;br&gt;204 Wurster Hall, UC Berkeley, 94720</td>
<td>(415) 642-2904&lt;br&gt;ATSS 582-2904</td>
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<tr>
<td>1988</td>
<td>Wesley M. Jarrell, Associate Professor&lt;br&gt;Soil &amp; Environmental Sciences, and&lt;br&gt;Director, Dry Lands Research Institute&lt;br&gt;2226 Geology, UC Riverside, 92521</td>
<td>(714) 787-3859&lt;br&gt;ATSS 651-3785</td>
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<tr>
<td>1989</td>
<td>Philip W. Rundel, Professor&lt;br&gt;Lab. of Biomedical &amp; Environmental Sciences&lt;br&gt;12-217 Warren Hall, UC Los Angeles, 90024</td>
<td>(213) 825-4072&lt;br&gt;ATSS 725-4072</td>
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<tr>
<td>1989</td>
<td>Robert R. Curry, Prof. of Environmental Geology&lt;br&gt;College Eight&lt;br&gt;215 Clark Kerr Hall, UC Santa Cruz, 95064</td>
<td>(408) 429-4061&lt;br&gt;ATSS 529-4061</td>
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<tr>
<td>1989</td>
<td>Jeff Dozier, Professor&lt;br&gt;Department of Geography&lt;br&gt;5712 Ellison Hall, UC Santa Barbara, 93106</td>
<td>(805) 961-2309&lt;br&gt;ATSS 649-2309</td>
</tr>
<tr>
<td>1989</td>
<td>E. Lee Fitzhugh, Extension Wildlife Specialist&lt;br&gt;Wildlife Extension&lt;br&gt;8 Briggs Hall, UC Davis, 95616</td>
<td>(916) 752-1496&lt;br&gt;ATSS 477-1496</td>
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Finances

Expenditures during the fiscal year for the Center’s regular program of work amounted to $63,406. Funds were provided from regular appropriations for the Agricultural Experiment Station.

During the current year, a new contract from the California Department of Forestry provided $90,000 for the Conifer Germplasm Conservation Project. Of this amount, $10,960 was spent, plus the $58,645 remaining from the first financial increment. The remaining $5,600 of a gift from PGandE during the preceding year funded publication of the proceedings of the streambank management workshop. A contract for $4,510 was received to assist in production of a directory to wildlands expertise on campuses of the California State University system, but pressures of other work prevented utilization of the funds during this fiscal year. A second gift of $60,000 from PGandE was distributed to the four faculty members on the Berkeley campus for whom it was intended.

Publications

*Conserving wildland resources through research: Introductory report from the Wildland Research Center. 1 October 1959. 64 p.


*Publication no longer available.