

# UC Office of the President

## NRS Transect

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## Protected Areas and Development

*People are a part of nature. Their spiritual and material well-being depends upon the wisdom applied to the protection and use of living resources. Development needed for the betterment of the human condition requires conservation of living resources for it to be sustainable.*

*Earth is the only place in the universe known to sustain life, yet as species are lost and ecosystems degraded, its capacity to do so is rapidly reduced, because of rising populations, excessive consumption and misuse of natural resources, pollution, careless development, and failure to establish an appropriate economic order among peoples and among States. The benefits of nature and living resources that will be enjoyed by future generations will be determined by the decisions of today. Ours may be the last generation to choose large natural areas to protect.*

So begins the Declaration of the World National Parks Congress, held in Bali, Indonesia, last October. This once-a-decade conference sponsored by the International Union for Conservation of Nature and Natural Resources (IUCN) brought together 450 managers, academicians, private conservationists, and government officials from 68 countries. Their purpose was to assess the state of the biosphere as seen through the eyes of the world's parks and protected areas and to chart a course of action for protected areas in the coming decade. Since the greatest diversity of habitats and species is found in the tropics—particularly its rainforests—tropical developing countries will be the focus of future protected areas efforts, hence the meeting in Indonesia. I was invited to give a paper at the conference on the role of protected areas and University teaching and research, focusing on the NLWRS, but more of that later.

The Bali Declaration characterizes a remarkable revolution in the international conservation community: the integration of living resource conservation with *sustainable* development. Traditionally, parks and protected areas have been viewed as resources to be "set aside" from the mainstream of human affairs—and development activities have been viewed as the major

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W. WEATHERS 1982

With a generous grant from the National Science Foundation, UC scientists will investigate the role of nitrogen as a limiting factor in desert ecosystems, such as this desert wash—palo verde woodland at UC's Philip L. Boyd Deep Canyon Desert Research Center.

## \$990,000 Desert Study at Deep Canyon

A three-year study of nitrogen fixation, water use, and plant productivity in warm desert ecosystems has received \$990,000 in funding from the Ecosystems Program of the National Science Foundation. The study, to be based at the Philip L. Boyd Deep Canyon Desert Research Center near Palm Desert in Riverside County, will be a multi-disciplinary effort by four principal investigators: Drs. Wesley Jarrel and Ross Virginia with the Department of Soil and Environmental Sciences at UC Riverside; Dr. Phillip Rundel with the Biomedical & Environmental Sciences Laboratory at UC Los Angeles; and Dr. Dan Kohl with the Department of Biology at Washington University, St. Louis, Missouri.

The study is primarily basic research aimed at understanding the role of water and nutrient cycling in plant productivity and species composition in warm desert ecosystems like California's Sonoran Desert. An understanding of plant productivity is important since plants form the base of the food chain in most major ecosystems. In warm deserts, water is traditionally viewed as the primary factor that limits plant productivity, but as Dr. Jarrel points out

desert ecosystems typically have low nitrogen levels as well. In areas of the desert where water is locally more available, low nitrogen may be the more important limiting factor.

According to Dr. Jarrel, "When little water is available, only limited plant growth is possible so the demand for nitrogen is low, and adequate supplies are usually available in the environment. But when water is locally more abundant, for example in areas of high ground water or where ephemeral flows are concentrated in desert washes, accelerated growth may be fostered that outstrips the supply of available nitrogen."

Not all plants are adversely affected by a low-nitrogen environment. Members of the pea family (Fabaceae) have a competitive edge in such environments because of the bacterial nodules that grow on their roots. These nodules are able to take nitrogen from the atmosphere and convert it to a form that is usable by the host plant. In effect, species in the pea family come pre-packaged with their own source of nitrogen. This feature may allow them to dominate in water-rich areas of the desert.

*Continued on page 4*

## NLWRS Contribution Series

If you are about to publish research based on work done at an NLWRS reserve, Stop! Consider registering your publication with our NLWRS Contribution Series Program. It will help us keep track of publications based on research conducted in the system and it will help us advertise the system to the larger scientific community. In each registered publication, the phrase "Contribution No. \_\_\_ of the University of California Natural Land and Water Reserves System" appears in either the acknowledgements section or the preface.

To record your research paper, phone the systemwide office of the NLWRS at (415) 644-4211 or ATSS 8/532-4211 prior to submitting your manuscript to the editor for final typesetting and proofing. It takes only a moment and there's no charge. Since first announcing the program in the first issue of the *Transect*, four new papers have been registered (see below). That's only

the tip of the iceberg as many more papers have been published without registration. We would like to hear from you!

### No. Publication

- 6 Weathers, Wesley W. 1983. *Birds of Southern California's Deep Canyon* Berkeley and Los Angeles: University of California Press.
- 7 Chappel, Mark 1983. Metabolism and summer regulation in desert and montane grasshoppers. *Ecologia* (in blue-line proof 9/15/82).
- 8 Price, Mary V. and Nickolas M. Waser 1983. On the relative abundance of species: post fire changes in a coastal sage rodent community. (Submitted to *Ecology* in October 1982).
- 9 Chappel, Mark 1983. Thermal limitation to escape responses in desert grasshoppers. (submitted to *Animal Behavior* October 1982).

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## Publications of Interest

**Biological Field Stations.** The May 1982 issue of *Bioscience* (Vol 32 No.5) features four articles on biological field stations: "The importance of Biological Field Stations," Edward O. Wilson; "For love of nature: exploration and discovery at biological field stations" Thomas Eisner; "The role of field stations in the preservation of biological diversity," Peter F. Brussard; "Human carrying capacity, extinctions, and nature reserves," Paul R. Ehrlich.

**Management Publications.** Three relatively new periodicals provide practical information and research results of interest to natural area, park, and field station managers:

1. *Natural Areas Journal*. A quarterly publication of the Natural Areas Association. "Articles relating to research or management activities for nature reserves, natural areas, parks, etc.; rare species management; land preservation techniques; theoretical approaches to natural areas work; book reviews; editorial and other review materials are welcome." (published since 1981).

The Natural Areas Association is a "national, non-profit organization of individuals actively involved in the identification, preservation, protection, and management of natural areas and elements of our natural diversity. Any person professionally employed or actively involved in the natural

areas field is invited to join. Individual membership dues are \$10 (includes journal subscription). Please address membership applications to The Natural Areas Association, 320 South Third Street, Rockford, Illinois 61108.

2. *Restoration & Management Notes*. A twice-yearly publication of the University of Wisconsin Arboretum, 1207 Seminole Way, Madison, WI 53711. "A forum for the exchange of news, views, and information among ecologists, land reclamationists, managers of parks, preserves and rights-of-way, naturalists, engineers, landscape architects, and others committed to the restoration and wise stewardship of plant and animal communities." Subscriptions are \$8 per year. Back issues (three) available. Published since 1982.

3. *Park Science, A Resources Management Bulletin*. A quarterly publication of the Cooperative Park Study Units (CPSUs) of the National Park Service. This bulletin is "a report to park managers of recent and on-going research in parks with emphasis on its implications for planning and management." According to Russell Dickenson, NPS Director, "The focus will remain on field activities—the information developed through research and the applications of that information to the field management of park resources and sites. Natural, cultural, and historic research as it relates to management, maintenance, planning, and interpretation are welcome in these pages, and the application of research findings are most important of all." The Editor is Jean Mathews, Oregon State University

## Submissions to the Transect Welcome

If you are teaching or conducting research on NLWRS reserves, we would like to hear from you. Leads on stories that provide insight into the "whys" and "hows" of field work are particularly valued. Submissions are open to students and staff, as well as faculty.

The emphasis is on NLWRS reserves and the activities they support, although more general information on biological field stations and natural areas is also welcome. Information on grants awarded, field trips and class projects, student research, faculty-student collaboration, new finds, special phenomena such as fires or rare species occurrence, new facilities and equipment, personality profiles, personal anecdotes, student commentary on the value of field experience, poetry or humor related to field work — all are topics for future publication in the *Transect*.

Donations of drawings and photos, especially of wildlife, facilities, and reserve users in action, are particularly needed. Artist and photographer credits will be given.

Please contact the Editor, Jeff Kennedy, at (415) 644-4211, for submission guidelines and further information.

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NPS/CPSU, Room 126 Forestry Sciences Lab, 3200 Jefferson Way, Corvallis, Oregon 97331; (503) 757-4579. Subscriptions are free. Published since 1980.

CPSUs are university-based management-oriented science programs with teaching, research and extension functions. Two CPSUs cover NPS units in California: 1) CPSU/UNLV, c/o Department of Biological Sciences, University of Nevada, Las Vegas, Nevada 89154, (702) 739-3219, Attention: Dr. Charles Douglas, Unit Leader (for Death Valley N.P. and Joshua Tree N.M.); 2) CPSU/UC Davis, c/o Institute of Ecology, (916) 752-7119, Attention: Dr. Charles Van Ripper III, Unit Leader (for the rest of California). Reports of Management-Oriented Research are published biannually.

## Resolution Endorses Field Semester for Biology Majors

At its annual meeting in September of 1981, the Organization of Biological Field Stations, representing over two-thirds of the field stations in the United States and Canada, passed the following resolution:

*WHEREAS the population growth and the needs of mankind are placing an ever-increasing demand upon the earth's natural environments,*

*WHEREAS the complex ecological relationships of the earth's vast flora and fauna are as yet poorly understood,*

*WHEREAS many persons currently trained in biology do not fully understand the intricacies of these relationships and the size and complexity of the world's biota,*

*WHEREAS the public, many conservationists, and numerous trained biologists still tend to focus on such eye-catching but simplistic concepts as "endangered species" rather than on the diverse, heterogeneous, and fragile ecosystems of the world, and furthermore,*

*In recognition that the wellspring of man's hope to cope with his effects on ecosystems rests with his understanding their composition and complexities,*

*THEREFORE, be it resolved that the Organization of Biological Field Stations urges biological departments at colleges and universities in North America, and indeed in the rest of the world, 1) to involve all students at both the undergraduate and graduate level in field studies that will provide them with a greater insight into ecological principles and practices and into the diversity of the flora and fauna, and 2) to strongly recommend or require that all students majoring in biology or pursuing higher degrees in that field participate in at least one full-time semester-in-residence at a field station, or in a similar environment, that provides an intimate contact with the heterogeneity and complexities of one or more ecosystems.*

## The Organization of Biological Field Stations

The Organization of Biological Field Stations (OBFS) is an association of field station directors and individuals interested in the biological field facilities of the United States and Canada. Although small in size, OBFS represents over two-thirds of the field stations of North America. Three UC facilities are currently members: The Hastings Natural History Reservation in the Carmel Valley, The Bodega Marine Laboratory in Sonoma County, and Berkeley's Sage Hen Creek Wildlife—Fisheries Research Station near Truckee.

The purpose of the organization is "the advancement of biological science through 1) the development of research and teaching programs at field stations in North America, 2) the implementation of cooperation between these stations, and 3) the dissemination of information about these stations." Field station directories have been published by OBFS in 1970 and 1977 (see citations at end of article), and a complete revision is currently underway.

"Many kinds of facilities, programs, management practices and institutional affiliations are represented among the membership", according to Dr. Richard Coles, secretary of OBFS and Director of the Tyson Research Center (Washington University, St. Louis). "Consequently, the discussion of matters of mutual interest is quite lively." Benefits of membership include the OBFS Newsletter, and an opportunity to attend the annual meeting at a member station and observe its operation. California has twice hosted the annual meeting: at the Pacific Marine Station at Dillon Beach and at Chico State University's Eagle Lake Field Station near Susanville. The next annual meeting is scheduled for 23-25 September 1983 at the University of Colorado's Mountain Research Station in Nederland, Colorado.

In addition, member institutions offering summer courses can have their curriculum listed in the OBFS annual course announcement poster, which is distributed to

over 2,000 bio-science departments in the U.S. and Canada. Listing in the course announcement costs \$35.00.

The OBFS welcomes new members at two levels: individuals at \$10 per year, and field stations at \$50 per year. Individuals need not be directly affiliated with a field station, but only representatives of member station are allowed to vote. Dr. Coles cautions that the organization is quite small; "Don't expect anything fancy. Most member directors are quite preoccupied with their home facility. The emphasis is on information exchange, much of which takes place at the annual meeting."

For information on membership and the course poster, contact:

Dr. Richard W. Coles  
P. O. Box 258  
Eureka, Missouri 63025  
(314) 938-5346

For information on the upcoming revision of the directory of biological field stations, contact:

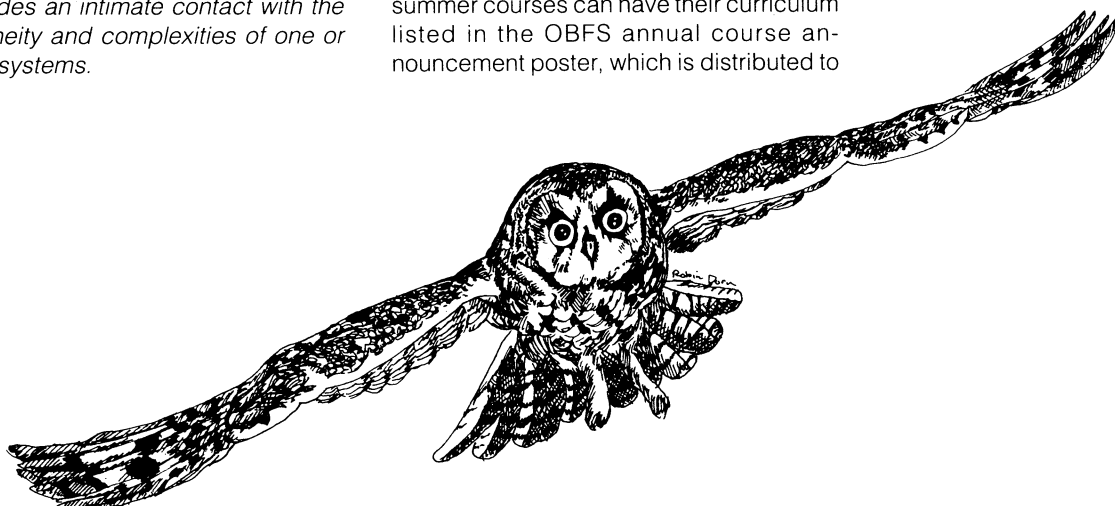
Dr. George Lauff  
W. K. Kellogg Biological Station  
3700 East Gull Lake Drive  
Hickory Corners, Missouri 49060, or

Dr. Mark Paddock  
University of Michigan Biological Station  
Natural Sciences Building  
Ann Arbor, Michigan 48109

Previous field station directories:

Hunsaker, Don and Robert Dalgleish. 1970. *Biological Field Stations of North America 1970*. New York: MSS Educational Publishing Inc. 142 pages, (out of date).

Coles, Richard W. 1977. *Organization of Biological Field Stations, Directory of Members 1977*. St. Louis: Organization of Biological Field Stations and Washington University. 92 pages, mimeographed.



## Desert Study—Cont'd from p. 1

The study at Deep Canyon will test the hypothesis that nitrogen is limiting when water is available by comprehensively documenting water and nutrient regimes and plant productivity in three different systems: 1) those with no accessible groundwater, which tend to be dominated by creosote bush (*Larrea tridentata*), 2) those with ephemeral water, dominated by palo verde (*Cercidium* spp.) and smoke tree (*Dalea spinosa*), and 3) those with permanent accessible groundwater, dominated by mesquite (*Prosopis* spp.). The focus will be on woody perennials in the pea family. This will be the first time that this hypothesis has been tested by this approach.

Although theoretical in nature, the study's findings will have practical application in predicting the effects of changing land use practices on desert plant communities. Activities such as groundwater pumping, debris basin construction, and irrigation and fertilization of golf courses and desert farming ventures all have an effect on the water and nutrient regimes of desert ecosystems. More broadly, the study will also shed light on how plants respond to water and nutrient stress in extreme environments. Understanding these response mechanisms is essential for efficient management of similarly-stressed plant communities, both natural and agricultural.

Deep Canyon Desert Research Center is the logical site for this study for several

reasons: its large size encompasses two of the three plant communities to be studied, with the third is nearby; it has site-specific baseline data such as long-term weather records and botanical surveys; it has on-site support facilities; and it is close to the Riverside and Los Angeles campuses.

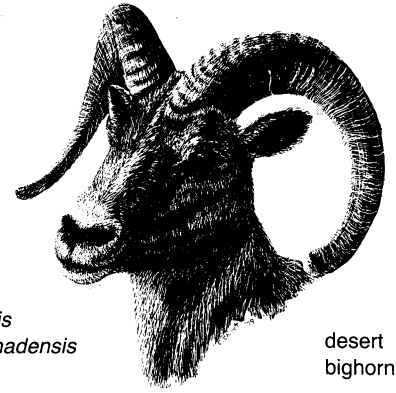
—Jeff Kennedy  
NLWRS Environmental Planner

## New Facilities at Deep Canyon

A new two-bedroom trailer has recently been installed at the Phillip L. Boyd Deep canyon Desert Research Center. The trailer will serve as the on-site residence for Dr. and Mrs. Alan Muth, the new resident scientist-manager at the center. Major funding for the project was provided by a \$15,000 gift from Mr. Boyd, a former Regent of the University, and \$12,000 from the Chancellor's office of the Riverside Campus.

The previous residence, a tackroom and guest cottage from Regent Boyd's Ranch, is now being refurbished as a new administrative office. This conversion in turn, will free-up a lab now being used as an administrative office, giving more space for research use.

Last summer, the center's well went dry, but a new well was completed last October with \$14,000 from the Chancellor's office. Ample water is now available for both resident researchers and lab use.



*Ovis canadensis*

desert bighorn

Boyd Deep Canyon Desert Research Center

## Habitats and Wildlife: Mammals of the NLWRS

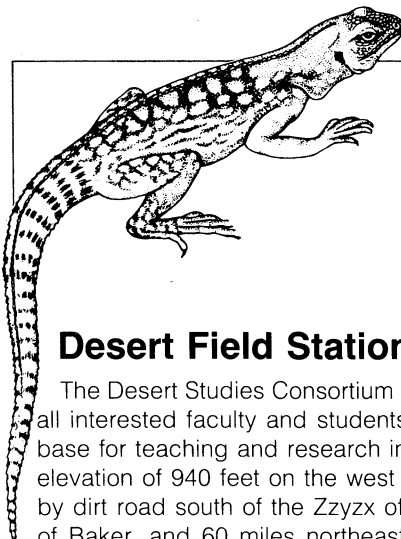
A major goal of the Natural Land & Water Reserves System (NLWRS) has been to secure a representative cross-section of California's natural diversity for teaching and research use. To gauge progress toward this goal, a checklist of habitat types was developed in 1975 by Dr. J. Robert Haller, Professor of Botany at UC Santa Barbara, and Norden H. (Dan) Cheatham, NLWRS Field Representative (Cheatham and Haller, 1975. *An annotated check-list of California habitat types*. Unpublished mimeograph. 81 pages). The checklist is a decimal system that catalogues habitat types at four levels of detail. The checklist is being used by California Department of Fish and Game's Natural Diversity Data Base as the framework for its community classification system. A thorough revision and expansion of the checklist is currently underway by the Data Base.

To date, the 26 reserves of the NLWRS encompass 76 of the 115 habitat types through the 0.01 level (66 percent representation), and 98 of 186 habitat types through the 0.001 level (53 percent representation). These figures indicate that major progress has been made toward the goal of habitat representation.

A major assumption of the habitat approach to reserve system design is that by protecting a cross-section of habitat types—which are determined by dominant plant species and physiographic features—a representative cross-section of the state's wildlife will also be protected. This assumption does not necessarily hold since research findings in island biogeography reveal that smaller protected areas support fewer species of plants and animals than larger areas, other factors being equal.

However, the assumed correspondence between habitat representation and wildlife representation has recently received a boost for at least one animal group, California's mammals. California has a diverse

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## DESERT STUDIES CONSORTIUM

### Desert Field Station Now Available

The Desert Studies Consortium of the California State University system is inviting all interested faculty and students to use its 130-acre Desert Studies Center as a base for teaching and research in the northeastern Mohave Desert. Situated at an elevation of 940 feet on the west side of (dry) Soda Lake, the Center is four miles by dirt road south of the Zzyzx off-ramp on Interstate Highway 15, six miles south of Baker, and 60 miles northeast of Barstow. Many areas of interest are nearby including the Devil's Playground, Kelso Dunes, Cima Dome, and UC's own Granite Mountains Reserve. Death Valley lies 100 miles to the North.

On-site facilities are extensive: 25 double rooms, a central bath house, a kitchen to feed 50, several meeting and conference rooms, dry-lab space, equipment storage space, and an on-site weather station. Electricity and limited potable water are available. Arrangements to use the facility can be made by contacting the Desert Studies Consortium, California State University at Fullerton, 800 North State College Boulevard, Fullerton, California 92634; (714) 773-2428. Additional information can be obtained by writing or phoning the above address.

## New Program Inventories Sensitive Species and Communities

It is not news that California is an area of remarkable biological diversity. What may be news is that there is an ambitious program underway to inventory the most sensitive or threatened components of that diversity. The program, called the Natural Diversity Data Base, is administered by the Planning Branch of the California Department of Fish & Game in Sacramento. Initiated in 1980 by The Nature Conservancy under contract to the Department, the Data Base is an example of a Conservancy "Heritage Program". The Nature Conservancy has successfully established Heritage Programs in 29 states to provide an objective basis for identifying natural areas that require protection.

The program uses an approach to natural diversity identification and protection that is quite unlike previous efforts in California. Rather than inventorying *areas* of natural diversity, the Data Base inventories the individual *elements* of that diversity. The elements being inventoried include plant and animal species and terrestrial and aquatic communities that are rare, threatened, endangered, of limited distribution, or otherwise "special"

Documented locations of these special elements are first plotted on USGS topographic maps and information on distribution and degree of threat are noted. These data are then entered into a computerized data base that can store both map data and textual information. Using the information in the data base, the elements are ranked on a relative basis to determine their significance to California's overall natural diversity. Natural areas can then be identified that include the highest ranking elements.

The distinction between inventorying elements and inventorying natural areas can be confusing at first. One important advantage of the element approach is its ability to solve the "apples-and-oranges" problem of comparing two or more places with radically different characteristics—say, Point Conception tidepools with Mohave Desert sand dunes. By analyzing the number of special elements and the relative rank of each element, an objective comparison of the two areas can be made based on a comparison of their critical elements.

This approach allows different agencies and organizations to use the Data Base to meet different needs. Some, like the California Native Plant Society (CNPS), are

primarily interested in protecting the locations of rare or endangered vascular plants. Others, like The Nature Conservancy, are currently most interested in areas with the highest concentration of the highest-ranked elements. Still others may start with an area to be logged or developed and want to know what elements are found there so adverse impacts to those species and communities can be avoided. Each is free to apply its own criteria when using Data Base information to judge site importance.



Santa Cruz Island Reserve

Recognizing the need to coordinate these various protection efforts, a companion program to the Data Base has been created in the Department of Fish and Game. Known as the Significant Natural Areas Program, or SNAP for short, its purpose is to match land management agencies and organizations with natural areas in need of protection.

The value of the Natural Diversity Data Base extends beyond its value in identifying natural areas directly. The locational information in the data base is playing an increasingly important role in land-use planning as well. Many agencies and planning consultants have come to appreciate the data base as an indispensable tool in the impact assessment process. With advance knowledge of the presence of sensitive resources in an area, conflicts between conservation and development can be minimized.

If all of this sounds to you like a big job, you're right. It cannot be done without the active involvement and support of literally hundreds of people: biologists, land managers, agency personnel, and the faculty, staff, and students of educational and research institutions throughout the state. The vast amount of data on rare and endangered vascular plants collected by the

California Native Plant Society and the expertise in inventory techniques gained by other state Heritage Programs are only two of the many sources which have greatly contributed to the success of the Data Base.

Of course, the Data Base is only as good as the information it has available to it. Input is continually needed to keep it accurate and up-to-date. By relying on a statewide network of knowledgeable individuals, the Data Base has become the best single location for information on rare or endangered species and communities in California. In the process, it has also become an informal clearing-house for tracking ongoing research on these sensitive resources.

So if you are interested in natural area protection, are studying a unique species or community, are working as an impact assessment consultant, or are interested in research related to conservation biology or rare species, you may wish to contact California's Natural Diversity Data Base. You can either provide Data Base staff with information, obtain information for yourself, or simply learn more about an exciting new program working toward the protection of natural areas in California.

Write or call: Natural Diversity Data Base, Planning Branch, California Department of Fish and Game, 1416 Ninth Street, Sacramento, California 95814, (916) 322-2493 ntor ATSS No. 492-2493.

—Deborah Jensen  
NDDDB Plant Ecologist

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## Mammals—Cont'd from page 4

mammalian fauna totaling 217 species. Of these, 21 are non-native, introduced species and 26 are whale species. This leaves 170 native, non-Cetacean mammal species for the state. To put this figure in perspective, California's 170 species represent 31 percent of North America's 359 native non-whale mammal species between the Mexican border and the Arctic Sea.

Recently, a master checklist of the mammal species found on NLWRS reserves was compiled by Dr. Joseph Spinelli, Veterinary Director of the Animal Care Facility and NLWRS campus chairman at the UC Medical Center in San Francisco, and Jeffery Kennedy, Environmental Planner for the NLWRS. The list revealed that NLWRS reserves encompass 111, or 65 percent, of California's 170 native species and 11, or 52 percent, of its 21 non-native species. These figures are in close-conformance with the degree of habitat representation in the NLWRS.

—Jeff Kennedy  
NLWRS Environmental Planner

threat to their continued viability. But protected areas ultimately do depend on development to some degree. In industrial societies, a failing economy can result in inadequate budgetary support for acquisition, protection, and management of protected areas. In developing countries, rural development that is insufficient to meet the basic needs of food, clothing, shelter, and health care, can force rural peoples to convert today's protected areas into tomorrow's crop and pasture lands. In the Third World, the economic well-being of local peoples is crucial to the continued viability of nearby parks and protected areas. The key is balance and a recognition of the interdependence between conservation and *sustainable* development.

The conservation goals of parks and protected areas are typically too abstract to be appreciated by traditional peoples living next to parks. There is an increasing realization that parks and protected areas need to benefit park neighbors *directly* and *concretely* if they are to be valued and preserved. As one delegate put it, "If parks aren't *for* people some of them may cease to be parks at all." Some parks are now being managed to bring social and economic benefits directly to local peoples. A prime example is Kenya's Amboseli National Park where grazing competition between wildlife and cattle caused Masai herders to spear wildlife in protest. As a consequence, the park's rhino population fell from 150 to 7 in less than 10 years. Tourist camps have since been moved from the park to adjacent Masai lands and the Masai now receive the income they generate. Park revenues are used to pay grazing compensation fees to the Masai for reductions in their herds, and trophy hunting fees go to the Masai for hunting allowed on their lands. The park offers employment to the Masai, and the staff school and hospital are available to Masai families. The rhino population has since doubled at Amboseli, while populations elsewhere continue to decline.

Although the dependence of protected areas on sustainable development is perhaps understandable, the reverse is considerably less so. Two references document in detail the economic benefits of the natural diversity safeguarded by parks and protected areas: 1) Norman Meyers, 1979. *The Sinking Ark*. Oxford: Permagon Press; and 2) Paul and Anne Ehrlich, 1981. *Extinction: The Causes and Consequences of the Disappearance of Species*. New York: Random House. The Bali Declaration lists four reasons for the dependence of development on living resource conservation. First, protected areas maintain essential

ecological processes that depend on natural systems (i.e., soil regeneration and protection, nutrient recycling, the cleansing of waters). Second, they preserve genetic diversity which is the basic resource for agricultural breeding programs, pharmaceuticals, industrial products, and the security of industries that use living resources. For example, a wild relative of corn from Mexico holds the promise of converting domestic corn to a perennial rather than an annual crop, reducing production costs and soil loss. The corn crop is worth over \$20 billion annually in America alone. Third, protected areas safeguard ecosystem productivity and preserve habitats critical to the sustainable use of species. A good example is Indonesian mangrove swamps which serve as nursery areas for a shrimp fishery worth over \$186 million annually in exports alone (83 percent of their total fishery export). And finally, protected areas provide opportunities for scientific research, education, and training which are essential to our understanding and informed management of natural systems.

It is in this last context that the international significance of the University's Natural Land and Water Reserves System becomes apparent, for the NLWRS is a system of protected areas specifically set aside for teaching and research use. In discussions with other delegates it was apparent that the NLWRS is the only university-owned and operated reserve system of its scope and diversity in the world. Like the parks of other countries, the NLWRS provides educational and research opportunities which are rapidly disappearing on other lands.

The problems faced by the NLWRS here in California might appear to be worlds apart from those faced by national parks in the tropical Third World, yet there are many parallels. Both face the loss of adjacent habitat and encroachment of development, both urban and agricultural; both require public support; and both face the difficulty of explaining what appears to be abstract values to a public with other competing priorities. The community of reserve users does a good job of explaining the value of its work to its academic peers, but it is less successful in explaining these values to the public at large. If there is anything to be learned from the experience of the world's protected areas, it is, perhaps, that we should do a better job of explaining ourselves to this larger audience, through interpretive programs, through publications such as this newsletter, or by whatever means consistent with the protection of reserve values.

Continued at right

**Brochure Grants.** In aggregate, \$5,000 has been donated by Utah International, TRW, and the Charles See Foundation of Los Angeles. These unrestricted grants will be used toward matching a \$15,000 challenge grant from the William and Flora Hewlett Foundation for the publication of individual reserve brochures. In addition, Mr. A. E. Stewart Chaffey has, for the third year in a row, contributed stock to the NLWRS. His gift, worth more than \$3,000, will also be used to match the Hewlett Foundation grant. An additional grant of \$15,000 has been received from the Atlantic Richfield Corporation towards the second year of the two-year brochure program. A staff editor is being hired to initiate the program this fall.'

**\$125,000 in Pledges.** Pledges of \$25,000 from the Goodhill Foundation of New York and \$100,000 from the Packard Foundation of California have been received for the acquisition of a key habitat addition to one of our major reserves. The acquisition also includes several buildings which will serve as the nucleus of field a station and housing complex for the reserve. An Additional \$175,000 is needed to complete the project. The support of the Goodhill and Packard Foundations is most appreciated!

**Dawson Contribution.** Mrs. Ida Dawson has recently added 10 acres to the 133-acre Dawson Los Monos Canyon Reserve near the town of Vista in Northern San Diego County. Mrs. Dawson also contributed \$3,000 to help replace fencing destroyed by a wildfire which burned over much of the area late last summer. Thank you, Ida!

**Cover Photo.** The University's San Joaquin Fresh Water Marsh Reserve and the UC Irvine campus are pictured on the cover of the New Orange County Central and North White Pages Telephone Directory which is distributed to over 900,000 telephone subscribers. The reserve, which is adjacent to the Irvine Campus, provides the most significant remnant of fresh water marshland in one of California's most rapidly urbanizing areas.

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The *World Conservation Strategy*, the guiding document of the IUCN, identifies the new perspective that is needed: "We have not inherited the earth from our parents, we have borrowed it from our children." Protected area systems like the NLWRS provide us all with an opportunity to understand the value of that debt to future generations.

—Jeff Kennedy Editor

## News and Notes—Continued

**James Estate.** The NLWRS has received over \$42,000 from the estate of Grace Clifford James' and her late husband, Harry. The 29-acre James San Jacinto Mountains Reserve, located in the heart of the U.S. Forest Service's proposed Hall Canyon Research Natural Area, was the first reserve to be added to the NLWRS after its creation in 1965. Proceeds from the estate will be used to make a number of improvements to the facilities of the reserve, as well as to assist with research projects there. The James Reserve provides a research base for ecological studies in the San Jacinto and Santa Rosa Mountain Ranges west of Palm Springs and the Coachella Valley.

**Motte Rimrock Reserve Additions.** Three gifts of property totaling 25.7 acres adjacent to the Motte Rimrock Reserve were received at year's end: one from Mr. and Mrs. Charles Motte, another from Mr. and Mrs. Howard Schlundt of Riverside, and a third from Dr. Anne Parker of Perris. These additions provide a more defensible boundary to the reserve and add important habitat as well. The reserve, which is only 20 minutes south of the Riverside campus, is used extensively by Riverside students. A long-term multi-disciplinary research project to study the recovery of reserve habitats from fire is also underway (see Vol. 1, No. 1). Our thanks to these five individuals for their generous support of the Motte Reserve.

**Fish Slough Legislation.** With the active support of California Department of Fish and Game, the U.S. Bureau of Land Management (BLM), the Los Angeles Department of Water and Power, and the University of California, legislation was recently passed by Congress and signed into law by President Reagan authorizing a land exchange between BLM and the owner of the last remaining private inholding at Fish Slough. Located just north of Bishop, Fish Slough is the last and best remnant of desert spring and riparian habitats in the Owens Valley. It is the world's only remaining habitat of the Owens Valley pupfish *Cyprinodon radiosus*, a federally-listed endangered species. Several rare plant species are found there as well.

The NLWRS is currently seeking funding for a comprehensive resource inventory of Fish Slough, to be conducted by the Santa Barbara campus. The data collected by the inventory will form the basis for a cooperative management agreement between the three land-owning agencies and the University.



The Scripps pier and Institute of Oceanography provide the backdrop for the Scripps Shoreline—Underwater Reserve. Terrestrial portions of the reserve, including newly accessible Sumner Canyon, lie further to the north in the area circled.

**Use Agreement at Scripps.** Agreement has been reached with the Scripps Estates Associates, a home-owners association, for the use of Summer Canyon adjacent to the Scripps Shoreline-Underwater Reserve. This canyon is a particularly valuable addition to the reserve for two reasons. First, it supports an unusual coastal assemblage of cacti and other species from both the Sonoran Desert to the east and the Baja Peninsula to the south.

Second, this canyon together with the reserve's Black Canyon are believed to be the landward extension of Scripps Submarine Canyon which drops to a depth of over 13,000 feet below sea level.

**Ryan Donation.** Ten acres of land in California's Mohave Desert have been donated to the NLWRS by Mrs. Francis Ryan of the Ryan Oak Glen Reserve. Although the property will ultimately be sold for the benefit of the NLWRS, it can be used in the interim for limited field work. It features a creosote bush scrub habitat.

**Citation-Winning Professor.** Professor Kenneth S. Norris founder of the NLWRS has been chosen as one of six citation winners in the Professor of the year competition for 1982, sponsored by the Council for the Advancement and Support of Education in Washington D.C. The Professor of the year competition recognizes "excellence in teaching and demonstrated impact on the lives and careers of students and former students." Over 121 entries from 42 academic disciplines in 34 states competed for the honors. Dr. Norris is the manager of the Landes-Hill Big Creek Reserve and Director of the Environmental Field Program at the Santa Cruz Campus. The field program has been instrumental in inventorying the natural resources on several NLWRS Reserves. Congratulations Ken!



Fish Slough, a desert spring ecosystem, is the last remaining habitat of the Owens Valley pupfish, a federally-listed endangered species. This birdseye view looking south shows the fault-bounded slough against a backdrop of the Owens Valley and the Sierra Nevada beyond. The slough is surrounded by arid schadscale scrub. Preservation of this important habitat has recently been ensured through the cooperative efforts of the California Department of Fish and Game, the Los Angeles Department of Water and Power, the US Bureau of Land Management, and the University of California.



## Gifts that Keep on Giving

The names of NLWRS benefactors identify over half the reserves in the system: former Regent Philip L. Boyd, Jean and the late Bruce Burns, the Allen and Sherman Chickering families, Ida Dawson, the late Frances Simes Hastings, Kenneth and Dorothy Hill, the late Harry and Grace James, Thomas and Ruth Jones, the late Lena Kendall, Edward Landels, Charles and Ottie Motte, Frances and the late Lewis Ryan, and Carol and the late Edward Valentine. It has largely been through the generosity and farsightedness of these people that a system of 27 natural reserves has been realized.

Many other individuals, foundations, and corporations have joined in making significant gifts of land or funds. The major fund-raising campaign of 1974-77 provides one measure of this cooperative effort. Highlighted by a challenge grant from the prestigious Ford Foundation, over \$3,000,000 in cash and property were raised in support of the system. Skilled leadership was an important element of that success. The overall chairman of the campaign was Regent William A. Wilson; the northern California chairman was the late Shermer Sibley, Chairman of the Board of Pacific Gas and Electric Company; the southern California chairman was Regent Robert O. Reynolds.

So next time you are on a reserve, take a moment to appreciate the contributions of these many individuals and organizations. They gave once, but theirs have been gifts that will keep on giving to all who use the reserves.

—William J. Davis  
Consultant For Development

## Valentine Open House.

This past August, the Valentine Eastern Sierra Reserve hosted its eleventh annual open house for the general public. Located at the foot of Mammoth Mountain between Mammoth Pass to the West and the town of Old Mammoth to the east, the 136-acre reserve is a highly diverse and pristine assemblage of forest, meadow, and streamside habitats. Located at an elevation of 8000 feet, Great Basin species mingle with Sierran species that "spill over" from the West slope of the Sierra Nevada, through Mammoth Pass.

The open house is quite popular with the local community. Over 225 people purchased tickets to attend the afternoon event. The open house is hosted by the Mammoth Lakes Women's Hospital Auxiliary, and all proceeds benefit the local hospital. The University provides twenty guides mostly students and scientists who use the reserve under the leadership of Dr. J. Robert Haller, Professor of Botany at UC Santa Barbara. The guides take groups of eight to ten people on hour-long tours of either the large wildflower meadow or the mixed conifer forests, explaining the history, flora and fauna, and current research at the reserve. Afterwards, guests are treated to hors d'oeuvres made and donated by the Women's Hospital Auxiliary.

The Mammoth Lakes community has been growing rapidly in the past few years into a densely developed destination resort for skiers and other recreationists. The Valentine Reserve is increasingly appreciated by the local community as a protected sample of their rich natural heritage that will remain for the benefit and enjoyment of future generations.

—Leslie Dawson  
Valentine Camp



A visitor enjoys the shade of a windswept Jeffrey pine at the Valentine Reserve.

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## Free Subscription

**tran' sect** (trăn' sēkt), *n.* **1. Field Science.** A line along which physical and biological data are collected. **2. Tech. Slang.** A cross-sectional slice of the environment under study

In a broad sense, the Natural Land and Water Reserves System, is also a transect. It encompasses a representative cross-section of California's natural diversity in a system of natural areas and field stations specifically reserved for teaching and research use. Recognizing this, we have chosen to call our newsletter the *Transect*. For a free subscription—three issues per year—write or phone the systemwide NLWRS office (415/644-4211; ATSS 532-4211).

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## The Best Laid Plans . . .

Despite our best intentions, only one issue of the *Transect* has been published (Spring 1982.) The 1983-84 academic year will be the first year of full production. We regret any inconvenience to our readers.

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