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Director Search Ends— Planning Begins

The search for a new Director for the Natural Reserve System ended last June, when Kenneth R. Farrell, Vice President—Division of Agriculture and Natural Resources, terminated the process and asked J. Roger Samuelsen to continue as Director on a full-time basis.

In announcing his decision, Farrell explained that the final candidates had expressed concern over the limited resources currently available to the systemwide NRS office and to the Reserve System as a whole. He pledged to make a concerted effort to secure additional funding. "At the end of the 1989-90 academic year," he said, "we will assess progress in development of NRS programs and financial resources, and determine what, if any, further action is appropriate to realize the full teaching, research, and public service potential of the NRS."

Farrell also noted that while the months of searching were uncertain and difficult for the NRS, the period was one of substantial progress. "I sense we have benefited from the questions that have been raised and the input we have received during this period," said Farrell. "We are all emerging with an

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Looking east towards Van Winkle Mountain from the base of Granite Cove, the building site for Granite Mountain Reserve's recently funded laboratory and housing facilities.

Reserves Receive \$500,000 in NSF Grants and NRS Matching Funds for Facilities Development

The National Science Foundation (NSF) recently awarded matching grants to two NRS sites through a special competition for equipment and facilities for research at biological field stations and marine laboratories. The Sierra Nevada Aquatic Research Laboratory (SNARL) received \$175,000 to construct an experimental stream system, and the Granite Mountains Reserve (GMR) received \$78,715 to establish an arid zone research facility.

Of the 31 proposals submitted and 15 funded, SNARL ranked first in the nation; GMR ranked seventh. Both reserves received more than the mean grant to inland stations of \$61,000.

This new NSF program differs from its predecessors in that it allows undeveloped sites with high potential for research productivity (such as GMR) to compete with

developed stations (such as SNARL) as long as their parent institution provides at least a 50 percent funding match. To take advantage of this expanded eligibility, in 1988 the NRS began its own program of awarding potential matching funds for NSF grants. SNARL and GMR also received \$100,000 and \$50,000, respectively, in this special competition.

The awards to SNARL will allow the reserve to augment its existing stream and pond system by constructing 15 experimental stream channels. Located along Convict Creek at the base of the eastern Sierra in Mono County, SNARL has been the site of fisheries research since 1935. Existing stream facilities consist of small laboratory channels and large field channels formed by dividing Convict Creek.

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Reserve Highlights

Marsh Plan Floats New Era of Cooperation

Visitors to the San Joaquin Freshwater Marsh Reserve are often struck by the site's contrast to its surroundings. For here, in a rapidly urbanizing region of Orange County, lies one of the few remaining freshwater wetlands along the Pacific Flyway in coastal southern California. Willows and cattails define the horizon, and the sound of wind in the tules is rivaled only by the calls of marsh birds.

The apparent tranquility within the marsh belies the hubbub occurring beyond its borders as an array of developers, public agencies, and citizens groups determine its future. No less than 15 federal, state, and local entities and private corporations own or manage the resources in or adjacent to the 580-acre freshwater marsh system. "The NRS reserve encompasses a third of the wetlands," says Reserve Manager William Bretz. "We're concerned the marsh is suffering from the uncoordinated management of the various groups that control it."

But in July 1989, the City of Irvine changed the open space element of its general plan, in part to better protect the marsh. This move catalyzed marsh interests to coordinate their planning and management. On December 8, their effort received a major boost when the State Coastal Conservancy voted unanimously to grant \$50,000 to the City of Irvine to prepare a resource enhancement plan for the marsh. These funds will be matched by \$50,000 from the City of Irvine and \$25,000 from the NRS.

The San Joaquin Freshwater Marsh Enhancement Plan will be coordinated jointly by the City of Irvine, the NRS, and the Coastal Conservancy. Based on a comprehensive study of the entire marsh system, it will analyze the marsh's existing natural resources and operations, recommend restoration and enhancement projects, identify strategies to minimize the negative impacts of developments adjacent to the marsh, and suggest public access and interpretive improvements compatible with the habitat.

This planning effort comes at a crucial time in the reserve's history as urban development intensifies around the marsh. The City of Irvine recently approved, with mitigation, two large private projects north of the wetlands. In addition, UC Irvine's own long-range plan calls for building on University property adjacent to the reserve's northern and western borders. The NRS recently entered into a precedent-setting

Memorandum of Understanding (MOU) with the Irvine campus regarding this land.

Under the terms of the MOU, buffer zones of native upland vegetation will be provided between the reserve and any development projects, access into the buffer zones will be limited, a berm will be built along the west edge of the reserve to reduce light and noise pollution, and the marsh's water supply will be protected. The MOU also recognizes the NRS as a Trustee Agency under the California Environmental Quality Act that must be consulted during the planning of any development that may impact the reserve.

Kids Learn about Ecology at Big Creek

On a sunny day in July, eight children from Inklings Grade School in a suburb of Los Angeles arrived at the Landels-Hill Big Creek Reserve for a week of intensive environmental education. Some had never camped before; most had never been to Big Sur. But by the end of the week, all were adept at living in the woods and knowledgeable about Coast Range ecology.

This on-site course is part of an environmental education program that Kim Smiley is developing at the Big Creek Reserve. A junior high and high school science teacher at the local Pacific Valley School, Smiley

received both her teaching credential and a B.S. in biology from UC Irvine. For the past two years, she's been developing hands-on curricula on the biology of the Big Sur region and field-testing the units with a variety of primary and secondary school groups at the Big Creek Reserve.

"I'm trying to teach the kids three main things," says Smiley. "An appreciation for the natural environment, information about its ecology, and a social awareness of environmental issues." Her lesson plans, which satisfy state science curricula requirements at a variety of grade levels, also familiarize students with scientific method.

For instance, Smiley uses the copious Big Sur banana slugs as the central theme in a unit designed to impart the importance of scavengers in a habitat. Students participate in a slug hunt, taking data on the habitat and habits of the slugs they find. They discover the natural defenses of slugs by using their senses on one, and they learn about slug behavior by performing simple, harmless experiments. In addition, the students play games and sing songs that teach them how a slug fits into an entire forest, create slug-inspired artwork to learn to appreciate the organism's aesthetic qualities, and write about their interactions with the animal and their experiences in its habitat.

Banana slugs may not be glamorous creatures, but they do attract *and hold* the attention of young students, and are therefore



Nathan Read, Kasey Atkins, and Lyndsie Read of Inklings Grade School examine a great horned owl skin as part of a unit on organisms' adaptations to their environment at the Big Creek Reserve.

Reserve People

effective subjects for teaching basic ecological principles.

Smiley recently received \$500 from the Big Sur Natural History Association to write up the banana slug unit for use by other teachers. To make the curricula development an educational experience in itself, Smiley has turned the grant over to a Pacific Valley High School senior who will finalize the package as a school project.

Smiley is also developing units on fire ecology, local prehistoric cultures, tide pools, aquatic and terrestrial insects, and terrestrial plants. The latter incorporate flash cards or pressed samples that students use as simple keys to identify organisms in the field, as well as learn how each organism makes a living and is used by humans.

In addition to writing and disseminating her curricula, Smiley plans to develop a reserve-based teacher training program to help others in the region integrate environmental education into their instruction.

Meanwhile, Inklings is making plans to return. "The whole experience was very positive," says teacher Regan Read, adding that Smiley's hands-on methods were effective with students of all ages. "Everyone came away with a deeper appreciation of how the natural world fits together."

Smiley currently lives at the Big Creek Reserve with her husband—Reserve Manager John Smiley—and their two-year-old daughter, Rosie.



Smiley introduces students to the animals of Big Sur with study skins such as this flicker.

In Memoriam

Philip L. Boyd, founding father to UC Riverside and the Boyd Deep Canyon Desert Research Center, died September 9, 1989, four weeks short of his 89th birthday.

A farmer, banker, developer, and legislator, Boyd counted his long service to the University and his efforts to protect the desert as two of his most satisfying life-achievements. UC President David P. Gardner characterized Boyd as "one of the University's most generous benefactors" and said:

Phil Boyd's devotion to the University was expressed in innumerable ways... But perhaps the contribution closest to his heart was his central role in the creation of the Philip L. Boyd Deep Canyon Desert Research Center, an enduring and altogether fitting tribute to this generous friend who gave so much to his community, to his university, and to the land he loved.

Though Boyd was a native of Indiana, he moved to California when he contracted tuberculosis during his junior year at Wabash College. In 1921, he visited the unincorporated resort village of Palm Springs (population: 500) and liked it so well he stayed.

From 1929 to 1938, he was the first manager of Palm Springs' first bank, a Bank of America branch. Boyd was a key member of the committee organized to incorporate the City of Palm Springs, and he served as its first mayor from 1938 through 1942.

In 1945, Boyd was elected to represent Riverside County in the state Assembly. He served two terms and, in 1947, sponsored his most notable legislation: a bill to create a University of California campus at Riverside, which opened in 1954. Later, as a private citizen, he founded and chaired the Citizens University Committee to assist UC's development and community relations.

The following year, more than three decades after poor health had forced him to abandon his studies, Boyd returned to college as a student at UC Riverside. He received his bachelor's degree in 1956.

His senior thesis, which dealt with financing the UC construction program 1956-66, found its way to the desk of Governor Goodwin J. Knight. Impressed with that document, Boyd's legislative record, and his Citizens University Committee support, the governor appointed Boyd to the UC Board of Regents in 1957. Boyd served as a Regent until 1970, the first member to come from inland Southern California.

Boyd's contributions to UCR's development did not end when he completed his term as Regent. He sat on the UCR Foundation board from the time of its creation in the



Phil Boyd, a long-time desert denizen, was amused when he brushed against a cholla during the dedication of the Boyd Deep Canyon Desert Research Center in April 1970.

early 1970s. He and his wife, Dorothy, financed construction of the campus bell tower. In 1983, UCR named its first endowed chair after him: the Philip L. Boyd Chair in Finance in the Graduate School of Management. Three years later, the University awarded Philip and Dorothy Boyd one of their first Founders' Awards.

Along with UCR, Boyd loved the desert environment that had restored his health. For thirty years from 1952, he served on the Palm Springs Desert Museum board. He also recognized the importance of conducting scientific research in an environment safe from interference, and in 1958, he offered approximately 1,500 acres to the University for this purpose. This land became the heart of the Boyd Deep Canyon Desert Research Center, which was gathered into the NRS as one of its first reserves when the System was founded in 1965.

In the years that followed, Mr. and Mrs. Boyd continued to support the reserve with additional donations of land and funds for facilities and equipment. Today the Boyd Deep Canyon Desert Research Center encompasses 15,896 acres and is part of the UNESCO Mojave and Colorado Deserts Biosphere Reserve Cluster. Al Muth, the reserve's resident manager, says simply: "It wouldn't be here without Mr. Boyd."

Boyd is survived by his wife of 63 years, two sons, one daughter, nine grandchildren, and one great-grandchild.

Susan Gee Rumsey, Editor
Natural Reserve System

People *continued*

NRS Champion Bill Mayhew: Retired but not Detached

According to UC Riverside Professor Wilbur (Bill) Mayhew, teaching biology without field trips is like trying to teach hitting without a bat. Mayhew retired last July from a career split between conserving natural areas—the “bats” of his trade—and using them to instruct his students in the natural sciences.

Mayhew has shaped and nurtured the Natural Reserve System from the start. A frequent victim of vanishing field sites, he was involved in the early discussions that led to the formation of the NRS in 1965. As UCR's NRS Advisory Committee Chair and de facto academic coordinator, Mayhew oversees seven reserves and has helped to identify and evaluate numerous potential sites for field use. Though he has seen a number of prime teaching areas replaced with apartment buildings, he is satisfied that “overall, we won more than we lost.”

Mayhew made extremely good use of those victories. Since he became a founding faculty member of UCR in 1954, more than 5,600 undergraduate and graduate students enrolled in his classes. Several have gone on in academia; many others have pursued careers in environmental planning. “I have moles everywhere,” says Mayhew. “Just about every major conservation organiza-

tion and resource management agency employs former students of mine.”

Prior to joining the UCR faculty, Mayhew studied the effects of radiation on living tissues as a staff researcher at the UCLA Medical School. He received his Ph.D. in zoology under Starker Leopold at UC Berkeley in 1953, following five years as a gunner and gunnery instructor in the U.S. Air Force. But his interest in biology dates back to early childhood, which he spent catching small animals in the San Joaquin Valley. “When I go back to Turlock, there’re still people who say ‘Hi, Bugs’ when they see me.”

Mayhew will continue to oversee UCR's reserves until July, when he hopes the campus will hire an NRS Academic Coordinator to take over the day-to-day administration. But he intends to remain personally involved with the program and will continue to push for preservation through the NRS and through such private conservation organizations as The Nature Conservancy. And when he's not “working on land deals,” Mayhew plans to catch up on his reading (“Just going through the books in my library that I haven't read yet would take about ten years”), travel (he and his wife, Corinne, have already been to more than a dozen foreign countries), and visit family (including their nine grandchildren).

“Bill Mayhew devoted his career to saving the land he loves and teaching people to understand and care for it,” says UCR Chancel-

lor Rosemary S. J. Schraer. “Thanks in large part to Bill's efforts, pristine and ecologically important segments of desert, mountain, and coastal habitat statewide have been set aside for teaching and research. California students and faculty researchers a century from now will benefit from his vision.”

Isabelle Kay Coordinates UC San Diego Reserves

When Isabelle Kay was finalizing her master's work in biology at San Diego State University last spring, she wasn't planning to stay in the area after graduation. “This is the only job that would keep me in San Diego when I finish,” she recalls thinking, referring to the post of Academic Coordinator for the UCSD reserves. Fortunately for San Diego, the job opened up just after Kay received her degree, and she began managing the campus's four reserves in early July.

Kay brings to the NRS a classical training in both laboratory and field science, work experience ranging from biochemistry to biological consulting, and familiarity with habitats as diverse as the Sonoran Desert, Hawaiian kipukas, and alpine meadows. She is particularly interested in the role soil plays in natural and reconstructed habitats; her master's thesis examined competition between soil bacteria. She has also published on her investigations of nitrogen fixation by arctic tundra, a study funded by the U.S. Department of Energy.

As Academic Coordinator for the UCSD reserves, Kay develops administrative, academic, and management programs for four sites: Dawson Los Monos Canyon Reserve, Elliott Chaparral Reserve, Kendall-Frost Mission Bay Marsh Reserve, and Scripps Coastal Reserve. She acts as the campus contact for reserve users and as liaison between faculty, campus and NRS administrators, communities surrounding the sites, and state and federal resource agencies. Her diverse responsibilities include coordinating field courses and research, developing community education activities, and monitoring local land-use planning issues.

In addition to getting other researchers more involved in the UCSD reserves, Kay looks forward to applying her own “ecosystem approach to restoration” at these urban sites. As a start, she has been overseeing UCSD's biodiversity group in its efforts to restore a portion of the Scripps Coastal Reserve. “As a consultant, I was mainly dealing in mitigation of destruction,” says Kay. “I was drawn to the NRS because it allows me to work toward conservation in a more constructive way.”



Bill Mayhew looks on while his students identify a pocket mouse they just captured at the Burns Piñon Ridge Reserve as part of a course in field zoology.

Planning Begins *continued from page 1*

even stronger commitment to the goals and objectives of the Natural Reserve System."

This decision marks a change in direction for Samuelsen, who for the last five years has split his time and attention between the NRS and divisionwide activities. As Special Assistant to the Vice President, he was responsible for fundraising, property negotiations, and special projects for the Division as a whole.

More recently, he joined the executive staff of the task force advising the University's President on the selection of new campus sites. Though he will continue to be involved in new campus site selection, Samuelsen has returned on a full-time basis to the NRS directorship, a position he has held since 1974 (see *Transect* 6(2):1).

"I am pleased to be able to devote the majority of my time and energy to the NRS once again," says Samuelsen. Noting that the Director search gave him an opportunity for reflection and evaluation, he adds, "As time went on, I was increasingly attracted to the possibility of continuing my involvement." According to Samuelsen, "We now face the challenge of drawing upon the input we received during this transition and developing a broad consensus on the future direction and needs of the program."

To this end, Vice President Farrell has appointed a Long-Range Planning Steering Committee chaired by UC Riverside Chancellor Rosemary S. J. Schraer to guide the planning process over the next several months. Coordinating this effort are two temporary special assistants to Samuelsen, Henry W. Offen of UC Santa Barbara and Jonellen C. Goddard of UC Davis.

Offen, Professor of Chemistry, oversees the UCSB component of the NRS. As Special Assistant for Academic Planning, he will provide academic input to the steering committee based on discussions with campus and reserve-based faculty and staff from throughout the University.

Goddard, the Assistant Dean for Graduate Studies at UC Davis, is serving as Special Assistant for Administrative and Budgetary Planning. In addition to assembling background material for the committee, she is collecting information and ideas from campus and reserve-based administrators and budget officers.

The steering committee recently met for the first time to review previous plans and proposals and to develop a strategy for obtaining additional input. In June, the committee will present the first phase of the Long-Range Plan to Vice President Farrell for approval and for submission to UC President David P. Gardner.



An existing field channel at SNARL, which recently received NSF funds to expand its experimental stream facilities on Convict Creek.

NSF Grants *continued from page 1*

The new, mid-sized channels will be large enough to simulate the physical, chemical, and biological characteristics of natural streams, yet small enough to allow researchers to conduct statistically valid replicate experiments and to manipulate stream flow parameters easily. They will be equipped with electrical outlets, underwater ports for video cameras, slots for holding drift nets or screens, and flood gates to regulate flow.

This new stream system will greatly enhance SNARL's ability to support work at the cutting edge of stream ecology, a discipline that has progressed through an early descriptive phase into a stage where experiments are used to test well-defined hypotheses. Once SNARL's project is implemented, it will provide one of the most comprehensive set of experimental stream channels in the world.

In addition to funds from NSF and the initial NRS matching grant, SNARL received matching grants of \$43,000 from UC Santa Barbara, which administers the reserve, \$19,000 from other NRS funds, \$10,000 from Inyo and Mono Counties, and \$5,000 in services from Dempsey Construction Company, for a total of \$352,000.

The grants to the Granite Mountains Reserve (GMR) will fund a laboratory, researcher housing, and a student campground. GMR is located in the East Mohave National Scenic Area of San Bernardino County, the most geologically, climatically, and biotically diverse portion of the Mohave Desert. Research use of the reserve has doubled since 1986 and increased more than tenfold since its founding in 1978. The new facilities will provide critically needed facilities in the East Mohave for conducting basic research.

The laboratory will be located in a 12 X 60-foot trailer, and will be equipped with counter and cabinet space, hot and cold running water, refrigeration and freezer space, microscopes, balances, a drying oven, and an IBM-compatible microcomputer with hard disk and printer. It will also house synoptic collections, library materials, maps, aerial photographs, and computer-based monitoring data. A thermal envelope will provide the trailer with passive solar heating and cooling.

Designed to sleep up to six researchers at a time, the residence will consist of a 1,200-square-foot passive solar building with cooking facilities. The campground will accommodate classes of up to 35 students.

GMR received additional matching grants of \$8,000 from NRS funds, \$8,000 from UC Riverside, which administers the reserve, and \$14,000 in equipment and services from the reserve, the NRS, and volunteer labor, for a total of almost \$160,000.

Long-Range Planning Steering Committee Members

- Richard E. Attiyeh, UC San Diego (Dean, Graduate Studies and Research; Campus NRS Administrative Officer)
- Timothy J. Bradley, UC Irvine (Associate Professor of Developmental and Cell Biology; Faculty Manager, San Joaquin Freshwater Marsh Reserve; Chair, UCI NRS Advisory Committee)
- Wilford R. Gardner, UC Berkeley (Dean, College of Natural Resources; Campus NRS Administrative Officer)
- Arthur C. Gibson, UC Los Angeles (Professor of Biology; former Chair, UCLA NRS Advisory Committee)
- Sally J. Holbrook, UC Santa Barbara (Professor of Biological Sciences; Faculty Manager, Santa Cruz Island Reserve)
- Rosemary S. J. Schraer, UC Riverside (Chancellor)
- Michael E. Soule, UC Santa Cruz (Professor of Environmental Studies; Chair, Environmental Studies Board; former Chair, UCSD NRS Advisory Committee)
- Larry N. Vanderhoef, UC Davis (Executive Vice Chancellor; Campus NRS Administrative Officer)

News and Notes

Research

Hastings Gets Grassland Grant

The Hastings Natural History Reservation received a five-year, \$75,000 grant from Dan Lufkin to study the effects of gopher activity and cattle grazing on native perennial grasses. Lufkin owns the Carmel Ranch Company, a cattle ranch located near this central Coast Range reserve.

Reserve Manager Mark Stromberg, who will oversee the project, hopes it will help researchers better understand the role of gophers in maintaining the exotic annuals that now dominate the area's pastures and grasslands. "A single gopher can move a ton and a half of soil per year," says Stromberg. "We think the gophers, by disturbing the soil, are providing ideal germination and establishment sites for introduced annuals, which in turn provide an ideal food source for the gophers." As a result of this synergistic relationship, unusually large numbers of gophers occur in grasslands dominated by exotic species. According to Stromberg, "We have 30 to 40 gophers per acre at Hastings, a density matched only in irrigated alfalfa fields."

By controlling the numbers of gophers and cattle in experimental plots, Stromberg hopes to develop recommendations that will help ranchers shift their ground cover from exotic to native grasses. He is working with staff of the UC Berkeley Museum of Vertebrate Zoology to administer the grant, which will fund a student fellowship.

Researchers Make Good Use of Newest NRS Reserve

The Northern California Coast Range Preserve (NCCRP), which joined the Natural Reserve System on a trial basis last February (see *Transect* 7(2):1), had a very busy first field season in the NRS, with a number of UC investigators undertaking long-term research on the site. This activity is due, in part, to a special grant competition initiated by the UC Berkeley College of Natural Resources, which administers NCCRP. Modeled after the NRS Student Grant Program (see page 8), the Jane McKenzie Research Grant Program awarded two UC Berkeley graduate students grants of \$500 each.

Jennifer Nielsen, Department of Forestry and Resource Management, studied the eating habits of juvenile steelhead trout and coho salmon born in the reserve's creeks and river. She discovered that immature females

who feed near river margins are more likely to develop eggs (which are later resorbed) than are females feeding in the central channel. One explanation, says Nielsen, is that the diets of fish along margins could contain greater numbers of mature insects with high hormone levels. As a result, the fish may be receiving false hormonal cues from their prey. Nielsen will test this and other hypotheses at NCCRP over the next few years as part of her Ph.D. research.

Devin Reese, a doctoral student in the Department of Integrative Biology, studied habitat selection among juvenile fence lizards. Reese built Stonehenge-like arrays of rocks, then introduced young lizards to the centers of the arrays to determine which rock pile features attract the most lizards. In future years, Reese hopes to determine how habitat choice and suitability influence lizard dispersal.

Long-time NRS supporter Jane McKenzie was so pleased with outcome of this special grant program that she has given an additional \$1,500 to fund student research at NCCRP in 1990.

In other research at NCCRP, Michael Parker, UC Davis Department of Air and Water Quality, continued his doctoral studies of the Pacific giant salamander as the keystone species in tributaries of the south fork of the Eel River.

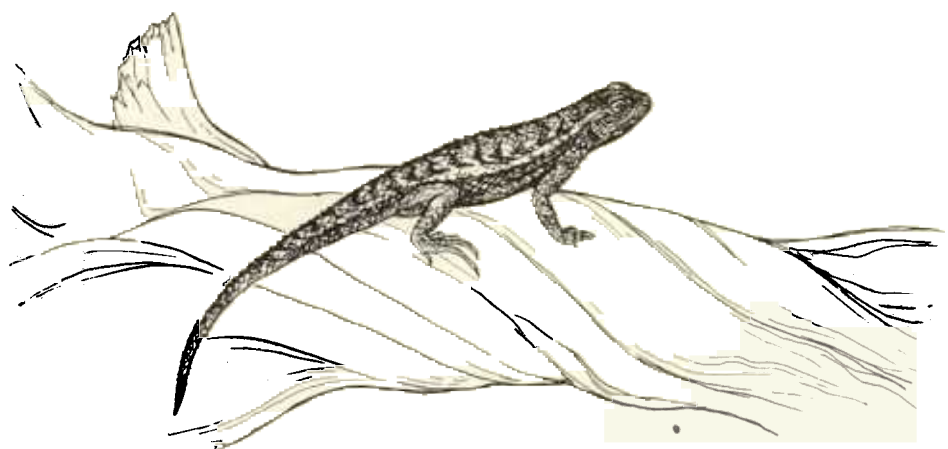
And Mary Power, UCB Assistant Professor of Integrative Biology and Faculty Manager of NCCRP, continued her long-term work on the effects of roach and steelhead trout on river insects and algae. Three undergraduates and four graduate students from the Departments of Geology and Geophysics, Sanitary Engineering, Chemical Engineering, and Integrative Biology participated in the study last summer. Funded

by the National Science Foundation and the California Water Resources Board, this project has also supported the construction of a new outbuilding (designed and built by Reserve Steward Peter Steel) that functions as an aquatic ecology lab by summer and as equipment storage space by winter.

Deep Canyon Shifts Research from Fringe-Toes to Flat-Tails

The Boyd Deep Canyon Desert Research Center has been awarded a California Department of Fish and Game (CDFG) contract to study the population biology of the flat-tailed horned lizard (*Phrynosoma m'calli*), a candidate species for state and federal listing. Under this \$43,000, 18-month contract, Resident Director Allan Muth and colleagues will collect baseline data for long-term studies to provide a basis for management decisions. The project will also evaluate current methods of population estimations and recommend procedures for monitoring populations.

The flat-tailed horned lizard lives only in areas of fine sand, sharing the habitat with fringe-toed lizards. Deep Canyon staff recently completed the fifth and final year of a CDFG-funded population study of the Coachella Valley fringe-toed lizard (*Uma inornata*) (see *Transect* 4(2):1,4-5). As the team anticipated, the *Uma* population crashed in 1989, a year of very low rainfall; Muth plans to continue monitoring this state and federally listed species. Both lizard studies are based at the California Nature Conservancy's Coachella Valley Preserve.



Western fence lizard, *Sceloporus occidentalis*, one of the organisms under study at NCCRP.

Management and Use

Earthquake Grazes NRS Sites

The 7.1-magnitude Loma Prieta Earthquake of October 17 shook up a few NRS sites, but caused only minor damage to reserve resources and facilities. None of the four sites nearest the epicenter—Año Nuevo Island Reserve, Hastings Natural History Reservation, Landels-Hill Big Creek Reserve, and Bodega Marine Reserve—have reported major damage or injury from the quake, and all are operating normally.

Granites Gets Lights and Flights, Loses Bullets

The Granite Mountains Reserve (GMR) has substantially upgraded two of its housing facilities with the help of tireless volunteers from all over the state. Last spring, students and staff from UC Santa Cruz reroofed the cabin and bunkhouse at Dorners Camp and installed a covered breezeway between the two buildings. Volunteers from UC Irvine helped install a photovoltaic electrical system at Dorners in the fall, substantially reducing the fire hazard from coleman lanterns and kerosene lamps. This watertight, well-lit facility located in the northeast part of the reserve can accommodate 25 and offers users a kitchen and work area. It has been used by field classes from a variety of institutions.

In the south end of the reserve, UCR Professors Nickolas Waser and Mary Price partially renovated the historic Staples Ranch House by providing water from the Granite Cove Spring, adding a small photovoltaic electrical system that provides lighting and an outlet for portable computers, and installing a privy and a propane refrigerator. Researchers working on site occupied the Staples House throughout the spring field season.

In addition to their work at Dorners Camp, volunteers from UC Irvine delivered and stacked two and a half cords of avocado wood donated by the South Coast Agricultural Field Station. The wood will be used to heat the reserve office and managers' house over the next two winters.

GMR also received help from two public agencies. The U.S. Bureau of Land Management recently established a no-shooting buffer zone around the reserve as part of the East Mohave National Scenic Area Management Plan. This new designation has helped

to keep hunters at a safe distance from the reserve. Meanwhile, the California Department of Fish and Game continues to provide flight time for reserve research and management activities in conjunction with the big-horn sheep study begun in 1987 (see *Transect* 6(2):2).

Bodega Adds Boundary Buoys, Topo Maps, Greenhouse Space

Though the Bodega Marine Reserve (BMR) is bounded by a harbor on one side and an ocean on the other, it faces trespass problems as serious as those of terrestrial stations. Because commercial fishers and abalone divers have recently taken many potential research subjects from reserve waters, BMR installed four state-surplus marker buoys at its 1,000-foot ocean boundary. It is hoped that raising the site's visibility will deter trespassers.

BMR continues to expand its monitoring program (see *Transect* 4(1): 2), and has added two digital datalogger microclimate stations and initiated periodic censuses of littorine snail populations on the rocky intertidal

coast. It also completed topographic maps of the reserve with ten-foot and two-foot contour intervals. Coupled with the site's gridded aerial photomap, these new topo maps offer reserve users a comprehensive resource of geographic information.

Finally, the reserve constructed a second greenhouse, bringing the total greenhouse space available for the study of terrestrial plants to 216 square feet. The space is currently in full use by three different research projects.

Events

Reserve Faculty, Managers Meet *En Masse* for First Time

The faculty who guide the NRS and the staff who manage it met as a group for the first time in October, when the James San Jacinto Mountains Reserve hosted both the sixth annual NRS Reserve Management Workshop and the fall meeting of the University-wide Faculty Advisory Committee. In joint sessions, the 50 participants discussed short- and long-range planning for the NRS, environmental monitoring, research introductions of novel genotypes, and overall reserve use.

Workshop participants also conferred about fundraising, job classifications, and agency-funded research. James Reserve Resident Director Mike Hamilton demonstrated his geographic information system and conducted tours of the reserve, its facilities, and nearby research sites on Mount San Jacinto and at Oasis de los Osos.

Retreat to NCCRP

Transect readers interested in the teaching and research potential of the Northern California Coast Range Preserve (see page 6) are invited to the reserve's second annual spring retreat. Planned for the second weekend in April, the retreat will include a Saturday evening slide show of ongoing projects, followed by a campfire discussion of future directions for the reserve. Contact Margaret Race at the UC Berkeley College of Natural Resources, (415) 643-8999.



Mark Stanback climbs a valley oak to examine the nest of an acorn woodpecker. His climb was part of a demonstration on research at the Hastings Natural History Reservation during the reserve's recent open house celebrating the completion of new laboratory and housing facilities.

Sarah Steinberg Gustafson

Opportunities

NRS Student Grants Fund Reserve-based Research

The NRS Student Research Grant Program provides grants of up to \$2,000 each to UC students for research on NRS reserves. The 1989-90 winners will be announced in the spring *Transect*; for information on next year's competition, contact your campus NRS representative.

Nature Conservancy Funds Management-related Research

The California Nature Conservancy (CNC) offers grants of up to \$20,000 for work on natural areas through its new Wild California Research Program. Though these grants are not limited to research on CNC preserves, they are designed to provide information on conservation and management.

The program is divided into three areas: 1) management-related investigations, such as the use of prescribed burning, control of invasive exotic species, and the effects of livestock grazing on natural communities; 2) preserve-design projects that can guide decisions on the optimal size and shape of natural areas for maintaining habitat integrity; and 3) studies that will answer questions regarding the taxonomy of rare species.

A steering committee reviews prospectuses twice a year, then requests more detailed proposals on selected projects. CNC accepts applications the year round, but they must be submitted by April 15 to be considered at the spring meeting. To receive CNC's standard two-page prospectus form, or for more information, contact the Stewardship Coordinator, California Nature Conservancy, 785 Market Street, 3rd floor, San Francisco, CA 94103; (415) 777-0487.



Publications

New Brochure Off NRS Press

The NRS recently produced a brochure for the Dawson Los Monos Canyon Reserve. The publication describes the site's natural resources and contains information on access, facilities, and use.

Also available are brochures for Año Nuevo Island Reserve, Bodega Marine Reserve, Boyd Deep Canyon Desert Research Center, Granite Mountains Reserve, James San Jacinto Mountains Reserve, Jepson Prairie Reserve, Landels-Hill Big Creek Reserve, Motte Rimrock Reserve, Pygmy Forest Reserve, San Joaquin Freshwater Marsh Reserve, Santa Cruz Island Reserve, Sierra Nevada Aquatic Research Laboratory, and Valentine Camp. Contact the systemwide NRS office for free copies.

Environmental Poll Available

"The issue of the environment has by now become an explosive and decisive cutting edge in mainstream politics," writes pollster Louis Harris in *The Rising Tide: Public Opinion, Policy, and Politics*. Released last spring, this report is the most comprehensive study of trends in environmental public opinion conducted to date. Americans for the Environment, the National Wildlife Federation, and the Sierra Club sponsored the report. It is available for \$10.00 from Americans for the Environment, 1400-16th Street, NW, Washington, DC 20008.

Free Subscription

tran • sect (tran'sekt), *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 Reserve System is also a transect. It encompasses a cross-section of California's natural diversity in a system of natural areas and field stations specifically reserved for teaching and research. Recognizing this, we have chosen to call our award-winning newsletter the *Transect*. For back issues or a free subscription write or call the systemwide NRS office.

If you're already a subscriber and wish to remain one, don't forget to send us the postcard enclosed in this issue.

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