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Systemwide Office Column:**State Agencies Find NRS A Valuable Resource**

Among the many research projects based on reserves in the past five years are 42 studies specifically designed to provide state agencies with the information they need to manage California's natural resources wisely. These programs range from the use of reserves' pristine habitats for baseline monitoring to sponsored research projects.

The list of agencies that use the reserves includes almost all of the natural resource managers of the state: Department of Fish and Game, Office of Appropriate Technology, Dept. of Parks and Recreation, Joint Committee on Aquaculture and Fisheries, Dept. of Health, State Water Resources Control Board, Regional Water Quality Control Boards, California Air Resources Board, Coastal Conservancy, Dept. of Food and Agriculture, Division of Mines and Geology, Dept. of Health, and Sea Grant College Program, a joint state and federal project.

The significance of the NRS to these agencies, and to the citizens of California, can be seen with a glance at some reserve-based research programs, which include studies of:

- elephant seal and sea lion biology (Año Nuevo Island Reserve)
- radionuclides in the Gulf of the Farallones (Bodega Marine Reserve)
- paralytic shellfish poisoning (Bodega Marine Reserve)
- biology of endangered species (Philip L. Boyd Deep Canyon Desert Research Center,

continued on page 5

**Spotted Owl Chick Saved at James Reserve**

This two-week old spotted owl, shown here with its mother, made last Memorial Day weekend one to remember for students and researchers at the James San Jacinto Mountains Reserve. A field zoology class from Santa Monica City College discovered the chick on the Reserve's nature trail on Saturday, May 23. Though unharmed and alert, this small member of a species of special concern to the state was too young to survive out of its nest for long.

Luckily, mom and dad were nearby, bringing food and tending to the chick at regular intervals. The group decided to let things be overnight, hoping the adults would be able to move the chick back to the nest. But the next morning the owl had only moved farther down the slope towards the creek. Since its chances of surviving where it was were next to none, it was time to get the chick off the ground.

Unable to find the owl nest, the group reinforced what appeared to be a squirrel's nest in a canyon live oak nearby. The nest

was a good 12 feet off the ground, but easily viewed from a rock higher up the slope about 20 feet away.

The chick was moved to its new home Sunday afternoon. Within two hours, its mother joined it there. Reserve Director Dr. Mike Hamilton monitored the situation for the next 10 days, then left for a six-week research trip to Venezuela. The nest was empty when he returned. In early August, another group of reserve users confirmed the chick had fledged when they were strafed at close range by a baby owl. Since then, Hamilton has seen the young owl on the Reserve a number of times, most recently in mid-October.

Don't forget...

You can help reverse the processes that are driving some 252 of California's native plant and animal species toward extinction by filling in Line 90 on your state tax return.

Reserve Highlights

NSF Tours the NRS

"Unique in the nation." "Exceptionally diverse." "A resource of national significance." "The caliber and commitment of reserve-based staff is most impressive." Such were the phrases used by Dr. Jim Edwards this September to summarize his impressions of the Natural Reserve System for Dr. Kenneth Farrell, UC Vice President—Agriculture and Natural Resources.

Edwards directs the National Science Foundation's (NSF) Biological Research Resources Program, the only federal grant program to fund both facility and equipment improvements at field stations. He had just completed a tour of 10 NRS sites in as many days.

As program director, Edwards regularly visits marine laboratories, field stations, and natural history museums, so his characterization of the NRS as a national role model takes on added significance. He did, however, identify areas in need of improvement, calling for (1) the provision of an adequate, dependable budget for operations, maintenance, and program development, (2) increased staffing, particularly at the reserve level, (3) increased opportunities for staff professional growth, and (4) the development of reserve-based instructional programs, currently lacking due to inadequate on-site housing and dining facilities.

Nonetheless, the NRS has fared well in competitions for facilities and equipment improvement grants at the national level. Recent NRS budget augmentations from within the University have made the reserves even more competitive. Such funding is particularly significant now, for the Reagan administration is placing increased emphasis on the importance of "research centers" to maintain the nation's leadership role in science and technology. NSF has been given the lead role at the federal level to fund the development of new research centers, including biological field stations.

Several recent changes to the facilities and equipment grant programs are particularly significant to the NRS. First, relatively young and undeveloped sites can now qualify for NSF improvements as long as they can document the potential for research productivity. Second, NSF grants must be matched dollar for dollar by the station's parent institution, but the value of instructional improvements can now be used to match research improvements. And third, NSF is placing increased emphasis on computerized database development, an area where the NRS is making rapid strides.

*Jeff Kennedy, Environmental Planner
Natural Reserve System*



Dr. Richard Karban, UC Davis, studies plant-insect interactions at the Bodega Marine Reserve and Laboratory, which recently received a \$45,000 NSF facilities and equipment improvement grant.

Hastings, Bodega Get NSF Facilities Grants

The National Science Foundation has awarded grants totalling \$145,000 to two NRS sites through its 1987 Biological Research Resources Program.

The **Hastings Natural History Reservation** received \$99,982 to more than double the size of an existing building, providing the site's first modern wet laboratory. The funds will also be used to purchase lab and field equipment, as well as to upgrade the lab's septic system. These additions will help meet the special needs of field research with a strong laboratory component. The Berkeley campus and the systemwide NRS office have also increased the site's funding base as part of its overall development.

Located in upper Carmel Valley, the 1,998-acre Hastings Reservation includes a complete representation of Mediterranean habitats characteristic of the central Coast Ranges. The site was founded in 1937 and is managed by the Museum of Vertebrate Zoology on the Berkeley campus. More than 240 publications have resulted from studies at the Reservation, including 43 produced during the last five years.

Existing facilities, which are now filled to capacity during the March through August field season, include a 600-square-foot dry lab/office, a library, synoptic collections, microcomputers, and residences for permanent and visiting researchers. The 671-square-foot addition will be divided into an office and a wet lab. A hazardous waste storage locker is planned as well.

The NSF grant will also fund an Omnidata digital recording weather station. In addition to providing the Hastings Reservation with a modern monitoring system, this

weather station will allow for comparative studies with other field stations.

These improvements will greatly increase the research capabilities of the Reservation, which is best known for work in vertebrate ecology. Ongoing studies span a spectrum of topics in plant and invertebrate ecology as well. But traditional natural history and field ecology studies now need experimental approaches to answer the more focused questions arising in modern field work on behavior, population dynamics, and adaptation. The expansion will provide the facilities that such work requires.

The second grant went to **Bodega Marine Reserve**, which received \$45,000 to establish a grid system, develop portable microclimate datalogger monitoring stations, and renovate an avian research lab. This grant was matched by \$4,500 each from the Davis campus and the systemwide NRS office.

Located on Bodega Head, this 326-acre reserve encompasses a variety of coastal habitats, from subtidal areas to active dunes. Complementing the site's natural diversity is the Bodega Marine Laboratory, built on the Reserve in 1966. Both the Reserve and the Lab are administered by UC Davis. Together they support a variety of studies on marine, intertidal, and near-shore terrestrial systems.

The NSF grant will fund a professionally surveyed, permanently marked grid covering the entire upland portion of the Reserve. It will be staked at 100-meter intervals and specially marked at 200-meter intervals for aerial photo-mapping. The grid will enhance researchers' abilities to map changes in vegetation and topography over time. It

Collaborative Programs

will also aid in planning long-term research and monitoring, serve as a reference for large-scale samplings of habitats or populations, and standardize resulting data sets.

The grant and matching moneys will also fund four portable microclimate stations. Populations of most plants and animals vary markedly over short distances on the Reserve, presumably in ways related to its pronounced microclimatic differences. Two of the weather stations will be used to gather background data defining microclimatic trends, and two will be available for researchers to use at specific study sites.

The grid system and microclimate monitoring capability will enhance the site's terrestrial work, including several studies of plant physiological ecology and ecological genetics, as well as plant and insect community ecology.

Researchers studying behavior, ecology, and physiology of birds will similarly benefit from the renovation of the avian research laboratory. The existing temporary aviary will be converted into a permanent lab meeting modern animal care guidelines, with a new, sloping concrete floor with drains, four separate bird holding rooms, and observation ports for recording behavioral data from outside the holding rooms.

Bodega Marine Laboratory/Reserve is one of the few sites nationwide to receive NSF grants for both terrestrial and marine station facilities improvement.

*Sarah Steinberg Gustafson, Editor
Natural Reserve System*

Fusari Coordinates Santa Cruz Reserves

At UC Santa Cruz, all NRS roads lead to Dr. Margaret H. (Maggie) Fusari, the Reserve System's newest campus-based Academic Coordinator.

"Campuses are often unaware of the value of their reserves," Fusari says. This should not be a problem at UC Santa Cruz. Since June 1987, Fusari has been applying her special competence and energy to make sure not only that her campus is aware of its reserves, but that the reserves best serve the teaching and research purposes for which they were intended. "It is important for the future of the reserves," she says, "that they be utilized appropriately."

Fusari coordinates activities for four reserves: Año Nuevo Island, Landels-Hill Big Creek, Younger Lagoon, and a campus reserve not within the NRS. She acts as liaison between the Santa Cruz campus, the reserve users, the site managers, funding agencies, and the systemwide NRS office. Her di-

verse responsibilities include developing programs and facilities, budgeting, fundraising, promoting research use of reserves, integrating reserves with campus objectives, and a feasible degree of public service.

Dedicated to Drylands

The Dry Lands Research Institute (DLRI) was established by the UC Regents in 1964 to create a center for agricultural and environmental research, education, and training for scholars working in arid and semi-arid lands. Located on the Riverside campus, the DLRI encourages association and interaction among investigators within the UC system and with local, national, and international research centers.

The main goals of the Institute are to encourage long-term, integrated research and improve the management of the often fragile and abused arid lands. As Gaafar Karrar and Daniel Stiles wrote in a recent article in the *Journal of Arid Environments*, "Dry lands are presently under stress to a degree perhaps unprecedented in history. High human and livestock population have resulted in 75 percent of all the productive land within the world's dry lands becoming desertified to some extent. The rate of desertification is increasing and, if present trends continue, by the year 2000, the situation will have become a global catastrophe."

The DLRI places special emphasis on applying the latest scientific advances to understanding, adapting, and improving traditional agricultural systems, as well as on

working with more resource-intensive production systems. Another priority is training that will increase the ability of other countries to study and develop dry lands. As part of its education program, the Institute publishes a quarterly newsletter called the *Drylander* and sponsors lecture series, workshops, and conferences on dry lands research and management.

The DLRI is in an environment suited for basic and applied research addressing the challenging problems facing the inhabitants of dry lands. It is centrally located in the dry interior of Southern California in the transition zone between sub-humid and semi-arid areas. Extremely arid low desert, high desert, dry forest, and shrub lands are all within easy reach. The DLRI makes use of UCR's 615-acre field experiment station and the 835-acre Moreno Ranch site within five miles of campus. The University's 37-acre Botanic Gardens maintain an extensive collection of dry land plant species from



The Granite Mountains Reserve is one of the NRS sites used by the Dry Lands Institute.

verse responsibilities include developing programs and facilities, budgeting, fundraising, promoting research use of reserves, integrating reserves with campus objectives, and a feasible degree of public service.

To this complex position she brings a 20-year background in teaching and research, as well as considerable administrative experience. For three years, she was in charge of curriculum design and management for Prescott College, a private, four-year institution in Arizona. Fusari maintains active status as a researcher, and specializes in zoology. Currently she is working with the Department of Fish and Game, the Bureau of Land Management, and Reserve Manager Dr. Philippe Cohen to establish a program to monitor bighorn sheep at the Granite Mountains Reserve.

With support from a committee of faculty, staff, and students, Fusari is compiling

a reserve-use history and projecting likely future needs. Her current concerns include site development for new lab facilities at Big Creek, creation of interpretive overlooks to provide secure access to Younger Lagoon, a resource inventory at Año Nuevo State Reserve in cooperation with the Department of Parks and Recreation, and development of a Field Studies Center at UCSC.

Fusari received her Ph.D. in Biology from UC Los Angeles. She first came to the Santa Cruz campus in 1980 to complete her dissertation and to lecture for the Departments of Environmental Studies and Biology. She still enjoys lecturing, particularly on field methods, but says she finds the position of Academic Coordinator "more satisfying than teaching alone could ever be."

*Susan Rumsey, Editorial Assistant
Natural Reserve System*

Collaborative Programs *continued*

around the world. Additional opportunities are available at field stations in the Mojave Desert, the Imperial Valley, and the southern San Joaquin Valley.

Research is also linked to the NRS, particularly the Philip L. Boyd Deep Canyon Desert Research Center, the Sacramento Mountains Reserve, and the Granite Mountains Reserve (see *Transect*, 5(2):3). This reserve is one of the most valuable for dry lands research, as it includes a remarkable variety of dry land ecosystems and environments. There are hot dry slopes to perennial springs, lowland cholla/yucca dominated bajadas, and juniper/pinyon peaks. Both pristine and poorly managed areas are available for research.

Scholars associated with the Institute during the past 20 years have improved the understanding and management of dry lands. For more information, or for a subscription to the *Drylander*, contact the DLRI at the University of California, Riverside, CA 92521, (714) 787-5318.

*Wesley M. Jarrell, Director
Diana W. Freckman, Associate Director
Dry Lands Research Institute*

Conserving California's Hardwoods

Statewide issues of oak conservation recently prompted the California Department of Forestry and Fire Protection and the UC Division of Agriculture and Natural Resources to create a program of research and education on hardwoods enhancement, protection, and management.

What does the Integrated Hardwood Range Management Program (IHRMP) have in common with the Natural Reserve System? Though their conservation goals are similar, the Hardwood Program focuses on the management and economics of resource use as the primary means of promoting oak conservation. Thus, the applied research and educational programs conducted by the Hardwood Program for resource management on multi-use lands are complementary to the more basic research programs supported by NRS reserves.

The Natural Resources Program of Cooperative Extension oversees the IHRMP, which has four major goals: (1) improve oak regeneration, (2) maintain habitat diversity for wildlife associated with oaks, (3) demonstrate the consequences of hardwood rangeland conversion to urban and intensive agricultural developments, and (4) develop feasible alternative manage-

ment strategies for hardwood range use. Six regional specialists and a number of county-based advisors across the state carry out these goals, supported by faculty research at state and private universities.

What is most exciting about the program is that it allows Cooperative Extension to develop a new constituency without abandoning traditional clientele. Population shifts from cities to rural areas have produced new problems for hardwood range resources. New demands have been placed on the University to solve problems involving quality of life and aesthetics while maintaining the state's economic strengths.

As with many natural resource issues, the ultimate goal of the Hardwood Program is to make oak conservation economically viable on private lands. The challenge is to create management options that are biologically sound, yet maintain the economic and cultural goals of the landowners. Lands serving the dual purposes of economic return and conservation vary in quality of resources, but all provide opportunities to augment the species and habitat conservation carried out on natural reserves.

The task of integrating biological conservation into urban and agricultural developments will undoubtedly bring the NRS and Cooperative Extension closer together as we prepare for the next century.

I'd welcome the opportunity to discuss these issues with *Transect* readers. Please contact me at the Dept. of Soils and Environmental Sciences, University of California, Riverside, CA 92521, (714) 787-5115, or your county Cooperative Extension Office.

*Tom Scott, Natural Resource Specialist
Integrated Hardwood Range Management Program*

Hardwoods Work at Hastings

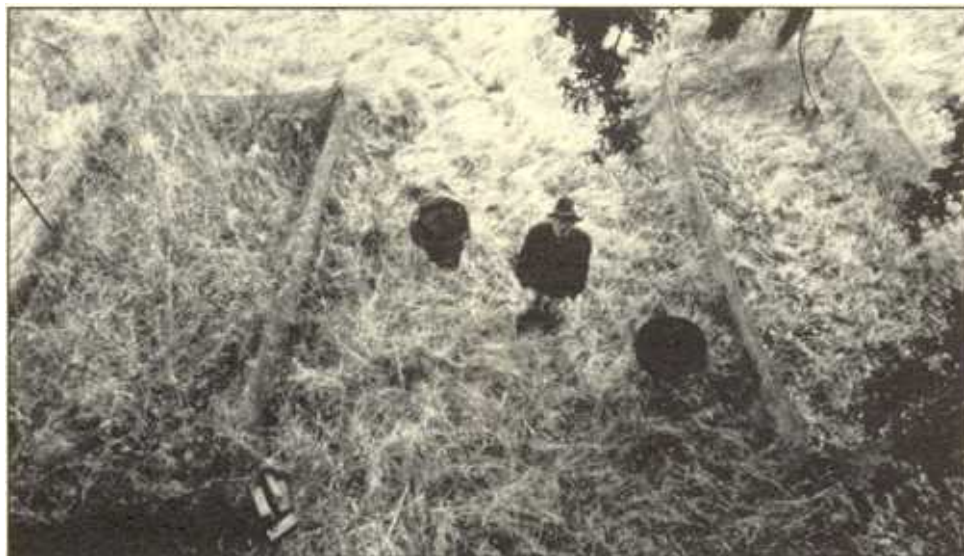
The IHRMP is supporting two new studies at the Hastings Natural History Reservation. Both projects involve planting and monitoring blue oak seedlings in wildlife/livestock exclosures to study several aspects of regeneration success.

Dr. John Menke and colleagues from UC Davis have constructed large exclosures at Hastings, at the Hopland and Sierra Foothill Range Agricultural Field Stations, and at Fresno State's San Joaquin Experimental Range. They're comparing seedling success in ungrazed areas to that in places with a long history of livestock use. In addition, Dr. Timothy Plumb, California State Polytechnic University, has built several small exclosures around individual trees or seed spots. His regional study also includes a number of sites in San Luis Obispo County.

Earthwatch Visits Bodega

Are you a field scientist in need of funding and field teams for your reserve-based research? Or perhaps just an individual in search of adventure? In either case, Earthwatch can help.

A non-profit organization, Earthwatch sponsors field research around the world in order to expand our knowledge of the earth and its inhabitants and to increase public understanding of science. Since it was



Dr. Jim Griffin, Resident Ecologist at the Hastings Reservation, stands between two wildlife exclosures being used in studies of oak regeneration.

founded in 1971, Earthwatch has mobilized 950 projects, providing researchers with nearly \$9 million and more than 15,000 volunteer field assistants.

Eight such hardy souls from all over the U.S. spent two weeks at Bodega Marine Reserve last March. Ranging in age from 18 to 77, these participants helped Reserve Manager Dr. Peter Connors and colleagues in an ongoing study of wintering shorebirds.

The goal of the project was to track the movements of different segments of local dunlin populations and to investigate differences in weights of the birds between these sub-populations. This entailed a major trapping effort at night in salt marshes with mist nets, as well as all-day watches by volunteers distributed at key points around Bodega Harbor.

Though hampered by rains more persistent than usual, the project achieved results that can be obtained only with large numbers of people working in close coordination. The Earthwatch volunteers were extremely enthusiastic about their experience, and the investigators greatly appreciated interacting with these interesting people.

For information on joining an expedition or applying for a grant, contact Field Representative Nonna Cheatham at P.O. Box 2101, Walnut Creek, CA 94595, (415) 934-7970. Full proposals must be submitted 10 to 12 months before the project begins.

UREP Supports Field Work

Within the University is a similar program dedicated to matching people from all walks of life with scholars in need of assistance. The University Research Expeditions Program (UREP) provides support specifically for UC research in the natural and social sciences, while promoting public involvement and understanding of the University's research role.

Faculty and staff research projects from any UC campus are eligible for full or partial funding through UREP. Graduate students may receive support as assisting members of the staff and in some cases, as independent field directors. Researchers generally receive funds for travel expenses, staff and participant field costs, and all or part of research expenses.

Proposal deadlines are March 25 for projects between November 1988 and April 1989 and September 16 for projects between May and October 1989. For information on applying, or for a catalog of 1988 expeditions, contact UREP, University of California, Berkeley, CA 94720, (415) 642-6586.



Desert bighorn sheep, a state-listed rare species, are the subject of a long-term monitoring and research program sponsored by the Dept. of Fish and Game at the Granite Mountains Reserve.

State Agencies *continued from page 1*

Granite Mountains Reserve, Kendall-Frost Mission Bay Marsh, and Valentine Camp)

- mosquito and encephalitis control (San Joaquin Freshwater Marsh Reserve)
- coastal and island crustal land deformation (Santa Cruz Island Reserve)
- sediment transport and beach protection (Scripps Coastal Reserve)
- high-elevation watersheds, including snow chemistry and the sensitivity of montane lakes to acid precipitation (Sierra Nevada Aquatic Research Laboratory)
- earthquake instrumentation for Long Valley (Sierra Nevada Aquatic Research Lab)

In addition, the Bodega Marine Reserve manages the Bodega Marine Life Refuge for the Department of Fish and Game and an Area of Special Biological Significance for the Water Resources Control Board. The waters surrounding the Año Nuevo Island, Santa Cruz Island, and Scripps Coastal Reserves are also Areas of Special Biological Significance.

As well as providing the use of field laboratories with equipment and trained personnel, the NRS supplies state agencies with the principal product of the University—knowledge. Most of the reserve-based research is designed to give state agencies the information necessary for developing sound management and policy.

This research also contributes to the knowledge used by state heritage agencies for their public interpretation activities. In this sense, the reserves provide an important, though indirect, service to all of the citizens of the state.

In some cases, reserve activities benefit the public more directly. Docents for the interpretive program at Año Nuevo Island State Park have been trained by Santa Cruz

campus faculty for more than a decade. Much of the course is based on knowledge gained from research at the Año Nuevo Island Reserve.

During their winter breeding season, elephant seals may abandon their beaches if disturbed. The 150,000 annual public visitors must be accompanied by trained docents to protect the breeding populations. Thus, this docent program is vital to the State Park's seal management objectives.

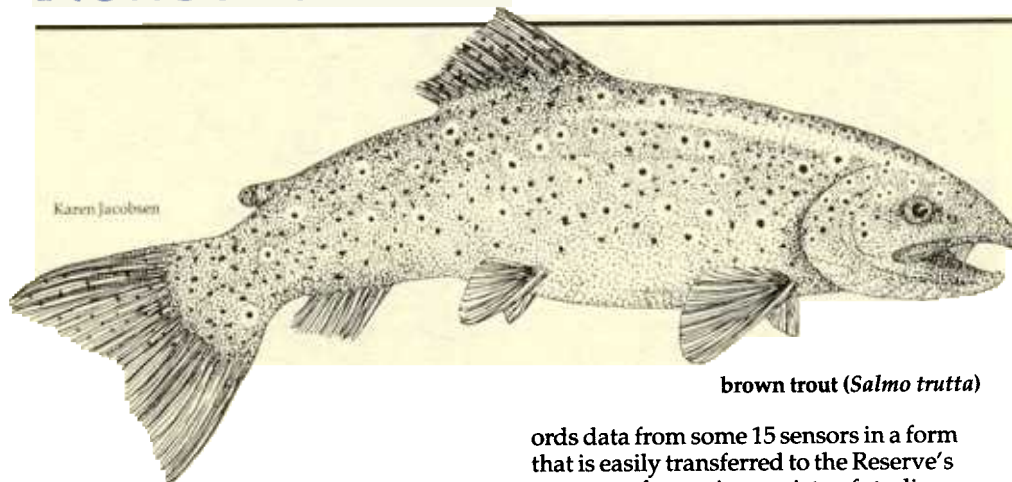
On a broader scale, the University provides state agency scientists with an enormous pool of diverse expertise. For example, the *Directory to Expertise and Facilities Related to Wildlands* (Wildlands Resources Center, Report # 8, December 1985) includes 780 academics involved with wildlands. They work in 161 units on 8 campuses and in 35 county offices of cooperative extension. The University's Water Resources Center also lists approximately 275 academics with expertise in water-related issues.

The agencies may also gain access to graduate students for research projects. The University benefits as well through interaction with agency personnel whose experience can provide students—and faculty—with a real-world pragmatism.

As the pressures on natural resources increase, applied ecology will become even more significant. Our major reserves can become centers for in-service training of agency personnel, providing the latest scientific methods to address problems of fire ecology, endangered species management, restoration ecology, etc. In this context, the NRS may play a key extension role, meeting the rapidly growing need by resource management agencies for guidance regarding the care of our natural heritage.

C. Ronald Carroll, Associate Director
Natural Reserve System

News and Notes



brown trout (*Salmo trutta*)

Announcements

SNARL Awarded Damages; Adds Monitoring Network

The Sierra Nevada Aquatic Research Laboratory (SNARL) will receive \$4,175 in an out-of-court settlement from Convict Lake Resort, Inc. to cover damages resulting from an illegal damming of Convict Creek upstream of the Reserve.

According to the resort's owner, Al Bentley, the combination of accumulated sediment near its docks and last year's low precipitation were causing boats to hit bottom. Though the U.S. Forest Service previously denied permission to do so, on March 28 the resort dammed the lake's outlet.

The downstream flow in Convict Creek dropped from 16 to 3 cubic feet per second before the Department of Fish and Game discovered the dam and ordered its removal on April 1. As a result, an estimated 75 adult brown trout and an entire age-class of some 10,000 emergent hatchlings died in SNARL's 3,600-foot portion of the creek alone. Each of the adults that died had been weighed, measured, and marked for identification in a study of the effect of set stream conditions on native trout growth. The lost research time and reliability is impossible to quantify, as is the impact on the stream's insect and algal communities.

Bentley was cited with violating the terms of his special Forest Service use permit and for obstructing the natural flow of a stream protected by the Dept. of Fish and Game. In addition to the money to be paid to SNARL, Bentley was fined \$1,000.

Meanwhile, SNARL installed a stream monitoring network consisting of in-stream instrumentation funded by the Southern California Edison Company that records discharge in three experimental stream channels and water temperature in two. In addition, a weather station was funded by the Dept. of Fish and Game and the systemwide NRS office. This equipment rec-

ords data from some 15 sensors in a form that is easily transferred to the Reserve's computer for use in a variety of studies.

Deep Canyon Adds Facility

The Philip L. Boyd Deep Canyon Desert Research Station recently completed a remote housing and laboratory facility at Agave Hill. Though only a mile due west of Reserve headquarters, it is half an hour away by car. Located at an elevation of 2,800 feet, this facility is more convenient to study sites in the upper part of the canyon. Researchers began using the facility in September.

The new building consists of a 400-square-foot shipping cargo container modified into an air-conditioned "vandal-proof" research facility. The dorm section contains bunk space for four and a bathroom with composting toilet. The kitchen/lab area is equipped with a refrigerator and microwave oven, a long bench, and cabinets.

Funding for the Agave Hill facility came from various donors and from campus and NRS funds. Mr. and Mrs. Boyd contributed toward interior furnishings and the planned construction of a deck to protect the dirt pad supporting the building.

Coast Cracks Down on TBT

On September 11, Governor Deukmejian signed a bill regulating the use of tributyltin (TBT), a highly toxic paint additive used to protect boat hulls from fouling organisms (see *Transect* 5(1):3). The bill takes effect January 1, 1988.

Introduced by Assembly Member Daniel Houser, Bill # 637 allows only "slow-leaching" paints to be sold or used—that is, those that release no more than 5 micrograms of TBT per square centimeter per day. It also bans completely the use of TBT-containing coatings on craft less than 25 meters long, as well as on fish capture nets, culture pens, or other items intended to be submerged in water. Aluminum vessel hulls are excluded because they are corroded by copper, the less toxic alternative to TBT. Violations of the prohibitions would be a misdemeanor.

In order to protect the entire Pacific

Coastline of America, Alaska, Washington, and Oregon have passed similar—and, in some cases, more restrictive—bills. Legislation at the federal level has made it through the House of Representatives and is now being considered by the U.S. Senate.

Bull Seals—A Weighty Subject

At the Año Nuevo Island Reserve, biologists have achieved the heretofore impossible: they've weighed adult elephant seal bulls. UC Santa Cruz Professor Burney Le Boeuf and colleagues weighed a dozen bulls this past summer; the largest tipped the scales at almost two tons. The researchers expect that record to be broken in the next month or so as seals return to Año Nuevo for the breeding season at their full winter weights.

Before last summer only females and immature males were weighed because available equipment could not handle the much larger adult males. Now the bulls can be weighed passively using a 4-by-16-foot aluminum platform set on two pressure-sensitive weighbars. The device is disguised with sand and placed in a location the animals are likely to cross.

A more comprehensive method requires that a bull be immobilized with drugs, then rolled onto the platform by eight to ten strong people. During the course of such an examination, the seal is also measured for length, girth, and blubber thickness, and a blood sample is drawn.

The breeding season at Año Nuevo runs from early December through mid-March, during which time the seals fast. Le Boeuf hopes to discover their metabolic cost of breeding by analyzing how much energy they burn up during the course of a season.

Upcoming Events

Davis to Host Riparian Meeting

UC Davis University Extension has issued a call for papers for the Second California Riparian Systems Conference scheduled for September 22 through 24, 1988 on the Davis campus. Abstracts for spoken and poster sessions are due March 15.

Like its 1981 predecessor, this conference will provide a technical update for professional resource managers and will seek to broaden public appreciation of riparian habitats by strengthening communication between people interested in their preservation. It will consist of invited lectures and panels, poster sessions, discussions between resource management professionals and policy makers, and public lectures and displays. NRS Associate Director Dr. C.

Ronald Carroll will be part of a panel discussing relationships between aquatic and terrestrial elements of riparian systems.

In addition to UC Extension, co-sponsors include the UC Davis Institute of Ecology and the Water Resources Center, which is part of the Division of Agriculture and Natural Resources. Registration for the three-day conference and its proceedings is \$70. Reduced rates for the public component alone may be available. For more information, contact Dr. Dana Abell, Riparian Conference Coordinator, University Extension, University of California, Davis, CA 95616, (916) 752-3098.

Enjoy Jepson Prairie This Spring

Docent-led public tours of the Jepson Prairie Reserve will be held Saturday and Sunday mornings from February 28 through May 1. Each tour starts at 11 a.m. and lasts 60 to 90 minutes.

Volunteer docents begin training January 20 on the Davis campus, which manages the site. Training requires six Wednesday evenings and one or two field trips to the Reserve, located 20 miles south of campus.

Late March and early April are the best time of year to observe the diverse flora and fauna of this Sacramento Valley vernal pool reserve. Jepson Prairie, recently classified by the National Park Service as a Designated National Natural Landmark, provides habitat for several listed species, including the Delta green ground beetle, the tiger salamander, and Solano grass.

For information and tour reservations, call Pat Hale at (916) 752-6580.

Past Events

OBFS Holds Annual Meeting at Bodega Marine Lab/Reserve

The 1987 annual meeting of the Organization of Biological Field Stations (OBFS) was held September 16 through 20 at the Bodega Marine Laboratory and Reserve. More than 60 scientists and station directors from throughout North and Central America attended, bringing the facility widespread recognition.

OBFS is the primary professional organization for North America's field station directors and private individuals interested in field stations. The 1988 meeting will be held in Maine, hosted by the National Audubon Society. For more information about OBFS, contact Dr. Richard Coles, Washington University, Tyson Research Center, P.O. Box 258, Eureka, MO 63025, (314) 938-5346.

Reserve Managers Gather for Workshop in Eastern CA

The Sierra Nevada Aquatic Research Laboratory (SNARL) and the White Mountain Research Station (WMRS) hosted the fourth annual NRS Reserve Management Workshop October 8 through 11. More than 40 people attended this year's meeting.

The workshop convened at SNARL, where participants discussed such topics as geographic information systems, strategic planning, and NRS funding. This portion of the meeting also included tours of SNARL's laboratory and experimental stream channel facilities, as well as nearby Valentine Camp. The latter half of the meeting was held in the White Mountains, with tours of WMRS' Owens Valley, Crooked Creek, and Barcroft Laboratories.

Welsh Seminar Draws California Conservationists

In July, the Nature Conservancy Council for Wales hosted 10 Californians for a two-week exchange seminar in oak woodland conservation and nature reserve management. The 10 participants represented the NRS (3), the UC Berkeley Department of Forestry and Resource Management (3), the California Native Plant Society (2), and the Department of Parks and Recreation (1).

Despite many differences in culture and land-use patterns, California and Wales share problems concerning hardwoods management. Of particular interest was a Welsh government program providing funding to sheep farmers to preserve and manage their rough grazing areas, including woodlands, in native vegetation.

The U.S. portion of the program took place last March, when four Welshmen toured California's oak woodlands. Plans

are now underway for a similar exchange next summer. For details, contact Larry Ford, Dept. of Forestry and Resource Management, 145 Mulford Hall, University of California, Berkeley, CA 94720.

Awards

Muth Gets Conservation Prize

Dr. Allan Muth, Director of the Philip L. Boyd Deep Canyon Desert Research Center, received a 1987 Outstanding Service Award from The Nature Conservancy for his work in creating a permanent home for the Coachella Valley fringe-toed lizard, an endangered species. Muth, who has studied the demography of the lizard since 1984, was involved in the multi-agency effort to form the Coachella Valley Preserve System. For more information on this project, see *Transect* 4(2):4.

NRS Publications Win Honors

Two NRS publications received awards this year. *Natural Reserve System: The First Twenty Years* won an award of achievement from the Society for Technical Publications. It also received a silver medal from the Council for Advancement and Support of Education (CASE) in the photocommunications via print category for the images by Galen Rowell. This 4-color, 24-page booklet describes the purpose and history of the NRS, and highlights various teaching, research, and public service projects based on reserves. In addition, the *Transect* received a bronze medal from CASE in the internal periodicals division. Both publications are available at no charge from the systemwide NRS office (see back page).



Looking northeast across Olcott Lake, a large vernal pool at the Jepson Prairie Reserve. Public tours of this site will be available this spring.

Opportunities

Island Research Fund

Would you like to do research on Santa Cruz Island? The Nature Conservancy and Santa Barbara Museum of Natural History are providing grants of up to \$20,000 for research projects that address questions related to terrestrial and freshwater flora and fauna, geology, and ecology of the Island.

A total of \$135,000 is available through the fund, and applications will be reviewed as they are received. For more information, including a list of high-priority research topics, contact the Santa Cruz Island Project Director, The Nature Conservancy, 213 Stearns Wharf, Santa Barbara, CA 93101, (805) 962-9111.

Publications

Guide to Oak Literature

Seeing the need for a comprehensive list of the extensive but scattered literature on California oaks, the Pacific Southwest Forest and Range Experiment Station (PSW) recently published *California Oaks: A Bibliography*. This 37-page publication contains more than 750 citations compiled by Dr. James Griffin, Research Ecologist at the Hastings Natural History Reservation, Dr. Philip McDonald of the PSW Station, and Pamela C. Muick, a graduate student at UC Berkeley.

In addition to the standard bibliography, the book includes a topical outline that displays references by key words and an index listing all *Quercus* species and named hybrids.

Known as General Technical Report PSW-96, this handy publication is available at no charge from the PSW Station, P.O. Box 245, Berkeley, CA 94701.



Sex and the Social Bird

Population Ecology of the Cooperatively Breeding Acorn Woodpecker will be available from the Princeton University Press in January 1988. Written by Drs. Walter Koenig and Ronald Mumme, this 450 plus-page book details the complex society of the only bird species native to California that breeds cooperatively (see *Transect* 1(1):1).

The monograph is based on almost 15 years of research conducted at the Hastings Natural History Reservation, much of which was part of the authors' UC Berkeley doctoral dissertations. Koenig, a resident research zoologist at Hastings, received his Ph.D. in 1978. Mumme completed his degree in 1984 and is now doing postdoctoral work at Cornell University.

The book will be available in hardcover (\$55.00) and paperback (\$16.95). To obtain a copy, contact the Order Department, Princeton University Press, 3175 Princeton Pike, Lawrenceville, NJ 08648, (609) 896-1344.

Get Your New Brochures Here

Hot off the press are brochures for two more reserves: Bodega Marine Reserve and Valentine Camp. Designed for prospective reserve users, these publications describe the natural resources of the sites and contain information on access, facilities, and use. Also available are brochures for Año Nuevo Island Reserve, Hastings Natural History Reservation, Pygmy Forest Reserve, Ryan Oak Glen Reserve, San Joaquin Freshwater Marsh Reserve, Philip L. Boyd Deep Canyon Desert Research Center, and Santa Cruz Island Reserve. Contact the systemwide NRS office for free copies.

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—two issues per year—write or phone the systemwide NRS office: (415) 644-4211; ATSS 8-532-4211.

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