UC Office of the President

NRS Transect

Title

The NRS Transect 7:2 (spring 1989)

Permalink

https://escholarship.org/uc/item/3cn9v09s

Journal

UC Natural Reserve System, 07(2)

Author

UC Natural Reserve System

Publication Date

1989-03-21

eScholarship.org Powered by the California Digital Library
University of California

The NRS
Transect

Volume 7, No. 2 University of California Natural Reserve System Spring 1989

In this issue:

Thoughts from the Vice President-ANR

I regret to report that, after protracted negotiations, the leading candidate for the position of Director of the Natural Reserve System has withdrawn his name from further consideration.

Concern was expressed during the course of my negotations—as indeed it has been expressed by many of you—about the current level of operational and staff support for the Natural Reserve System. I share this concern and am committed to doing everything possible to identify and secure new sources of funding both internal and external to the University. Several promising possibilities are in the offing which we will vigorously pursue.

This is a difficult time of transition for the NRS and all of us responsible for its stewardship. The search for its new director has taken far longer than any of us anticipated; I know that delay is as frustrating for you as it is for me. I am moving with dispatch on the next round of negotiations and shall hopefully be in a position to make a final announcement in the near future.

Kenneth R. Farrell, Vice President
Agriculture and Natural Resources

Don't let your *Transect* subscription end! We're updated our mailing list. If you still wish to receive this newsletter, please complete and mail the enclosed postcard today.

Bill Trush

Elder Creek meets the Eel River at the Northern California Coast Range Preserve.

NCCRP Brings Old Growth and Eel River to the UC Reserve System

One of the Natural Reserve System's newest sites contains some of its oldest habitats. An extensive, centuries-old forest of Douglas-fir dominates the Northern California Coast Range Preserve (NCCRP), located near the headwaters of the South Fork of the Eel River. This 7,520-acre wilderness consists of a 3,940-acre core owned by The Nature Conservancy (TNC) and 3,580 adjacent acres owned by the U.S. Bureau of Land Management (BLM). On February 1 of this year, the University entered a three-year management and use agreement with TNC to evaluate the potential of this northwestern California site for more formal inclusion in the NRS.

Natural Features: NCCRP is located in Mendocino County, about 150 miles north of San Francisco near the town of Laytonville. The south fork of the Eel River flows north and east through the reserve for about a three miles, draining highly deformed ridges with slopes commonly exceeding 50 percent.

Also within reserve boundaries and those of surrounding buffer lands owned by BLM are four undisturbed watersheds. The most significant of these is Elder Creek, which at more than six square miles is one of the largest pristine watersheds in northwestern

continued on page 6

Reserve Highlights

UC President Gardner Increases NRS Budget

This spring the NRS received a special budget augmentation of $104,800 from the Office of the President's discretionary funds.

The augmentation consists of $37,500 in one-time funds to help replace the 50-year-old, spring-fed water system at the Hastings Natural History Reservation with a new water main to a well and two automatically filling storage tanks.

The Natural Reserve System also received $77,300 in permanent maintenance and operational funding, which is being used for the following:

- $6,000 for utilities for the new laboratory/office and maintenance at the Motte Rimrock Reserve;
- $28,800 to hire a roving steward for the Santa Cruz Island, Carpinteria Salt Marsh, and Coal Oil Point Natural Reserves;
- $16,700 to hire a part-time reserve steward at the forthcoming Santa Monica Mountains Reserve;
- $5,000 to hire a part-time boat operator for the Año Nuevo Island Reserve;
- $5,000 to control invasive species at the Bodega Marine Reserve;
- $4,800 for casual labor and maintenance equipment rental at the Granite Mountains Reserve;
- $3,000 for casual labor at the James San Jacinto Mountains Reserve;
- $5,000 for maintenance at the Landels-Hill Big Creek Reserve;
- $3,000 to maintain the fence and trail at the Younger Lagoon Reserve.

Sarah S. Gustafson

UC President David P. Gardner discusses NRS business with Robin Stevens, daughter of UCSC Chancellor Robert Stevens, while Libby Gardner and Kathy Booth Stevens look on. Both families visited the Big Creek Reserve on the occasion of its 10th anniversary.

Big Creek Celebrates Its 10th Anniversary

Representatives of the state Assembly, The Nature Conservancy (TNC), the Save-the-Redwoods League (SRL), and the U. S. Forest Service, as well as corporate and private donors recently joined the University of California in celebrating the 10th anniversary of the Landels-Hill Big Creek Reserve.

The University acquired the Big Creek Reserve, located along the rugged Big Sur coast, in December 1978 through a cooperative scientific and conservation effort with TNC, SRL, and many other parties, both public and private. The anniversary gathering offered a salute to this unique partnership and celebrated the reserve's rapid recovery from a 1985 wildfire that burned almost all of the site and its facilities.

More than 130 people attended the anniversary dinner in Carmel on November 4th. In addition to UC President David P. Gardner and UC Santa Cruz Chancellor Robert B. Stevens, the speakers included Steve McCormick, State Director of the California Nature Conservancy, and Bruce S. Howard, President of SRL and Vice President of the National Audubon Society.

State Assemblyman Sam Farr presented a resolution recognizing the scientific significance of the site and commending the University for its management of "one of California's most valued environmental resources."

Many of the dinner guests also attended a field trip to Big Creek on November 5.

NRS Annual Report Is Now in the Works

Currently being compiled is the first comprehensive *NRS Annual Report*, which will provide a statistical overview for all NRS reserves for the fiscal year 1987-88. Among the information this report contains:

- Twenty-three reserves in 1987-88 drew users from 202 separate organizations, including 93 U.S. colleges and universities, 15 colleges and universities abroad, 11 federal and state agencies, and 83 other organizations ranging from Boy Scouts to bird-watchers.
- Research based on 23 reserves resulted in 187 publications, including 24 theses and dissertations, during the 1987 and 1988 calendar years.
- Twenty-three reserves reported 344 projects-in-progress.
- Totals of more than 8,200 reserve users and nearly 25,000 user-days were reported by 24 reserves. Instruction accounted for 53 percent of users and 34 percent of user-days, while research accounted for 23 percent of users and 55 percent of user-days, with the remaining percentages attributable to nonacademic (i.e., public service) use.

In addition, the annual report will show the location of all NRS sites, update the list of contact addresses and phone numbers for each reserve, and offer a selected 1987-88 bibliography of articles, reports, theses, dissertations, and other published works that resulted from reserve-based research.

Winners Selected for Student Grant Program

The Natural Reserve System is pleased to announce the award of grants totalling $5,500 to seven UC graduate students conducting research on NRS sites. These awards are the first in a new annual student research grant program funded with the income from a recently established endowment.

Kim Kratz, UC Santa Barbara, received $1,000 to analyze factors and mechanisms influencing the structure of stream invertebrate communities in the experimental stream channels at the Sierra Nevada Aquatic Research Laboratory (SNARL).

Gregory Lowenberg, UC Davis, received $750 to study the effect of herbivory on the breeding system and mating patterns of *Sanicula arctopoides*, a coastal prairie plant, at the Bodega Marine Reserve.

Gwen Bachman, UCLA, received $750 to investigate the influence of stored fat on foraging behavior in Belding's ground squirrels at SNARL.

Steven Morey, UC Riverside, received $750 to research the life history of the Great Basin spadefoot toad at SNARL.

David Ribble, UC Berkeley, received $750 to study the population structure of the California mouse at the Hastings Natural History Reservation.

Pamela Muick, UC Berkeley, received $750 to study the effects of light and seasonal herbivory on seedling establishment of blue oak and coast live oak at the Hastings Natural History Reservation.

Felisa Smith, UC Irvine, received $750 to research the utilization of plant fiber as an energy source by the desert wood rat at the Granite Mountains Reserve.

These projects were chosen from among 17 submissions representing 7 campuses, 11 reserves, and both graduate and undergraduate students. Though the Universitywide selection committee originally intended to make only three awards, it was so impressed by the quality of the proposals received in this first year that NRS Director Roger Samuelsen expanded the program by adding funds from one-time sources.

The deadline for grants to be made in 1989-90 will be announced at a later date. Potential applicants, who must be UC students, should contact their campus NRS representative for more information.

NRS Coordinates with Other Land Managers

On April 17, Natural Reserve System Director Roger Samuelsen joined agency directors from other major natural areas programs in California at a meeting in Sacramento to sign a memorandum of understanding relating to the identification and management of the state's natural areas. Recognizing that natural areas don't always observe political boundaries, the framers of the memorandum hope to further facilitate cooperation and coordination between land managers at the regional, state, local, and private levels.

Participants include the U. S. Bureau of Land Management, National Park Service, U. S. Fish and Wildlife Service, U. S. Forest Service and its Pacific Southwest Forest and Range Experiment Station, California Department of Fish and Game, California Department of Parks and Recreation, State Lands Commission, The Nature Conservancy, and the University of California Natural Reserve System.

The California Department of Fish and Game, which hosted the meeting, will take the lead in administering the agreement and continue to provide baseline data on natural areas to field personnel through its Non-Game Heritage Program, which was recently elevated to Division status within the Department.

Through this agreement, the NRS formalizes its long-standing involvement with these other land managers. NRS Field Representative Dan Cheatham is a founding member of the Interagency Natural Areas Coordinating Committee, which developed the memorandum. The agreement adds new significance to the committee's activities, which will include identifying natural areas in need of protection, conducting technical interagency workshops on specific sites or issues, and organizing seminars to share general information about natural areas with agency decision-makers.

lupine (*Lupinus sp.*)

NRS Considers Experimental Introductions on Reserves

Can we use our reserves and have them, too? That essential question was addressed at a day-long workshop on "Experimental Introductions on Research Reserves" held recently at the Bodega Marine Laboratory and Reserve in Sonoma County.

The workshop was attended by Bodega staff, visiting scientists, UC Davis faculty, and representatives from the state Departments of Fish and Game and of Parks and Recreation. Their aim was to discuss appropriate policy for the Bodega Marine Reserve (BMR)—where fully one-third of the plants are introduced species—and to consider guidelines for the entire Natural Reserve System (NRS) regarding the introduction of novel genetic strains for educational purposes. Though the workshop focused on flora, much of the discussion applies to introductions of fauna as well.

When considering introducing any organism to a reserve—be it a potentially invasive exotic species or a different strain of a native species already present—the NRS must weigh its goal of conserving samples of California's natural habitats with its purpose of providing those habitats specifically for teaching and research. Workshop participants agreed upon three major criteria for judging research that proposes an experimental introduction:

- It should be science of high quality.
- It should not interfere with other ongoing research.
- It should not diminish a reserve's ability to support future research.

Reserve management can readily reject a poorly conceived proposal or one that would obviously interfere with ongoing research. However, if a proposal's potential value is high and the research seems unlikely to affect other current projects, the manager still must struggle to determine what degree of habitat or gene pool alteration to permit.

Maintaining the overall research potential of a reserve over time is a complex matter, and the stakes are high. Any introduction of a new species, whether experimentally intended or accidental, has the potential for severe consequences on reserve ecosystems, including the loss of key habitats to aggressively invasive species. For example, a South African species of ice plant was introduced in the vicinity of BMR, probably to serve as landscape groundcover, before the lab was

built in 1966. Over the past decade, however, the reserve's coastal prairie habitat has been invaded by this hardy non-native, resulting in localized monocultures of ice plant.

The introduction of an aggressive species like ice plant poses some obvious problems. At the other extreme are the subtle complications that could result from introducing a population of a native species that differs in genetic make-up from the naturally occurring population. A new genotype, while superficially native, could permanently alter the genetics of an entire population in ways that would be very difficult to measure.

A case in point is a recent proposal by Barbara Bentley, a National-Science-Foundation-funded distinguished research fellow from SUNY Stony Brook. Bentley plans to grow a number of different strains of California bush lupine (*Lupinus arboreus*) in a common garden at BMR. This species varies in flower color and foliage chemistry across its range from Ventura to central Oregon.

The lupine flowers either blue or yellow; the color varies among populations, and may influence the species' pollinators. The plant's leaves contain alkaloids that may affect the herbivores that feed upon it. While the concentration of these chemicals increases in populations from north to south, the relative composition of different alkaloids varies among populations in a more complex pattern. Bentley hopes to learn the relationship among these various traits and their effects on insect herbivores.

Lyn Cheatham

Deborah Elliot-Fisk, UC Davis, holds the mangrove seedling she has just plucked from the Kendall-Frost Mission Bay Marsh Reserve. A dynamic example of the dangers of *uncontrolled* experimental introductions, mangroves were planted in the marsh by a researcher in the mid-1960s. They thrived, threatening the reserve and surrounding wetlands. Although the mangrove persists in the marsh in low levels yet today, vigilant efforts by reserve management have nearly eradicated this aggressive exotic species.

Such research addresses the major question of how organisms adapt to differing environments. Yet in doing so, it may alter the gene pool of lupines at the site, introducing uncertainties about the future genetic make-up of the locally adapted population.

Should a reserve limit the potential for future research by allowing a study that may alter a population? On the other hand, should it turn away an interesting, well-designed project today exclusively to protect a population for future studies? And how do these human-induced risks compare to current and previous gene flow, natural or otherwise?

As a result of the workshop, BMR management decided to allow the lupine research as long as the scientists remove the plants before they flower. It will also take the lead in developing reasonable guidelines for future experimental introductions. Workshop participants agreed this approach is preferable to either the absence of any control on proposals, which risks too much, or a systemwide ban that prevents everyone from introducing anything anywhere.

Participants also agreed that in order to evaluate a proposal, a reserve manager must know something about its potential risks. The researcher, being the authority on the subject, bears the burden of providing that information.

And researchers must also be able to give reserve managers reasonable assurance that their species can be removed when the studies are done and that removal will not be unduly costly and troublesome. However, a certain irony attends each assurance: much of the information a reserve manager needs to assess a proposal may be the same information a scientist hopes to obtain through the research itself.

Susan Gee Rumsey, Editor
Sarah Steinberg Gustafson, Senior Editor
Natural Reserve System

La Selva's Guidelines May Serve as Model

La Selva Biological Station of the Organization for Tropical Studies (OTS), Costa Rica, has developed regulations on research use of non-native organisms within its boundaries. The NRS may eventually adopt a modified version of these regulations to control experimental introductions on its own reserves.

At La Selva, all proposals for experimental introductions are reviewed on a case-by-case basis and must receive prior approval. Proposals should summarize information on:

- geographic range and habitat of the proposed introduction;
- taxonomic relatedness to La Selva species;
- size and characteristics of local populations of the same or related species;
- provenance of seeds, in the case of species already at La Selva;
- history of introductions to other areas where not indigenous;
- reproductive biology (vegetative reproduction, pollination, seed dispersal);
- susceptibility to pathogens or pests potentially dangerous to native or economically important species in Costa Rica;
- eradicability, in the event of spread;
- other relevant natural history information (e.g., uncontrolled spread of congeneric species);
- experimental design (size of plantings, type of propagule to be used, periodicity and characteristics of monitoring to be carried out by the investigator);
- financial provision for adequate monitoring by OTS, removal of the planting at termination of the study (or earlier, if spread occurs), and post-removal verification.

All experimental plantings and exotic animals must be removed at the end of an experiment. In addition, experimental plants must be removed before flowering, or all flowers and fruits bagged to prevent escape of pollen or seeds.

No species with a history of uncontrolled spread may be introduced. Regular monitoring to detect spread will be carried out by OTS as well as by the researchers involved at the researcher's expense. Researchers must report to OTS any signs of spread from their plots.

Publications and Productions

NRS Movie Debuts—Oscar Nomination Due

The NRS movie made its world premiere late last year and was released this spring. This 12-minute movie, shot on 16-mm film, gives a general overview of the Reserve System. It stars many of the reserves, with supporting performances by NRS founder Ken Norris of UC Santa Cruz, UCLA's Mildred Mathias, chair of the Universitywide NRS Faculty Advisory Committee, and Claudia Luke, a Ph.D. candidate at UC Berkeley.

The NRS invites *Transect* readers to view the movie. The film is available at the NRS systemwide office; video-based copies are available at each reserve with on-site facilities, at the NRS headquarters on each campus, and at the systemwide NRS office.

The NRS movie was made possible by the ARCO Foundation, Chevron, U.S.A., Inc., The Edwin W. Pauley Foundation, and Lane Publishing Co. Much of the footage was shot by Robert G. Dickson of Instructional Media Services at UCLA; Robert Dering, former NRS budget analyst, acted as research "gofer"; Sunset Films and Television produced and directed the film.

UCSB's Herbarium Produces New Volumes

The UC Santa Barbara Herbarium recently added three books to its publications series:

• *Intertidal Macrophytes of Santa Cruz Island, California* (UCSB Herbarium Publication No. 6; $8.00), written by Kirk Apt, Carla D'Antonio, James Crisp, and Joyce Gauvain and edited by Wayne R. Ferren, Jr. (1988). The most complete work of its kind for the California Islands, this 87-page book provides an in-depth analysis of the intertidal marine macrophytes—both algae and angiosperms—of the Santa Cruz Island Reserve.

The authors sampled twelve sites and analyzed the distribution and relative abundance of the 154 species collected, 34 of which are new records for the island. They also created an annotated catalogue of plants collected in the study, an illustrated catalogue of species difficult to identify, and the first integrated checklist of all intertidal and subtidal macrophytes reported for the island. In addition, they evaluated the island's flora in terms of its relationship to northern and southern intertidal floras.

The Northern Channel Islands, in which Santa Cruz Island is centrally located, are off the coast of Santa Barbara. They contain the most undisturbed sections of coastline remaining in Southern California. Surveys such as this provide important baseline information for the evaluation of human impacts on the environment and of changes that may result from climatic anomalies such as El Niño.

• *University of California, Santa Barbara, Campus Wetlands Management Plan, Part I: Technical Report on the Botanical Resources of West and Storke Campus Wetlands* (Environmental Report No. 12; $10.00), by Wayne R. Ferren, Jr., Dean G. Capralis, and Diana Hickson (1987). Undertaken as part of the Campus Wetland Enhancement Plan (see *Transect* 5(1):2), this is the first part of an eventual four-volume UCSB Campus Wetlands Management Plan.

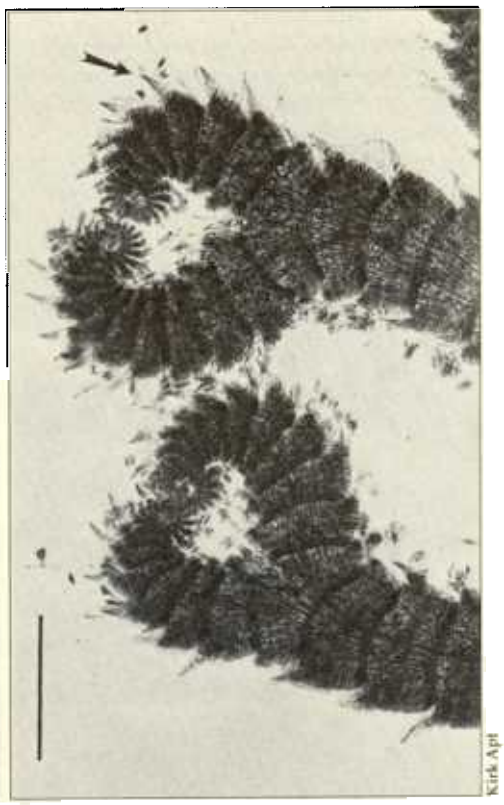
The 196-page report discusses the history, nature, and extent of Devereux Slough, located at the Coal Oil Point Natural Reserve, and part of Goleta Slough, located on Storke Campus. In part, the authors summarized aspects of the physical environment as they relate to vegetation; classified, described, and mapped existing wetland vegetation; analyzed vegetation patterns; and suggested potential enhancements, restoration activities, and ongoing monitoring activities that could be implemented as part of a Campus Wetlands Plan.

• *Enhancement, Restoration, and Creation of Vernal Pools at Del Sol Open Space and Vernal Pool Reserve, Santa Barbara County, California* (Environmental Report No. 13; $15.00), by Wayne R. Ferren, Jr., and David A. Pritchett (1988). This 169-page publication describes vernal pool research project taking place

continued on page 12

Wayne Ferren

Looking westward across the central area of the Coal Oil Point Natural Reserve during flooded conditions. The emergent wetland is dominated by pickleweed (*Salicornia virginica*). The botanical resources of this site are described in the first part of its new management plan.



Kirk Apt

***Centrocerus clavulatum*, one of the difficult-to-identify species pictured in *Intertidal Macrophytes of Santa Cruz Island*. Distinct spines (arrow) distinguish this red algae from other closely related taxa. Scale bar = 500 µ.**

NCCRP *continued from page 1*

California. Its steep rocky channel serves as an important nursery for a variety of anadromous fishes. The National Park Service has registered Elder Creek as a National Natural Landmark, and the U. S. Geological Survey has operated a Benchmark Hydrologic Station on it for 20 years.

In addition to bringing part of a major California river system into the NRS, this new reserve adds the largest virgin Douglas-fir community left in the state. California was covered by two to three million acres of old-growth forest until Douglas-fir became the most important timber species in North America.

NCCRP, which receives an annual average rainfall of 85 inches, lies in the southern portion of the Douglas-fir's range. Here, the moderately shade-tolerant species prefers cool, moist slopes that face north. Three-hundred-year-old trees dominate the reserve's old-growth forests. At this age, the forest acquires a unique composition and structure; huge fallen logs litter the ground, majestic old snags stand amidst live trees of varying ages, and the multi-layered canopy creates a cool, moist microclimate at the forest floor where sunlight rarely reaches.

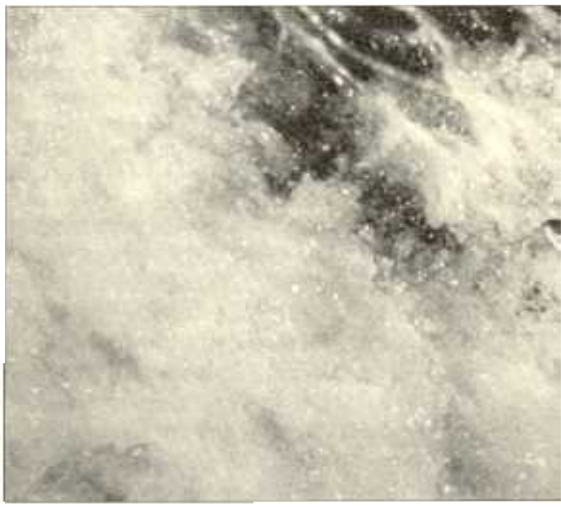
Though Douglas-fir is the climax species in the reserve, NCCRP also harbors significant groves of redwood, as well as pure and mixed stands of madrone, tan oak, chinquapin, canyon live oak, and interior live oak. At least eight recognized types of chaparral dominate the hot, south-facing slopes. A series of stream terraces above the present river channel underlie seven distinct meadows that support bald hills grasslands, a type of coastal prairie. Preliminary assessments have identified 26 terrestrial and 4 aquatic habitat types at NCCRP, making it one of the 4 most diverse reserves in the NRS.

Natural disturbances have accompanied the burning, clearing, and subsistence agriculture practiced by early inhabitants. Thus, an intricate mosaic of vegetation types exist at NCCRP today, including virtually all successional stages.

The wildlife of NCCRP reflects both the diversity and the integrity of its habitats. The reserve supports two nesting pairs of spotted owls, a federally threatened species. It boasts the lowest recorded elevation for nesting goshawks, another bird considered sensitive to human disturbance. Other species closely associated with old-growth forests, such as the northern flying squirrel, the red-backed tree vole, and the Olympic salamander, are abundant here.

A number of the site's animals depend on its pristine aquatic ecosystems. Among the riparian dwellers are three to four mating pairs of river otters, as well as minks and fishers. The Pacific giant salamander, the top predator species for the steep headwater streams of the northern Pacific Coast Ranges, approaches its southern and eastern range limits here. Silver salmon run in several of the reserve's creeks, as do both steelhead and resident rainbow trout. In the river and some of its tributaries live Pacific lamprey, the "eel" for which Eel River was undoubtedly named.

NCCRP has received international recognition from the United Nations Environmental, Scientific, and Cultural Organization as part of its Oregonian Province Biosphere Reserve, which also includes Redwood National Park and the NRS's Landels-Hill Big Creek Reserve.



courtesy of NCCRP

A steelhead trout jumps Elder Creek Falls on its way to spa

History: NCCRP'S earliest human inhabitants were the Kato Indians, the southernmost group of Athabascan-speaking people in Northern California. The Indians most likely used reserve lands seasonally to collect acorns and to catch salmon and steelhead.

Homesteaders arrived in the late 1800s. They settled primarily along the reserve's meadows, where they built houses, planted fruit trees, and raised livestock. They also collected and sold the bark of tan-oak and harvested some of the larger redwoods and Douglas-firs. Two of the families began a resort business; Wilderness Lodge—a building from this era—now houses reserve users.

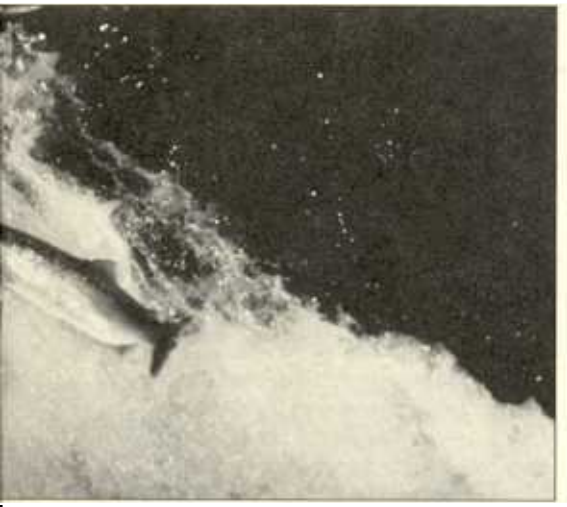
In 1931, Heath and Margorie Angelo bought the first 160 acres of what was to

Sarah S. Gustafson

Looking southwest to Wilderness Lodge from the Ahlquist Trail Overlook.

N. H. (Dan) Cheatham

Descendants of the original owners of NCCRP gathered in Berkeley to celebrate the signing of a joint management and use agreement for this reserve. From left to right are Heath and Gail Angelo, Peter Steel, Geoffrey Steel, a map of NCCRP, Mary Angelo Steel, and Homer and Ann Angelo.



ning grounds upstream.

Northern California Coast Range Preserve

Location:	Mendocino County, CA, on the south fork of the Eel River. 20 miles west of Laytonville; 150 miles north of San Francisco.
Latitude:	39° 43' 45" N
Longitude:	123° 38' 40" W
T, R; S:	T22N, R16W (MDB&M); all or portions of secs. 15-22, 26-29, 32-35 T22N, R15W (MDB&M); portions of secs. 30-31 T21N, R16W (MDB&M), portions of secs. 1-2, 12 T21N, R15W MDB&M), portions of secs. 6-7
USGS Maps:	Legget 7.5' Tan Oak Park 7.5' Lincoln Ridge 7.5' Cahto Peak 7.5'
Size:	3,940 acres owned by The Nature Conservancy 3,580 acres owned by the U.S. Bureau of Land Management
Elevation Range:	1,240-4,233 feet
Precipitation:	85 inches/year
Topography:	Elongated belt of highly deformed, well-defined coastal ridges cut by stream and river channels.
Habitats:	Mixed chaparral (including chamise, montane manzanita, whitethorn, tobacco brush, buck brush, interior live oak, and northern north slope chaparral), bald hills prairie, non-native grassland, freshwater seep, various woodlands (including Oregon oak, black oak, interior live oak, and mixed north slope cismontane woodlands), mixed forest types (including mixed evergreen, California bay, interior live oak, black oak, tan-oak, mixed north slope, madrone, upland redwood, upland Douglas-fir, Pacific yew, and knobcone pine forests), coastal fall/winter run steelhead trout stream, coastal coho salmon stream, coastal minnow stream.
Species Diversity:	fungi: 321 lichens: 78 mosses: 93 liverworts: 9 vascular plants: 451 fish: 5 amphibians: 9 reptiles: 12 birds: 118 mammals: 63
Facilities:	Bunkhouse cabins for 30 people, with bathrooms, showers, kitchen and dining hall; small laboratory with electricity.
Database:	Aerial photos, maps, temperature and precipitation data, raw hydrologic data, herbarium, species lists, age-stand data.
On-site Personnel:	Reserve Steward

become the reserve's core. By the mid-fifties, they had amassed nearly 3,000 acres and a large tax burden. Faced with liquidating the trees or preserving the forest, the Angelos sold their holdings to TNC in 1959, making NCCRP the first Nature Conservancy site in the western United States. The BLM subsequently designated its adjacent holdings as an Area of Critical Environmental Concern.

Facilities: A single road enters NCCRP from Branscomb Road and runs parallel to the river through much of the site. Its gravel surface, graded regularly, is open to passenger vehicles the year round. Inside the reserve, an extensive trail system allows access to NCCRP's lower elevations.

Located near the entrance is the site's headquarters, consisting of a visitor's kiosk, a public outhouse, and a two-story cabin that houses the reserve herbarium and serves as its office and laboratory. It is equipped with water, electricity, and a telephone.

About two miles from headquarters is the reserve's housing area. Eight screened cabins provide overnight bunk space for 30 people (weather permitting); a rustic lodge sleeps 6 more. Nearby are bathrooms with flush toilets and solar showers. A screened dining hall and kitchen equipped with propane refrigerators, stoves, and ovens complete the Wilderness Lodge compound.

A resident reserve steward provides logistical support to researchers and field classes.

Research: NCCRP has a strong history of research and teaching use, facilitated by baseline climate and hydrologic data, several permanent forest monitoring plots, aerial photographs, and basic floral and faunal inventories. Six UC graduate students are now conducting doctoral research on site. Past and current projects include studies of human land-use history, fire history, meadow and forest succession, tree species soil affinities, vegetation dynamics, river food webs, and the ecology of steelhead trout, Pacific giant salamanders, spotted owls, and river otters.

But this work only begins to address the questions that can be pursued at NCCRP. Of particular interest to reserve management is one of the homesteads—listed with the National Register of Historic Places—which cries out to be restored, and its artifacts catalogued. In adjacent BLM-owned buffer areas, planned timber harvests and prescribed fires could be incorporated into manipulative research addressing resource management questions as well as into comparative studies with the reserve's pristine core area. Basic surveys of some organisms are also needed.

Local schools make annual field trips to NCCRP, and the reserve needs interns to coordinate and instruct its environmental education program. The site also accommodates limited public day use, but this has never impaired ongoing research. According to one long-term user, you could leave a one-hundred-dollar bill on a rock, and if not for the deer, it would be there when you return.

The UC Berkeley campus administers NCCRP. For more information on using this reserve, contact Mary Power, the site's faculty manager, or Margaret Race, assistant dean for planning, College of Natural Resources, at 101 Giannini Hall, University of California, Berkeley, CA 94720, (415) 643-8999, or Reserve Steward Peter Steel, 42101 Wilderness Road, Branscomb, CA 95417, (707) 984-6653.

Sarah Steinberg Gustafson, Senior Editor
Natural Reserve System

News and Notes

Contributions and Additions

A Lot of Help from Our Friends

Contributions from several public and private sources have enhanced the Natural Reserve System this year. Among these contributors are:

Philip L. and Dorothy Marmon Boyd — who contributed $3,700 towards a new IBM Series II computer system at the Philip L. Boyd Deep Canyon Desert Research Center.

A. E. Stewart Chaffey — who donated 50 shares of R. J. Reynolds, Inc. stock (valued at $4,500) to benefit the Hastings Natural History Reservation.

Stuart Kaplan, Carolyn K. Harris, Harold Finkel, Raymond E. Finkel, Robert Rosenstiel, Edward B. Rosenstiel, Jr., and Edward Van Vliet — who donated their 70 percent interest in a 140-acre parcel adjacent to the Philip. L. Boyd Deep Canyon Desert Research Center site near Pinyon Flat. This property adds a superb patch of pinyon-juniper woodland to the Pinyon Flat study area, located on the west side of the hilly plateau through which Deep Canyon cuts. The reserve has a full decade of data on the relative abundance of vertebrates from transects placed on this site in May 1979.

Charles and Ottie Mae Motte — who donated $1,000 to the Motte Rimrock Reserve brochure fund.

Security Pacific Foundation — which donated $2,000 of unrestricted funds.

Contributions of money, time, and/or equipment have also been received from *Alpha Resins Corporation, Alumax Building Products, former UC Vice President Earl C. Bolton, the San Bernardino Valley Audubon Society, Emmons Sebenius, the Sierra Club's Back-Roads Explorers, and various friends of the Hastings Natural History Reservation and the Granite Mountains Reserve.*

The Natural Reserve System depends upon such contributions for many of its resources and programs. We are grateful to all our donors for their generous support.

Hastings Beefs Up Facilities

The Hastings Natural History Reservation recently added housing and laboratory space for long-term researchers with the completion of three important projects.

Funded by a $99,982-grant from the National Science Foundation (see *Transect* 6(1):2), a 720-square-foot laboratory was built by Daniels and House Construction of Monterey. The wood-frame building can accommodate up to eight researchers at a time, providing both wet and dry lab space, desk space, a fume hood, and a new septic system. A new ultra-cold freezer, funded by a grant from the Genetic Resources Conservation Program at UC Davis, is already storing tissues from western bluebirds, yellow-billed magpies, California deermice, acorn woodpeckers, California quail, and western mud turtles. These tissues are prepared for DNA fingerprinting analysis in the lab.

Gary Ambrose

Henry Koerper (left), Cypress College, and Owen Davis, University of Arizona, remove a portion of a 23-foot sediment core from the San Joaquin Freshwater Marsh Reserve. The scientists will radiocarbon date the core's organic deposits and analyze its pollen in order to characterize past changes in the flora of the area. The base of this core, taken in February, was 18 feet below current sea level and may contain sediments almost 20,000 years old. Look for more on this study in a future issue of the *Transect*.

In addition, the UC Berkeley Museum of Vertebrate Zoology, which administers the reserve, funded the renovation of an old garage to provide a badly needed workshop. The building's cement floor, frame repairs, new lighting, and a complement of tools allow field researchers to build and repair equipment and vehicles on site.

Work has also been completed on a new housing facility known as the Robinson House. Owned by Fanny Hastings Arnold, long-time benefactor of the reservation, the Robinson parcel lies just southeast of the reserve proper. Arnold has generously arranged for the complete renovation of the existing residence and for its use by reserve researchers.

The house sleeps five in four bedrooms, and has a common kitchen, living room, screened porch, and redwood deck. A modern wood stove provides heat. Though the Robinson House is already booked for this summer and next, it is available the rest of the year. Among its first users were 20 attendees of the 23rd Annual West Coast Ecology Meeting, organized by Martin Cody (UCLA) and John Roughgarden (Stanford).

Resident Director Mark Stromberg oversaw the construction of these facilities.

The NSF grant also funded an Omnidata digital recording weather station, which was installed last fall. The station samples wind speed and direction, relative humidity and air temperature, soil temperatures, solar radiation, and precipitation every five minutes. Each hour, the averages or totals are recorded, then averaged again at the end of each day.

Stromberg and James Keating, a work-study student, have digitized 25 years of hygrothermograph charts from the old weather station. These charts were reduced to DBase III files with the "MorphoSys" video image analysis system developed by Chris Meacham, UCB. Among other things, researchers plan to use this data to investigate the relationship between patterns of survivorship of young birds and patterns of warm and cold stretches in the critical days of spring.

One of the most prolific sites in the NRS, the Hastings Reservation supports 10 percent of the System's current research projects in progress, with much of the work focusing on vertebrate ecology and oak woodland biology. It also logged more than 2,000 user days in the 1987-88 academic year. As this

reserve has had to turn away prospective users in the past, these new facilities will further increase the site's academic productivity.

New Classroom Space Answers Prayers at SNARL

The Sierra Nevada Aquatic Research Laboratory (SNARL) was recently enhanced with the acquisition of the "Little Green Church," located half a mile east of the reserve. The University owns the structure and leases the underlying 0.6 acres from the Los Angeles Department of Water and Power.

Once the home of the High Sierra Presbyterian Church, this building now provides the first dedicated classroom space at SNARL. It can seat 30 people for talks or 20 at work tables and is available to any college-level course visiting or originating at SNARL.

Big Creek Adds Laboratory and Weather Station

Landels-Hill Big Creek Reserve Manager John Smiley recently converted the storage shed near the reserve's main entrance to a research laboratory and library using funds generously donated by A. E. Steward Chaffey. This 400-square-foot facility has running water, a gas hookup, and is solar powered. It houses the beginnings of an herbarium and insect collection, study skins, and scientific journals, and contains two IBM personal computers, microscopes, and limited bench space available to reserve users.

Smiley has also installed the first three units in a network of electronic weather stations, one of which is located at the lab.

Reserve Research and Management

NSF Funds Archaeology at Santa Cruz Island Reserve

Dr. Jeanne E. Arnold, Institute of Archaeology, UCLA, recently received $92,000 from the National Science Foundation (NSF) to study the emergence of prehistoric cultural complexity on Santa Cruz Island.

Arnold's work focuses on the period between 1050 and 1350 A.D., when it appears the island's Chumash population went through a transition from an egalitarian society to one with a hierarchical political economy. She hypothesizes that this evolution can be traced to an environmental change that occurred in the first century of this period, when water temperatures rose and fluctuated in a very severe El Niño, devastating populations of marine species that the island peoples relied upon.

By the end of the period, the Channel Islands apparently served as the "mint" for the region's bead "money" supply. Islanders used the beads they made to obtain food from the mainland, where resources were much more stable.

Arnold and colleagues hope to determine if the stress caused by limited food resources created the political opportunities for centralized leaders to take control of the production and distribution of beads. They are currently surveying, excavating, and auger-sampling several sites in order to analyze both the environmental change itself and the subsequent alterations in diet, health, settlement patterns, and economic organization.

In a very successful fall field season, Arnold's group recorded almost three dozen previously undocumented archaeological sites and identified seven sites with well-preserved strata spanning this transitional period.

Arnold has been studying craft specialization at the Santa Cruz Island Reserve since 1980. Other members of this project come from UC Santa Barbara, the Santa Barbara Museum of Natural History, the University of Northern Iowa, and UCLA. To augment her research grant, the NSF has also given Arnold a Research Experience for Undergraduates Award to cover the expenses of Barbara Stevenson, a UCLA honors student who will assist Arnold in the field this year.

James Reserve Helps Forest Service Develop Fire GIS

Smokey the Bear has traded in his shovel for a personal computer in the San Bernardino National Forest, thanks to faculty at UC Riverside and the James San Jacinto Mountains Reserve.

Working with the Forest Fire Laboratory in Riverside and the UCR Department of Geography Research Laboratory, James Reserve Resident Director Mike Hamilton helped develop a Geographic Information System (GIS) for the 200,000-acre San Jacinto Ranger District. This state-of-the-art computer system will aid forest managers in predicting the behavior of wildfires, determining where to set prescribed burns, and deciding when to let natural fires burn themselves out. The U. S. Forest Service, which funded this pilot project, plans to adopt GIS technology nationwide by 1991.

A GIS enables researchers to combine many different types of data—including topography, soils, vegetation, climate, hydrology, fire history, and roads—onto one map in order to analyze the various features and how they interact. The fire GIS, which uses ARC/INFO software, now resides on the UCR mainframe under the watchful eye of Richard Minnich, director of the GIS lab. This database is now being transferred to an IBM AT in order to integrate it into the James Reserve interactive video system (see *Transect* 5(2):1).

Hamilton published an article on the project with Research Forester Lucy Salazar and Keith Palmer of UCR in the February 1989 issue of *Fire Technology*.

California Policy Seminar Funds SNARL-Based Work

Last year, the California Policy Seminar funded a survey of the distribution of the brine fly at Mono Lake by Timothy J. Bradley and David B. Herbst, both of UC Irvine. Using the Sierra Nevada Aquatic Research Laboratory as a base of operations, the researchers are studying the effect of the lake's declining water levels on the population of this insect, which provides a vital food source to the birds that feed and breed at Mono Lake.

More definitive information about the loss of brine fly habitat is a critical component of any analysis of the impact of continued diversion of water from Mono Lake. The ultimate goal of the study is to help establish an ecological basis for Mono Lake water management.

The California Policy Seminar was convened by Governor George Deukmejian, Assembly Speaker Willie L. Brown, Jr., Senate President Pro Tem David Roberti, and UC President David P. Gardner to help bridge

News and Notes *continued*

the gap between academics and public policy by allowing the state to draw directly on faculty expertise for a variety of studies. By funding research such as this, the seminar seeks to provide public officials with the information they need to form sound policy.

Peregrine Falcons Breed on Santa Cruz Island Reserve

For the first time in more than 30 years, young peregrine falcons should fledge from the Santa Cruz Island Reserve this spring.

Greg Austin, of the Santa Cruz Predatory Bird Research Group (SCPBRG), discovered a four-egg nest in early April on the west end of the island. By the end of the month, three of the eggs had broken; SCPBRG biologists Matt Nixon and Lee Aulman replaced the remaining egg with two 14-day-old chicks, one captive-bred and one taken from another wild nest.

The new parents began feeding their foster chicks later that day. Meanwhile, Nixon and Aulman began incubating the island egg, which hatched April 30.

This breeding management program is part of a decade-long effort to save the endangered peregrine falcon from near-extinction in North America. A top-of-the-food-chain predator, the falcon accumulates high levels of toxins that are passed on to its eggs. DDT, in particular, thins the shells, drying out the eggs and making them very fragile. As a result, the birds are unable to hatch their chicks successfully in the wild.

By incubating and hatching the eggs in captivity, then reintroducing young to the wild, the SCPBRG has helped the species recover from 2 breeding pairs in California in 1979 to more than 80 this year. Biologists believe the state historically supported about 150 pairs.

The Predatory Bird Research Group, located at UC Santa Cruz, is the West Coast affiliate of the Peregrine Fund. It is currently working with an interagency team on a four-year study of the state's peregrine population that will be used by the U. S. Fish and Wildlife Service in evaluating whether the species can be delisted from endangered to threatened. While surveying the Channel Islands as part of this study, Austin also discovered peregrine nests on San Miguel and Anacapa.

Craig Hummel-wright

A peregrine falcon guards two three-week-old chicks placed in her nest as part of a breeding management program run by the Santa Cruz Predatory Bird Research Group.

Motte Reserve Manages Fires

Motte Rimrock Reserve Director Barbara Carlson is preparing a fire management plan with the assistance of personnel from the Perris office of the California Department of Forestry (CDF). The plan includes widening existing reserve roads to act as fire breaks and to increase access for fire trucks, grading fire breaks along fence lines next to populated areas, hand-clearing fire breaks in sensitive and inaccessible areas, establishing a policy of using hand crews and water to extinguish fires on the reserve, reducing fuel loads in some high fire hazard areas, and conducting prescribed burns to protect special features.

The plan is vital to the reserve's management, as the site has sustained eight fires in the past ten years. All had human causes; two were started on the reserve by children playing with matches. Because the reserve is in a rapidly urbanizing area, it is constantly at risk for this type of burning. All recent fires have been marked with permanent metal stakes, making the reserve an outdoor laboratory for fire succession research in grassland or coastal sage scrub.

Even though the management plan is only in draft form, it has already been implemented in fighting the two fires within the past year. In both cases, CDF used only hand crews and water. In addition, the new fire lanes prevented one fire from spreading in two directions, assisting the crews in extinguishing it quickly.

People

UCSD Academic Coordinator Becomes County Biologist

Julie Vanderweir, former academic coordinator for the UC San Diego reserves, recently accepted the position of Biologist for the County of San Diego's Department of Planning and Land Use.

We wish Vanderweir well in her new job and look forward to continuing to work with her on land-use policy issues in San Diego County.

M. L. Herring

Looking north over the Motte Rimrock Reserve, site of a new cooperative fire managment plan.

Former First Lady Visits Bodega

On April 12, Lady Bird Johnson toured the Bodega Marine Reserve along with about 18 other people involved in the National Wildflower Research Center in Austin, Texas. The center studies and passes along information about some 20,000 species of American wildflowers. This visit was part of a tour of Northern California sites known for their blooms.

Reserve Director Teaches Image Processing for Ecology Abroad

On March 1, James San Jacinto Mountains Reserve Resident Director Mike Hamilton returned from Caracas, Venezuela, where he taught a six-week course entitled "Ecological Image Processing: Microcomputer Techniques for the Ecological Sciences." He was based at the Institute of Tropical Ecology at the University Central de Venezuela.

Twenty-three students attended the course, most representing natural resource areas throughout the country. Using Apple Macintosh computers, the class assembled a database and interactive laserdisc consisting of maps, photos, and ecological data for many locations throughout Venezuela.

Hamilton will teach the course again next year.

NRS Planner Appointed to Ecological Society Committee

Jeff Kennedy, NRS Senior Environmental Planner, has been appointed to the Ecological Society of America's Long-Term Studies Section. Its objectives include encouraging research on long-term processes in ecological sciences; exchanging ideas on techniques, procedures, and selection of parameters; facilitating communication of the results of research; and enhancing public understanding of the relevance of long-term ecological data to identification and resolution of societal problems.

As part of this assignment, Kennedy recently visited the Andrews Experimental Forest (AEF) in Oregon, the only National Science Foundation Long-Term Ecological Research site west of the Rocky Mountains. He also hosted the site's director, Arthur McKee, on a tour of selected NRS sites. As a result, the AEF intends to include the Landels-Hill Big Creek Reserve and the Northern California Coast Range Preserve (NCCRP) in its extensive Pacific Northwest sampling program designed to to quantify the structure and ecosystem dynamics of old-growth forests. In particular, the program will focus on the linkages between terrestrial forest and aquatic stream systems. Both Big Creek and NCCRP encompass entire old-growth watersheds with significant anadromous fisheries.

NRS Bids Farewell to Two Long-Time Friends

Whether measured as human beings or as professionals, Jim Kendrick and Maynard Toll were exemplary and will long be remembered. The Natural Reserve System is fortunate to be the beneficiary of their remarkable insight, direction, and support, and, as NRS Director, I was fortunate to consider them among my closest friends and advisors.

Jim Kendrick's association with the University spanned nearly 60 years—as a part-time employee, student, faculty member, and administrator. From 1968 until his retirement in 1986, he served as Vice President—Agriculture and Natural Resources. The NRS was added to his portfolio in 1977; Jim was instrumental in developing greater recognition for the program, both internally and externally, integrating the NRS into the academic programmatic framework of the University, and generating additional core support.

But it is the character of the man that lingers most vividly. As UC President David P. Gardner said at Jim's memorial service in February, "He was a man who cared about others, who cared about the service he was rendering, and who cared deeply about the University of California and the noble cause it sought to advance."

Maynard Toll contributed to the development of the NRS in a different capacity—as an attorney and as a member of the Citizen's NRS Advisory Committee. His clients included Carol Valentine and the Valentine Foundation, who combined in donating the magnificent Valentine Camp—a component of the Valentine Eastern Sierra Reserve—along with a $600,000 support endowment. They also included the trust that conveyed, on a bargain sale basis, 120 acres of what is now known as the Carpinteria Salt Marsh Reserve. As a member of our advisory committee for some 15 years, Maynard gave invaluable input and raised thousands and thousands of dollars from private sources.

The NRS was but one recipient of his humanitarianism. Most fittingly, the Legal Aid Foundation of Los Angeles established the annual Maynard J. Toll Award in 1985 to honor attorneys who represent Toll's record of public service.

Two uncommon men. They will be greatly missed by many, and the NRS extends its deepest sympathy to Evelyn Kendrick, Ethel Toll, and their families.

Roger Samuelsen, Director
Natural Reserve System

Opportunities

New Student Grants To Funds Research on NRS Reserves

The NRS Student Research Grant Program provides grants of up to $1,000 each to UC graduate or undergraduate students for research on NRS reserves.

Policies and procedures for 1989-90 awards have not been finalized. See page 2 for information on this year's winners, and keep in touch with your campus NRS representative for more news of the upcoming competition.

Funds Available for Island Research

Would you like to do research on Santa Cruz Island? The Nature Conservancy (TNC) and the Santa Barbara Museum of Natural History are providing grants of up to $20,000 for projects that address questions related to the terrestrial and freshwater flora and fauna, geology, and ecology of the island. Preference is given to those projects that bear on current or potential management issues before TNC.

Applications are reviewed as they are received. For general description and guidelines, grant applications, and a list of high-priority research topics, contact: Santa Cruz Island Director of Stewardship, The Nature Conservancy, 213 Stearns Wharf, Santa Barbara, CA 93101, (805) 962-9111.

Publications *continued from page 5*

near the Coal Oil Point Natural Reserve. It also discusses the results of a previous reserve-based project (see *Transect* 4(2):2).

To obtain copies, send requests to the Herbarium, Department of Biological Sciences, University of California, Santa Barbara, CA 93106. Please make checks payable to "The Regents of the University of California."

New Reserve Brochures Come Off the NRS Press

The NRS recently produced brochures for the Sierra Nevada Aquatic Research Laboratory and the Motte Rimrock Reserve. Designed for prospective reserve users, each publication describes the natural resources of the site and contains information on access, facilities, and use.

Also available are brochures for Año Nuevo Island Reserve, Bodega Marine Reserve, Granite Mountains Reserve, Hastings Natural History Reservation, Jepson Prairie Reserve, Landels-Hill Big Creek Reserve, Philip L. Boyd Deep Canyon Desert Research Center, Pygmy Forest Reserve, San Joaquin Freshwater Marsh Reserve, Santa Cruz Island Reserve, and Valentine Camp. 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 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.

100% Recycled paper
Edited by Sarah Steinberg Gustafson
Designed by Pam Fabry

In accordance with applicable Federal laws and University policy, the University of California does not discriminate in any of its policies, procedures, or practices on the basis of race, religion, color, national origin, sex, marital status, sexual orientation, age, veteran status, medical condition, or handicap. Inquiries regarding this policy may be addressed to the Affirmative Action Director, University of California, Agriculture and Natural Resources, 300 Lakeside Drive, 6th floor, Oakland, CA 94612-3560, (415) 987-0097.

04-UJ14
Natural Reserve System
University of California
300 Lakeside Drive, 6th floor
Oakland, California 94612-3560
(415) 987-0150

Nonprofit Org.
U.S. Postage
PAID
Berkeley, CA
Permit No. 1