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Natural Reserve System: Putting the “Nature” in “Natural Resources”

A number of years ago, the University's Division of Agricultural Sciences changed its name to the Division of Agriculture and Natural Resources. The change expressed the importance of California's abundant natural resources to agriculture and to the state at large.

California's citizenry has grown increasingly concerned about the deterioration of our global environment and the rapid loss of the state's natural diversity. Such concern underscores both the importance of research designed to understand and wisely manage natural systems and processes, and the need to better educate students and the general public about these crucial resources. Ironically, as the need for long-term environmental knowledge increases, the number of possible sites for field study continues to decrease as natural areas are converted to other uses.

The Division provides vital research and teaching opportunities in the environmental sciences through the Natural Reserve System (NRS), which has just celebrated its 25th anniversary. An educational innovation born of necessity, the NRS grew from the University's need for field sites that reflect the state's unparalleled natural diversity and that can be kept safe from habitat degradation. The network has grown from seven sites at its inception to 27 reserves and three affiliated sites, with several new acquisitions pending. At more than 130,000 acres, the NRS is the largest and most diverse university-owned system in the world.

The reserves extend the length and breadth of the state, and range in elevation from 750 feet below sea level (offshore) to 8,500 feet above. They preserve examples of a majority of California's habitat types, including island, coastal, wetland, desert, and mountain ecosystems.

NRS sites are devoted entirely to academic purposes. They are protected and managed specifically so that teachers and researchers can undertake long-term projects with the confidence that their outdoor classrooms and laboratories will not be disturbed.

The success of the NRS approach is evident in its intensive use for teaching and research. Last year, more than 4,400 students visited NRS sites, some in introductory field classes, others in advanced courses that spend an entire semester on reserves. These students are able to reinforce the knowledge they gain in the classroom with firsthand experience in natural ecosystems; they graduate with the training necessary to begin to recognize and solve environmental problems.

In addition, more than 1,800 scientists participated in 350 research projects on NRS sites last year alone. More than 2,200 professional publications have been based on studies conducted on reserves. Many of these scholars, who come from all over the world to use these unique reserves, would find it impossible to perform work of equal caliber without the protected sites and services the NRS provides.

Because reserves draw faculty from many institutions and a variety of disciplines, NRS sites serve as catalysts for integrated

research into the basic ecological principles that apply to such human concerns as global climate change, energy shortages, habitat restoration, pollution, and preservation of biodiversity. The program contributes to land stewardship statewide by working with conservation organizations and public agencies responsible for managing natural resources and regulating environmental quality.

Some reserve-based research applies directly to agricultural problems. For example, the Sierra Nevada Aquatic Research Laboratory in the Owens Valley was the base of an integrated study that tracked all moisture entering and leaving an entire watershed to determine the effect of acid precipitation on water quality. At the Hastings Natural History Reservation in the central Coast Range, a local rancher is funding a study of the effects of gopher activity and cattle grazing on native perennial grasses. At the Boyd Deep Canyon Desert Research Center in the Coachella Valley, scientists are examining the water relations, net CO₂ exchange, and thermal relations of selected desert plants to better understand plant functioning in arid regions.

For its first 25 years, the Natural Reserve System has concentrated on acquiring land — on setting aside valuable teaching and research sites while they're still available. As the collection of habitats nears completion, the NRS is entering a new phase that concentrates on making the sites more useful by expanding facilities, personnel, and support services, as well as on more fully integrating the NRS into the academic programs of the UC campuses. Within the Division, the NRS offers unique opportunities for Agricultural Experiment Station scientists by using, for example, natural resource systems to address questions related to sustainable agriculture. Many of the reserves could become excellent laboratories for Cooperative Extension education programs on natural resource management.

Last year, I appointed a Steering Committee on Long-Range Planning to chart the development of the NRS in this era of increasing concern for the environment. The committee, chaired by UC Riverside Chancellor Rosemary S. J. Schraer, has just completed a report on how the NRS can build on present strengths to fulfill its potential as a world-class facility for the study of the earth and its natural systems.

The report stresses the urgent need for adequate support facilities and personnel, effective organization, and sufficient funding for the NRS, which now operates on only \$2 million annually, the majority of it non-state funds. The committee concludes that the Natural Reserve System is central to the mission of the University: "As California's natural resources become increasingly scarce and global environmental problems more ominous, the value of the NRS will continue to grow, as will its role in teaching, research, public service, and resource management."