



Agriculture and the ecosystem: partners for life

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Consider these facts cited in a recent report of the Council for Agricultural Science and Technology:

- Humans control and use to their benefit 40% of Earth's land surface.
- In the process, humans frequently jeopardize other species' habitats.
- Not surprisingly, human activity of all kinds has led to losses of biodiversity — the essential web of life that constantly renews the planet. Scientists report that extinctions are occurring 1,000 times faster than at any time in the last 10,000 years.

The CAST report, "Benefits of Biodiversity" called for significant expansion of germplasm collections and natural reserves. Moreover its authors, a 14-member scientific task force, called for production agriculture to function as one component in a complex and highly interdependent ecosystem encompassing all aspects of nature.

Increasingly, agricultural and environmental issues are intertwined and inextricable. Solving problems in either realm, without considering the impacts on the other, can have unintended and sometimes ruinous consequences.

In California, for example, historical damming of rivers throughout the state has endangered native runs of California salmon, and more recent decisions protecting vernal pools and other forms of habitat have restricted agricultural activities.

As species are listed for protection under the Endangered Species Act, the watersheds affecting their habitat become the focus of intensified water quality concerns and regulation. Federal and state regulators may seek reductions in sediments, nutrients, pesticides and pathogens coming from widely dispersed sources, including farms and ranches.

Nine years ago, UC Cooperative Extension launched a program to help ranchers improve water quality and salmon survival (see page 4). The Rangeland Watershed Program teaches ranchers what impairs habitat for fish, and how to correct it through livestock and grazing management, stream corridor management, and erosion control.

Since 1994, program participants representing nearly one million acres of privately owned rangeland (1% of the state's land surface) have completed voluntary ranch water quality plans.

Farmers and ranchers have a vital role to play in protecting and restoring the natural environment. Although wildlife restoration projects often take place on state and federal lands, the majority of the nation's wildlife populations are found on private property, according to a recent report by the California Farm Bureau Federation.

Farmers are experts on their own property, and often know firsthand the reasons why biodiversity is important. Ecosystem

processes dependent upon biodiversity include generation of soils and their fertility, detoxification of wastes, pollination of crops and natural vegetation, and control of most potential agricultural pests.

Just as a healthy ecosystem is vital to agriculture, agriculture can provide a haven for wildlife, by forming a buffer between natural habitat and urban development. Development not only consumes wildlife habitat, it fragments what is left, creating islands of space too small to support healthy populations of mammals and migratory birds. Farms and ranches can provide feeding, breeding and wintering areas, as well as stopovers for migrating birds.

When agriculture is designed to accommodate wildlife, the results can be dramatic (see page 10). Agricultural landowners in the Sacramento Valley have built brood ponds for waterfowl. The California Waterfowl Association has observed 65 different bird species at these sites.

Scientists have also reported that well-managed use of wildlands for agriculture can be beneficial to wildlife (see page 12). Field studies have confirmed that harvesting marsh grasses in the Ash Creek Wildlife Area has increased sandhill crane abundance and diversity. Wild hay provides cover from predators, and allows the cranes more time for foraging. Harvesting is performed late in the season, after nesting and brood rearing conclude.

Other articles in this issue of *California Agriculture* examine the interaction between the environment and California's growing population, which places high amenity value on such spectacular California landscapes as Yosemite National Park (see page 17). Authors also examine prescribed burn techniques and the tradeoffs involved in prescribed burn programs (see page 22). Unfortunately, the benefits of prescribed burning, as in Yosemite Valley, could be outweighed by the resulting air pollution. Land managers must balance the ecosystem benefits with the needs of 4 million tourists per year.

The role of UC's Division of Agriculture and Natural Resources is to identify priority areas where more research is needed and to provide objective, unbiased research-based information. There is an urgent need for research to support management decisions for agriculture and the environment.

The development of agriculture 10,000 years ago freed humans to create what is today a vast and complex industrial society. However, improving both our lifespan and the quality of our lives through a highly efficient agriculture has had unintended consequences for biodiversity. By developing collaborative approaches that involve all stakeholders, we can integrate agriculture into the whole ecosystem, and better protect the earth's biocomplexity — on which we all depend — and agriculture itself.