



Cattle grazing is used to control invasive species and reduce fire fuel loads at Mission Peak Regional Preserve in Fremont managed by the East Bay Regional Parks District. Photograph courtesy of Sheila Barry, University of California Cooperative Extension.

CONSERVING AND MANAGING PRAIRIE, GRASSLAND, AND VERNAL POOL LANDSCAPES THROUGH COLLABORATION

by Pelayo Alvarez

About 250 years ago the Spaniards arrived in California in an event that forever changed landscapes in the state. They brought with them things from the old world that were important for their survival, including livestock and a long list of plant species that thrived in California's Mediterranean climate. Some of those non-native species provide the basis for what is now a vibrant agricultural multibillion dollar industry.

Other plant species, such as yellow star thistle, were accidentally introduced and became invasive, wreaking havoc in both natural and agricultural systems, reducing production, fragmenting habitats, and altering competitive interactions among plant species and other im-

portant ecosystem processes. The scale and rapidity of the vegetation conversion was unprecedented and brought about additional management challenges to the already complex system that comprises California grasslands. Today only one percent of remaining grasslands are native. Despite that catastrophic vegetation conversion, California grasslands remain one of the most biodiverse systems in the world.

ECOLOGICAL VALUE OF GRASSLANDS

There are over 11 million acres of grasslands within and encircling the Central Valley and the interior Coast Range, many of which are

privately owned and managed as rangelands for livestock production. Grasslands in California provide multiple ecosystem services—the benefits that human societies obtain from nature—including wildlife habitat, watershed protection, open space, and climate change mitigation.

California grasslands support a wide variety of wildlife species including freshwater fish, birds, invertebrates, and mammals (Hunting 2003). There are 75 species associated with California grasslands, including 10 vertebrates, 14 invertebrates, and 51 plants that are listed as threatened or endangered under the Endangered Species Act (Jantz et al. 2007).

California valley grasslands arguably provide the most important



In serpentine soils, grazed sites (right) provided better habitat for the endangered Bay Checkerspot butterfly than ungrazed ones (left). Photograph courtesy of Dr. Stuart Weiss, Creekside Center for Earth Observation.

perwintering habitat for raptors in North America (Pandolfino 2006). California Bird Species of Special Concern (Shuford and Gardali 2008) which use these habitats extensively include Mountain Plover, Burrowing Owl, Loggerhead Shrike, Grasshopper Sparrow, and Tricolored Blackbird.

Grasslands also provide impor-

ception among land managers and the conservation community regarding grazing and other ranching activities was very negative. Land managers in California quickly removed grazing from land that was historically grazed in an attempt to restore it to a natural state. After a few years and in the absence of disturbance,

tant habitat for pollinators that are essential for pollinating California's agricultural crops. The value of pollinator services from wild pollinators to California agriculture has been estimated at between \$937 million and \$2.4 billion per year (Chaplin-Kramer et al. 2011).

Despite their ecological value, California grasslands do not enjoy the same protection that other areas do. In the 1980s and 1990s the per-

the non-native annual grasses and other invasive plant species created an impenetrable thatch that further suppressed native plants. However, a few forward thinking land managers began rethinking the previously held views on the role of grazing when they saw that, on a number of private ranches, the wildflowers were still thriving in upland areas and vernal pools.

A NEW PERSPECTIVE ON GRAZING

The concept that grazing could be beneficial in the management of California grasslands was not news to the California Native Plant Society. An article in the January 1992 issue of *Fremontia* describes how grazing could be used to favor native bunch grasses (Edwards 1992). But it was not until years later that research done in California started to provide scientific evidence that

Cattle grazing vernal pools at North Table Mountain Ecological Preserve, managed by the California Department of Fish and Game. Photograph by Tracy Schohr.



properly managed grazing could be an important tool for increasing the conservation value of grasslands and associated habitats in California.

Research conducted by Jaymee Marty, an ecologist with the Nature Conservancy, and collaborators suggested that cattle grazing could be an essential management tool in maintaining biodiversity in vernal pool ecosystems (Marty 2005). Cattle consume the more palatable non-native annual grasses that invade vernal pools, allowing native plants and the species that depend on them to thrive. In addition, by reducing evapotranspiration from the non-native annual grasses, cattle grazing increases the inundation period of the pools by as much as 50 days. This allows vernal pool endemic invertebrate species to complete their life cycle (Pyke and Marty 2005).

Similar beneficial effects of grazing have been found on serpentine sites south of San Francisco Bay (Weiss 1999). These sites support many rare plant and wildlife species, including the endangered Bay checkerspot butterfly. Studies conducted by Dr. Stuart Weiss, chief scientist at the Creekside Center for Earth Observation, showed beneficial effects of grazing on butterfly habitat in south San Jose where non-native annual grasses were outcompeting the dwarf pliantain, a plant that the checkerspot butterfly caterpillar feeds on. In this ecosystem, cattle selectively graze the non-native grasses over the native forbs, favoring the dwarf pliantain and allowing the butterfly to thrive (Weiss 1999).

More recent research published



Dark blue shows rangelands of highest conservation value and level of threat of conversion. Source: California Rangeland Conservation Coalition, 2007.

in the December issue of the *Journal of Wildlife Management* (Germano et al. 2011) summarizes ten years of data on the effects of grazing and invasive grasses on desert vertebrates in California. The study concluded that grazing can be used to control exotic non-native grasses and be beneficial to vertebrate species that rely on open habitats, such as the blunt-nosed leopard lizards, giant kangaroo rats, short-nosed kangaroo rats, and San Joaquin antelope squirrels, among others.

Today grazing is recognized as a cost-effective and natural tool for managing vegetation and enhancing wildlife habitat and other ecosystem services. It is also a tool that is being used by several land management agencies in California that rely on local ranchers to be able to meet their conservation goals.

Other activities associated with

ranching are also beneficial from a conservation standpoint. Ranch stock ponds play an increasingly important role in providing habitat for amphibians. In the Bay Area, stock ponds on ranchlands provide up to 50% of the remaining habitat for the threatened California tiger salamander (United States Fish and Wildlife Service 2006).

Other ecosystem services from rangelands are increasingly being recognized, including open space, watershed protection, and climate change mitigation and cultural services. Among the cultural values we should recognize are recreation, open space, and the knowledge ranchers have accumulated over generations on how to manage these lands.

Although views on the ecological importance of grasslands and the role of ranching are gradually changing, ranchers still face numerous challenges to stay in business. Profit margins are extremely low, making conversion to other uses (vineyards, orchards) a tempting proposition to ranchers that are land rich and cash poor. Younger generations may not be interested in ranching, and land prices make it difficult for them to start their own operations. Little by little the infrastructure that once supported ranching has slowly been dismantled, making ranching in some areas a marginal activity.

A recent rangeland vulnerability assessment by the Nature Conservancy found that every year 20,000 acres of rangeland in California are converted to intensive agriculture and urbanization (Nature Conservancy, unpublished data). The loss and fragmentation of these habitats

CALIFORNIA RANGELAND TRUST

California Rangeland Trust formed following a round table discussion among innovative ranchers who understood the need for a land trust dedicated to preserving not only the land, but also the stewardship and the iconic California ranching heritage that the ranchers provide. Since its founding in 1998, the Rangeland Trust has grown substantially, and to-date has protected in perpetuity over 250,000 acres of rangeland.

Rangeland Trust works to preserve grasslands through voluntary conservation easements. A conservation easement can be purchased or donated, and is an agreement between the landowner and the land trust that the land will remain as is, undeveloped forever. Funding is applied from state and federal programs, and more often these days comes from private foundations and individuals who believe that the Rangeland Trust is protecting both the heritage and the future of ranching in California. Currently, the Rangeland Trust has 120 families on its waiting list that hold nearly 500,000 combined acres of grassland.

In California, there are 34.1 million acres of grassland that provide sanctuary and habitat for the state's diverse wildlife and plant species. Of those, 22 million acres are privately owned, and all are cared for and stewarded by California ranchers.

Through the use of rotational grazing and land management practices by ranchers, rangelands provide habitat and homes for 95% of the state's endangered and threatened species. Grazing and grasslands are also key factors in the spectacular wildflowers that bloom in the spring. Many of the native flowers would be overtaken by invasive species without the use of grazing as a natural management tool.

Urban development and sprawl are major challenges for California's open spaces, and they will continue to put pressure on grasslands and the resources they provide, including clean air, clean wa-

ter, and species habitat. Between 1984 and 2006 over 400,000 acres of California grasslands—the equivalent of more than 303,000 football fields—were lost to development. With the California population still on the rise, development pressures will continue to be relentless.

Conservation easements held by land trusts are an extremely viable alternative to combat the pressures of development. Through conservation easements, ranchers can receive tax benefits and funding to ensure the future of their ranches. Many ranchers use conservation easements to ensure that the ranch stays in the family and remains economically viable. Estate taxes often leave heirs with significant debt and few options to pay the inheritance tax. At times the family is forced to subdivide and sell the ranch for development. However, a conservation easement provides a way to pay inheritance taxes and takes development options out of the equation, lowering both land taxes and the estate taxes.

The hard work and long hours put forth by land trusts in California are key in preserving the state's open spaces and resources. Conservation easements provide rangelands a preferred advantage over development options. However, with the economic downturn and state budget cuts, funds to preserve rangelands are shrinking. As funds become scarcer, land trusts like Rangeland Trust will be relying more heavily on donations from those who believe in their mission.

For the foreseeable future, ranchers and the Rangeland Trust will be facing some tough challenges. However, numerous opportunities still exist to preserve grasslands and the resources they provide for future generations of Californians. The fact that the Rangeland Trust has a half-million acres waiting to be protected through conservation easements is a hopeful sign.

—Sahara Saude

reduces their ability to provide ecosystem services and erodes the socio-economic framework of rural communities.

The accumulation of scientific evidence on the use of grazing as a management tool and concerns over grassland conversion has created an unprecedented alliance. The US Fish and Wildlife Service took the

lead in bringing together ranchers, environmentalists, and regulatory and non-regulatory agencies, after repeatedly hearing from the environmental community about the loss of grassland habitats and species, and from the ranching community about the impact that regulations were having on their ability to stay in business.

BIRTH OF THE RANGELAND COALITION

A barbeque in Sunol, CA provided the backdrop for the first meeting of a group of 12 organizations who had the courage and vision to set aside their differences and focus on potential solutions to protect California rangelands. Among them

were representatives from the California Native Plant Society. “We did not know if we were going to a barbecue or to be barbecued,” said Carol Witham, “but it was clear that there was some common ground to work with.”

The new coalition was called the California Rangeland Conservation Coalition,¹ and founding organizations crafted a document, the Rangeland Resolution, that outlines the principles by which Coalition signatories work together. A focus map was created (see page 51) that prioritized area in the Central Valley and inner Coast Ranges where important species and habitats needed to be protected. It included 500 rare plant species in grasslands, blue oak woodlands, and vernal pool habitats.

Today the Coalition has grown to more than 100 organizations, including government agencies, researchers, environmental organizations, and others who work together to protect and enhance the economic and ecological values of grasslands in the Central Valley of California. Overall the Coalition tries to promote collaboration and improve communications among all the people and organizations who have an interest in these areas.

Science was essential in breaking the barriers between the various Coalition partners, and that made possible the creation of this broad umbrella organization. Science remains central to its ongoing work, which promotes multidisciplinary scientific collaborations and facilitates interactions between the research community, ranchers, and land managers.

Outreach efforts are focused on raising awareness of the importance

¹ The California Rangeland Conservation Coalition is an alliance of environmental organizations, government agencies, and the ranching community whose mission is to bring together ranchers, environmentalists, and government entities to conserve and enhance the ecological values and economic viability of California’s working rangelands.

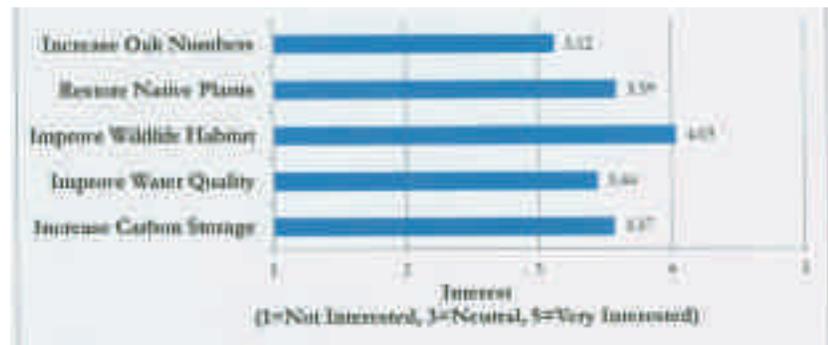
of California grasslands and the need to work with private landowners for their protection. The Coalition organizes a yearly conference, maintains a website (<http://www.carangeland.org>), and hosts several field trips, workshops, and presentations on a variety of topics such as grassland ecology and management, existing conservation programs available to ranchers, and emerging markets for ecosystem services such as car-

dinate permits for conservation projects on private lands, and improve communications with the ranching community.

RECOGNIZING SHARED VALUES

Defenders of Wildlife, a national environmental organization with a strong California presence, early on

FIGURE 2. RANCHER INTEREST IN SELECTED ECOSYSTEM SERVICE RELATED ACTIVITIES.



Ranchers in the Central Valley were asked to rate their interest in providing ecosystem services (Cheatum et al. 2011). Respondents expressed an interest in “improving wildlife habitat” and “restoring native plants.”

bon sequestration and water quality markets.

In the policy arena, the Coalition supports public policies that maintain essential infrastructure and technical capacities of government agencies, and at the same time improve the business and regulatory environment for ranchers. For instance, it supports policy tools that are important to ranchers such as the Williamson Act—which provides tax incentives to agricultural producers in California—and the estate tax.

It also seeks common ground among its signatories to increase funding for grassland conservation in California. In addition, the Coalition works to promote collaboration among several government agencies in order to increase awareness of the ecological importance of privately owned grasslands, coor-

became one of the most active members of the Coalition. “We realized that we needed to work with ranchers in order to be successful at protecting the native species and habitats that are important to our mission,” explained Kim Delfino, director of the California Office of Defenders of Wildlife. “It’s not always easy for an environmental group to partner with ranchers. Sometimes we have mistrust and preconceived ideas, but after talking with these folks, I’ve come to realize that we share a love of the landscape.”

Today Defenders of Wildlife, in collaboration with other Coalition signatories, conducts research on identifying and quantifying the public benefits of protecting California grasslands. A recent survey of ranchers in the Central Valley showed that ranchers are indeed interested in protecting ecosystem ser-



In the absence of disturbance such as grazing, invasive plant species dominate vernal pools, thus reducing biodiversity. Photograph courtesy of Dr. Jaymee Marty, The Nature Conservancy.

vices such as wildlife habitat and water quality, and increasing native species (see Figure 2), provided that there are incentives available. Relying on the ranchers' desire to become more involved in conservation, Defenders is now working on the development of payments for ecosystem services programs that will give ranchers the opportunity to stay on the land while providing all the environmental benefits that California grasslands produce.

Other environmental organizations have also come to recognize the importance of California grasslands and are now working with the ranching community. By providing incentives that keep ranchers on the land, we will be better able to protect grasslands and their species.

California grasslands and coastal prairies produce many benefits to

Californians. The protection of California's prairies and grasslands requires complex solutions and is integrally linked to the ability of ranchers to continue being good stewards of the land. Fostering collaborations that cross boundaries and engage private landowners, this broad coalition is working towards the protection of these beautiful landscapes. Constantly threatened by the worst in human nature, California grasslands might very well be saved by the best of it.

REFERENCES

Chaplin-Kramer, R., K. Tuxen-Bettman, and C. Kremen. 2011. Value of wildland habitat for supplying pollination services to Californian agriculture. *Rangelands* 33(3): 33-41.

Cheatum, M., et al. 2011. A California rancher survey on ecosystem services. Conservation Economics

White Paper. Conservation Economics and Finance Program. Defenders of Wildlife, Washington, DC.

Edwards S.W. 1992. Observations on the prehistory and ecology of grazing in California. *Fremontia* 20: 3-11.

Germano, D.J., G.B. Rathbun, and L.R. Saslaw. 2011. Effects of grazing and invasive grasses on desert vertebrates in California. *Journal of Wildlife Management* 75: 1-13.

Hunting, K. 2003. Central Valley grassland habitat. In *Atlas of the Biodiversity of California*. California Department Fish and Game, Sacramento, CA.

Jantz, P.A., et al. 2007. Regulatory protection and conservation. In *California Grasslands: Ecology and Management*, ed. M.R. Stromberg, J.D. Corbin, and C.M. D'Antonio. University of California Press, Berkeley, CA.

Marty, J.T. 2005. Effects of cattle grazing on diversity in ephemeral wetlands. *Conservation Biology* 19: 1626-1632.

Pandolfino, E. 2006. Christmas bird counts reveal wintering bird status and trends in California's Central Valley. *Central Valley Bird Club Bulletin* 9(4): 21-36.

Pyke, C.R., and J. Marty. 2005. Cattle grazing mediates climate change impacts on ephemeral wetlands. *Conservation Biology* 19(5): 1619-1625.

Shuford, W.D. and T. Gardali. 2008. *California Bird Species of Special Concern*. Studies of Western Birds No. 1. Western Field Ornithologists and California Department of Fish and Game, Camarillo, CA and Sacramento, CA.

US Fish and Wildlife Service. 2006. Designation of critical habitat for the California red-legged frog, and special rule exemption associated with final listing for existing routine ranching activities, final rule. http://ecos.fws.gov/docs/federal_register/fr5071.pdf.

Weiss, S. 1999. Cars, cows, and checkerspot butterflies: Nitrogen deposition and management of nutrient-poor grasslands for a threatened species. *Conservation Biology* 13: 1476-1486.

Pelayo Alvarez, 1303 J Street, Suite 270, Sacramento, CA 95814, pelayo@carangeland.org