

Western Ecological Research Center <http://www.werc.usgs.gov>

The Western Ecological Research Center (WERC) brings unbiased research and data to bear on complex natural resource issues. Scientific data and analyses lead to a better understanding of these issues, enabling land managers and communities to address resource use that affects our environment and quality of life.

WERC is based in the Pacific Southwest, a region containing some of the nation's most ecologically rich and diverse areas. Habitats range from below-sea-level deserts to alpine tundra to coastal mountains, seashores, and marine ecosystems, encompassing 20 different regional climate zones. It is also a region of explosive human population growth, increased competition for scarce natural resources, and recurring natural phenomena like fire, drought, and floods.

Natural resource managers in this region face a daunting array of critical natural resource decisions. Issues include wildland fires, invasive species, environmental contaminants, declining populations of native species, and urban development. Decision-makers need to understand the impacts of land use change on habitats, biological resource systems, and individual and communities of species.

WERC scientists are deployed throughout the region, co-located with partners, clients and collaborators, in proximity to primary research endeavors and client needs. WERC scientists have knowledge in such areas as plant and animal taxa and their habitat needs, and



the natural and human-altered ecological and physical processes influencing them. WERC capabilities match the varied needs of its clients, from ecological research to technology development and simulation modeling. Although research is focused in California and Nevada, WERC expertise extends to national and international programs and concerns.

WERC researchers are collecting information vital to the sound management of plant and animal species of special interest to client agencies, including threatened and endangered species, candidate species for federal listing, and game species. Long-term research on listed species such as the desert tortoise, least Bell's vireo, giant garter snake, and Channel Islands' rare plants are providing key information on threats, habitat needs, and efficacy of management measures taken to recover these species. Amphibian researchers are intently seeking to fully understand the causes for declines in several species of native frogs across the Pacific Southwest. The tracking of migratory waterfowl by satellite is providing insight into their habitat needs on wintering and breeding grounds in addition to seeking the causes of mysterious declines in certain species.

Fire research in the Sierra Nevada is providing managers guidance on how to reintroduce fire to forest ecosystems where fire historically played a vital role in reproduction of such trees as the giant sequoia. A



long-term research project has provided managers with the ability to predict fuel loading by species and make informed decisions on when and where to use prescribed burning. A historical review of wildfires in California chaparral is leading managers and communities to reexamine how to design effective firebreaks against home-destroying Santa Ana wind-driven fires. Other scientists are investigating the relationship between invasive alien plants and wildfires that threaten to change the ecosystems of the Mojave, Sonoran, and Great Basin deserts, and how to best restore desert ecosystems damaged by fire, invasive species, or off-road vehicle use. In north coastal California, WERC disturbance research is evaluating the effect of watershed restoration on reducing sediment loads, improving stream habitat, protecting streamside forests, and increasing populations of salmon and other species.



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WERC research in coastal ecosystems in California and Alaska revealed declines in sea otters and raised awareness and concern for the health of the world's oceans. In the San Francisco Bay estuary, research on wintering diving duck movements and prey will provide regulators much needed information about environmental pollutants and their potential effects in the estuary. Research on how salt pond communities function will help to identify those with wildlife values that are difficult to replace and those that may be successfully restored to functioning intertidal wetlands, so that the greatest diversity of species can be supported in the San Francisco Bay estuary.

WERC research on invasive alien plants will help improve the ability to detect, monitor, and predict the effects of these species. A recent study documenting nonnative plant surveys in Sequoia and Kings Canyon and Yosemite national parks provides a useful template



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for resource managers there and elsewhere to assess alien plant threats and set priorities for managing problem species. Equally important research is being conducted by WERC scientists on exotic animals such as the European green crab.

Through extensive collaborative activities, WERC extends its capabilities to meet the growing need for scientific information. WERC staff provide scientific support for the State of California Natural Communities Conservation Planning Program, U.S. Fish and Wildlife Service recovery teams, the Sierra Nevada Framework for Conservation and Collaboration, the Mojave Desert Managers Group, the southern California fire group, and others.

Center scientists also provide technical assistance—including the development of monitoring protocols and data collection techniques using personal digital assistants (PDAs), and data analysis—for habitat conservation planning in central and southern California and the Mojave and Sonoran deserts. For example, in southern California, this effort has revealed the magnitude of local extirpation of several species, primarily snakes, over the last 70 years, whereas other species, considered sensitive at the start of the study, were found to be widespread and even abundant at certain sites. Carnivore monitoring is identifying wildlife corridors and the importance of unfragmented habitats for wildlife.

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