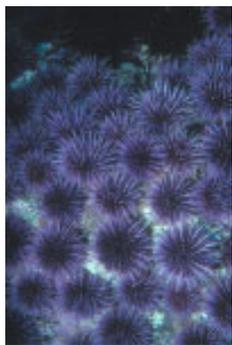


Selected Journal Articles by WERC Scientists

Lead scientists at the USGS Western Ecological Research Center have produced over 250 peer-reviewed journal articles since 1994. Technical products like these put vital information into the hands of resource managers. Highlights of some recent articles follow. Names of WERC scientists appear in bold.

Overharvesting Has Altered Life in the Sea Since the Earliest Fishermen

Scientists documented the long-term effects of fishing and provided a framework for repairing coastal marine ecosystems that have collapsed from centuries of overfishing. They found that human depletion of coastal marine species began thousands of years ago.



Jackson, J. B. C., M. X. Kirby, W. H. Berger, K. A. Bjorndal, L. W. Botsford, B. J. Bourque, R. H. Bradbury, R. Cooke, J. Erlandson, J. A. Estes, T. P. Hughes, S. Kidwell, C. B. Lange, H. S. Lenihan, J. M.

Pandolfi, C. H. Peterson, R. S. Steneck, M. J. Tegner, R. R. Warner. 2001. *Historical Overfishing and the Recent Collapse of Coastal Ecosystems. Science 293:629-638.*

Starving Killer Whales Turned to Sea Otters

Scientists untangled the chain of events that led to the collapse the sea otter/kelp forest ecosystem in the Aleutian Islands. They discovered that the collapse was driven by increased killer whale predation of sea otters in lieu of sea lions and seals, and ultimately caused by human impacts on the oceanic ecosystem.



Estes, J. A., M. T. Tinker, T. M. Williams, and D. F. Doak. 1998. *Killer whale predation on sea otters linking coastal with oceanic ecosystems. Science 282:473-476.*

Blame the Wind, Not Fire Suppression

Analyzing historical records, scientists found that fire suppression failed to prevent large wildland fires in southern California shrublands because these fires usually occur when powerful Santa Ana winds blow. Under Santa Ana conditions, fires carry



through all chaparral regardless of stand age. Therefore, prescribed burning programs to remove old stands and maintain young growth as bands of fire-breaks are futile at stopping these wildfires.

Keeley, J. E., C. J. Fotheringham, and M. Morais. 1999. *Reexamining fire suppression impacts on brushland fire regimes. Science 284:1829-1832.*

California Ravens Are a Breed Apart

Scientists discovered a deep genetic split between common ravens from the southwest United States and the rest of the world. The split probably started through geographic isolation over 2 million years ago, from glaciation during the Ice Age. This discovery will be particularly important to systematists and biogeographers, but also to agencies responsible for managing raven populations where they are endangered.



Omland, K. E., C. L. Tarr, W. I. Boarman, Marzluff, J. M., and R. C. Fleischer. 2000. *Cryptic genetic variation and paraphyly in ravens. Proceedings of the Royal Society of London B 267:2475-2482.*

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Where There's Smoke, There's Germination

Heat from fires induces many plant species to germinate. Scientists established that smoke exposure, but



not heat, was necessary for triggering germination in dormant seeds of 25 chaparral plant species of California. These differences in response to fire are ecologically significant, because the structure of chaparral plant communities is determined by which plant species recolonize the landscape following fire.

Keeley, J. E., and C. J. Fotheringham. 1998. *Smoke-induced seed germination in Californian chaparral.* *Ecology* 79:2320-2336.

Windblown Pesticides May Play an Important Role in California Amphibian Declines

Dramatic population declines in red-legged frogs, yellow-legged frogs, and other frogs occurred in California over the last 10-15 years.



Scientists discovered that organophosphorus pesticides from agricultural areas in the Central Valley, which are transported to the Sierra Nevada on prevailing summer winds, may be affecting populations of amphibians that breed in mountain ponds and streams. They found that pesticides are being absorbed by frogs and suppressing an enzyme called cholinesterase, essential for the proper functioning of the nervous system.

Sparling, Donald W., Gary M. Fellers, and Laura McConnell. 2001. *Pesticides and Amphibian Declines in California, USA.* *Environmental Toxicology and Chemistry.* 20(7):1591-1595.

Large Sequoias Are Younger than Once Thought

Scientists estimate the world's largest tree and other famous giant sequoias growing in California's Sequoia and Kings Canyon National Parks, are younger than formerly thought. Their new age estimates rely on tree-ring measurements from pencil-thin, foot-long cores of wood and mathematical formulas based on measurements from hundreds of sequoia stumps. The General Sherman tree may be little more than 2,000 years old, instead of



earlier estimates placing the tree's age at 5,000 to 6,000 years.

Stephenson, N. L. 2000. *Estimated ages of some large giant sequoias: General Sherman keeps getting younger.* *Madroño* 47:61-67.

Tools for Restoring Northwestern Streams

Predicting how a river channel redevelops after disturbance is important in stream restoration work. A



WERC scientist used a model to look at the developmental sequence of channel changes following sediment pulses in the Redwood Creek basin in northern California and

additional research sites. Understanding the trajectories of physical recovery in disturbed stream systems will help predict the biological response to disturbances.

Madej, M. A. 2001. *Development of channel organization and roughness following sediment pulses in single-thread, gravel bed rivers.* *Water Resources Research.* Vol. 37 No. 8, p. 2259-2272.

Madej, M. A. 2001. *Erosion and sediment delivery following removal of forest roads.* *Earth Surface Processes and Landforms* 26:175-190.

Man's Footprint on California's Deserts

Southern California's Mojave and Colorado deserts, more than 38,000 square miles, have been profoundly altered by humans since

the arrival of modern civilization and it may take centuries for the harsh but fragile ecosystem to recover. Scientists based their conclusions on the first comprehensive examination of the scientific literature on human impacts in southern California deserts, after reviewing more than 150 previous studies by university and government scientists.



Lovich, J. E., and D. Bainbridge. 1999. *Anthropogenic degradation of the southern California desert ecosystem and prospects for natural recovery and restoration.* *Environmental Management* 24:309-326.