

# Carolyn Murphy: Climate change and future of Southern Sierra

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Like many people, I've been frustrated at the lack of seriousness at the national level about climate change. The conversation between "believers" and "non-believers" seems silly and dangerous.

So I was heartened when I attended the Southern Sierra Change Adaptation Workshop in Visalia on Feb. 20-22, to find that groups of committed professionals were indeed analyzing the data and trying to figure out how we should adapt right here in our own backyard.

The workshop was organized by a committee of National Park Service, Bureau of Land Management, U.S. Geological Survey and U.S. Forest Service staff, and was sponsored by the California Landscape Conservation Cooperative, the Sequoia Natural History Association, Sequoia and Kings Canyon national parks, the Bakersfield office of the Bureau of Land Management, the California Fire Science Consortium and the National Park Service Climate Change Response Program.

I learned that the biggest certainty about the future of the Southern Sierra Nevada is uncertainty. Coming changes will be unprecedented and unpredictable. All climate models show a warming between 2.6 and 3.9 degrees Celsius, but they do not agree on how much warming will occur in our foothills and mountains or how that will affect precipitation. About half predict much hotter weather and dryer conditions, and half predict warmer weather and increased precipitation.

What is known about these warmer winters is that the snow is already melting earlier in the spring. This means longer, hotter summers, and higher rates of evaporation, increasing the danger of uncontrollable forest fires and unstable water supplies. Can the fire danger be mitigated, even with thinning and prescribed burning? And since Sierra runoff accounts for nearly 65% of California's annual water supply for human use, what are the implications of unpredictable quantity and timing of our water sources? What will be the impact on agriculture in our Valley?

No place is more iconic than the groves of Giant Sequoias. They need moist soil and fire for successful regeneration. Should they be thinned to reduce competition for water? Should

prescribed burning be used to reduce the danger of severe fires? Should sequoias be planted upslope where the coming environment might be friendlier? Should they be artificially watered to try to preserve the current conditions?

What about the oak woodlands? Most of the woodlands are now on private property, and urbanization has greatly reduced the rate at which these trees reproduce. Warming will increase the summer season and make the winter warmer, again increasing the danger of severe fires. Homes and a great variety of wildlife in this area are at risk.

Studies show that 16 bird species are moderately vulnerable, including the popular osprey and bald eagle. Will their habitats drift upslope where soil conditions are so different? Can they be managed?

How should the agencies respond? Is the National Park Service mission of keeping the parks "unimpaired for the enjoyment of future generations" relevant anymore? Budgets are always tight. Should certain ecosystems be targeted for management and the rest let go? Will there be unintended consequences for artificially trying to maintain current conditions? Can we afford the time to take single steps, or do we need to try all possible solutions and see what works?

There was a method developed at the conference for thinking about the answers to these questions. The first step is deciding what we value the most. Is it biodiversity? Is it watershed? Is it the Giant Sequoias? Is it fire management? Is it involvement with the public? With limited resources and an uncertain future, what becomes most important?

A big concern is with a general public that seems to have found other recreational interests, because the agencies know that these value decisions will have to be shared. Public interest has an impact on budgets, and these forced choice decisions need to have broad agreement going forward.

Thanks to these agencies for continuing to do the hard work. They need our help. We all have a huge stake in what happens in the Southern Sierra. Let's get involved!

More information can be found about the information covered at the workshop at <http://www.cafiresci.org/s-sierra-adaptation-workshop>.

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