



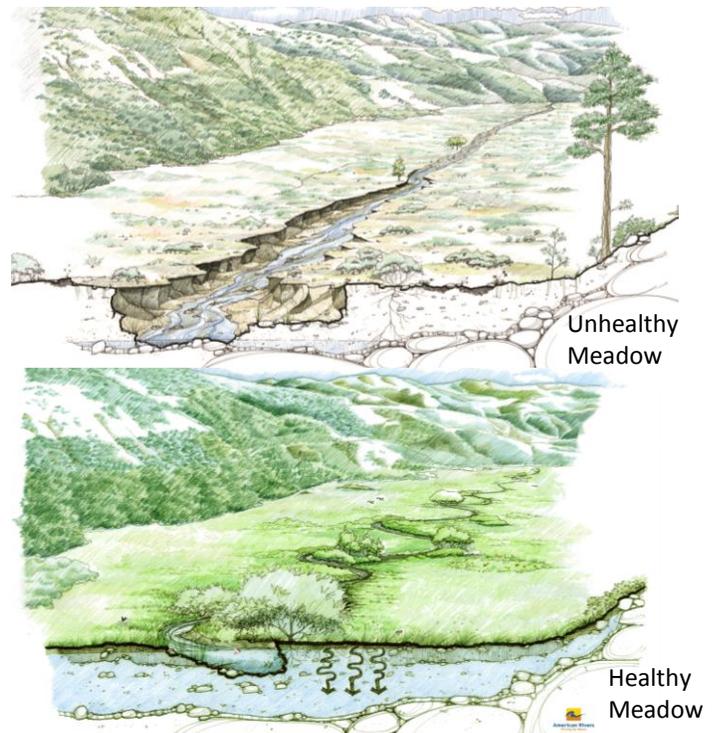
RESTORING SIERRA MEADOWS

Spectacular Scenery Hard at Work

Camp out among the grasses and gentians of glacial meadows, in craggy garden nooks full of nature's darlings. Climb the mountains and get their good tidings, Nature's peace will flow into you as sunshine flows into trees. –John Muir

Sierra meadows are natural marvels. For millennia they have been cultural havens, hotspots of biodiversity and, recently, valued components of California's natural water infrastructure. Sierra meadows absorb snowmelt in early spring and gradually release the stored water throughout the dry summer months. Healthy meadows keep cool water flowing; they also keep streams clear and clean by filtering out sediment and absorbing floodwaters. In 1889 John Muir's laments for overgrazing in Tuolumne Meadows and in the headwaters of the Merced River prompted his proposal to create the nation's third National Park. In 2016, the Governor's Water Action Plan again elevated meadows. "Meadows provide a natural storage opportunity, critically important with a changing climate."

However, mountain meadows need our help. During the gold rush, people and livestock streamed into the Sierra. After witnessing the fragility of the meadows and the impacts of overgrazing, Muir famously referred to sheep as "hoofed locusts" that trampled stream banks and wiped out vegetation which had previously kept the soil in place during spring floods. These impacts, in addition to mining, logging and road building have led to widespread erosion and gullyng of stream channels which once meandered through Sierra meadows. Once erosion takes hold, floodwaters no longer spread out. Instead the energy of high flows is concentrated within the downcut channel, causing further erosion in a cycle of unravelling and degradation. As shown in these figures and the following images, when meadow streams cut



down into meadow soils, meadows dry up and lose many of their marvelous values.

In 2009 American Rivers began a campaign to restore Sierra Meadows, teaming up with the National Fish and Wildlife Foundation to author a 10-year business plan to increase investment in California's headwater meadows. Since that time we have worked with state and federal agencies to prioritize meadows and we have engaged foundations, corporations and other conservation groups to support meadow restoration. As a result, the two largest resource managers in the state, the Forest Service and California's Natural Resources Agency have established meadow restoration goals, and a number of corporations, including Coca-Cola, now invest in meadow restoration.

As support grows, we anticipate that funding for on-the-ground implementation will soon outpace the supply of shovel-ready projects. In response, we are training agency staff and consultants in meadow restoration design. In 2016 we offered a week-long course in meadow restoration which drew 20 Forest Service hydrologists from around the state. We are following up with a mentorship program and more on-the-ground restoration experience. Our goal is to create a full and expanding pipeline of restoration projects that will produce many benefits including a supply of clean water throughout the summer.



Benefits of Meadow Restoration

- **Drought and Climate Change resilience.** The Sierra snowpack is California's largest freshwater reservoir. However, snows melt earlier and the summer drought averages 10 days longer than just 50 years ago. Restoration replenishes natural water storage and increases summer stream flows.
- **Habitat improvement.** A number of rare bird species such as the Great Grey Owl and Sandhill Crane rely on Sierra meadow habitat. Wildlife and fish including Lahontan Cutthroat and Golden Trout also benefit from cool water and improved habitat in restored meadows.
- **Improved forage.** Ranchers observe accelerated livestock growth following restoration. Improved forage also benefits pronghorn, deer and other wildlife.
- **Recreation.** Meadow restoration improves birding, fishing, and wildflower and wildlife viewing.