

EXECUTIVE SUMMARY

Prioritizing Prescribed Fire to Protect Water Quality in the Central Sierra Nevada



SPRING 2021

OVERVIEW

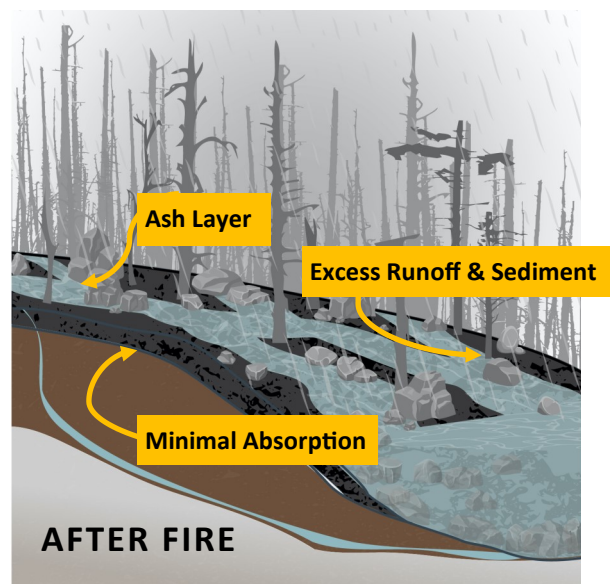
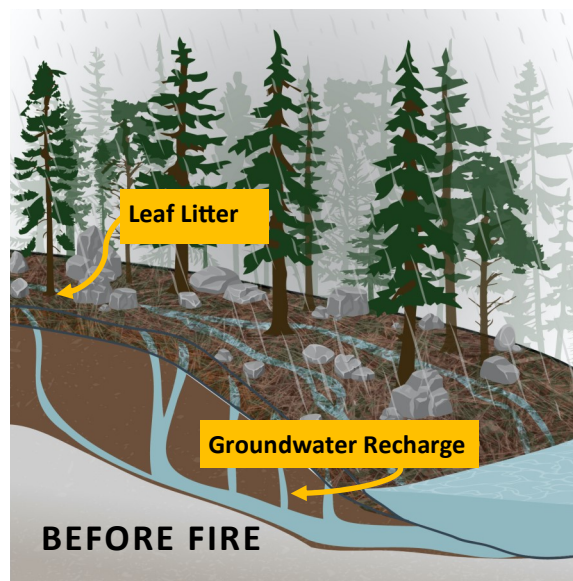
Changes in forest structure and climate have made the forests of the Sierra Nevada increasingly vulnerable to high severity wildfire. Post-fire erosion and sediment delivery to rivers and streams can severely damage aquatic habitat, degrade water quality, and reduce reservoir storage capacity, threatening river ecosystems and clean water supply. Fuel treatments including prescribed fire are an effective way to reduce fire severity, but existing fuel treatment prioritizations generally do not consider wildfire impacts to water resources. Our tool helps land managers include water quality in fuel treatment decision-making processes to minimize wildfire impacts to critical water supply and sensitive riparian habitats.

BACKGROUND

Forest management practices over the last century have resulted in less resilient forest ecosystems in the Sierra Nevada. Where mosaic forest structures once dominated the landscape, today's forests are denser and more homogenous, making them much less resilient to wildfire, drought, and pests.¹ These structural changes, coupled with climate change stressors, have made California's forests more vulnerable to high-severity wildfires.

Due to steep slopes and heavy seasonal rains, Sierra Nevada watersheds are highly susceptible to erosion after high severity wildfires. Post-fire erosion in the Sierra Nevada threatens the primary drinking water supply of over 23 million people and 60% of California's water supply overall.² In addition, post-fire erosion can severely damage aquatic habitat. Ash and debris increase turbidity, nutrient loading, and sediment accumulation, which is harmful to aquatic species.¹

To bolster forest resiliency and reduce the impacts of high-severity fires, California is attempting to increase the pace and scale of forest fuel reduction practices, including prescribed burning. However, insufficient funding, limited capacity, and arduous permitting for fuels reduction projects make it critical to prioritize treatments areas that will yield the greatest benefit. Several prioritization methodologies for fuel treatments exist, but most focus on the protection of homes as the primary goal. Furthermore, little attention has been paid to prioritizing fuel treatments specifically for the protection of water infrastructure and aquatic ecosystems.

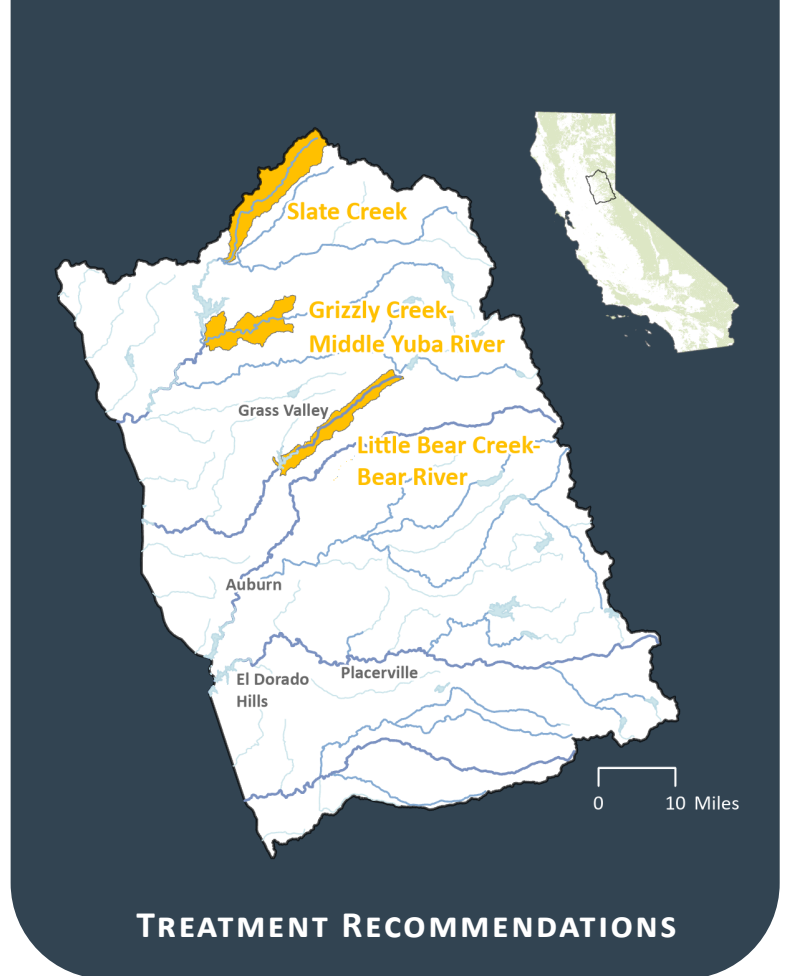


Source: USGS, 2020

OUR TOOL

To help close this gap, the Forests to Faucets team developed a hydrocentric prioritization methodology that identifies locations where high post-fire sediment production coincides with high value aquatic habitat and water infrastructure. Our prioritization methodology is based on seven components: 1) aquatic habitat, 2) water infrastructure, 3) vulnerable communities, 4) local water quality, 5) burn probability, 6) treatment feasibility, and 7) avoided sediment loss due to fuel treatment. The subwatersheds recommended for fuel treatment constitute the intersection of these seven components.

We demonstrate this methodology by prioritizing prescribed fire locations in the Cosumnes, American, Bear, and Yuba (CABY) watersheds, a region that is fire prone, ecologically rich, and a significant contributor to California's water supply. Based on our prioritization, we recommend fuel treatment in Grizzly Creek – Middle Yuba River, Little Bear Creek – Bear River, and Slate Creek watersheds to protect river ecosystems and clean water supply in the CABY region.



ENVIRONMENTAL IMPACT

The result of our project is a transferable decision support tool that can be used to guide fuel treatment planning with water quality considerations throughout the Sierra Nevada. The tool allows users to explore many different scenarios to assist in optimal siting for fuel treatment projects at a regional scale by changing the relative importance of the available benefit considerations to match their interests and the region's specific needs. American Rivers and their partners will use this tool to direct fuel treatments to the places where they will have the greatest benefits to river ecosystems and clean water supply.

Recent state and regional efforts to increase the pace and scale of forest management are likely to increase the funding and resources available for fuel treatment in the coming years. Our methodology allows land and water managers to incorporate consideration of water resources into their fuel treatment planning to direct resources where they will most benefit ecosystems, communities, and water resources.



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Learn more about this project at: www.Forests2Faucets.com

REFERENCES:

1. McCann, H. *et al.* *The Benefits of Headwater Forest Management Technical Appendix*. (2020).
2. California's Primary Watershed. *Sierra Nevada Conservancy* <https://sierranevada.ca.gov/ca-primary-watershed/>.