

Protect California Source Waters: Fix the Roads

Reducing sedimentation from roads is necessary to protect and improve water quality and water supply in California. Efforts should be focused in the Sierra Nevada, which provides 60% of the state's water supply.

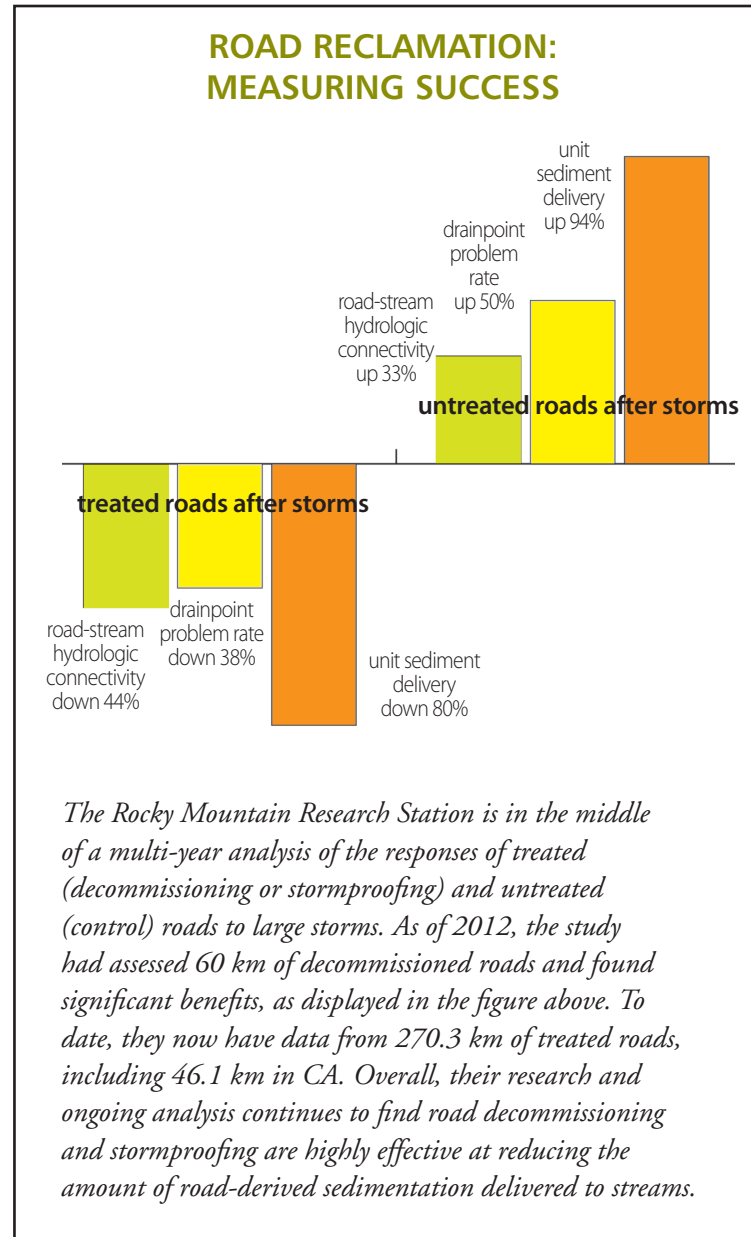
Maintenance and stormproofing treatments are most appropriate for roads that are needed in the transportation network. Examples of treatments include resizing and replacing culverts, upgrading bridges, and outsloping roadbeds.



Road reclamation is most appropriate for roads that are no longer needed or that traverse especially sensitive lands. The most important step in road reclamation is to physically disconnect the road drainage system from the stream/hydrologic system. Treatments include: removing culverts/restoring stream crossings, decompacting and fully recontouring old road beds, and revegetation.

MAKING IT HAPPEN: INVESTING IN MITIGATION AND RESTORATION

- Secure additional funds for road reclamation and stormproofing in headwater areas. Increase the reach and breadth of the Forest Service's Legacy Roads and Trails program which is specifically designed to address forest road impacts to water resources.
- Invest in road mitigation and reclamation. Road mitigation and reclamation funding from the State



of California to improve water quality and native fisheries should continue.

- Encourage public/private and intergovernmental partnerships to facilitate road reclamation and stormproofing across multiple landownerships and targeted in headwater ecosystems.
- Regard road mitigation and reclamation as an economically viable green infrastructure solution that can increase reservoir life and reduce municipal water filtration costs.

A Messy Combination

Forest Roads and Water in California

Clean water is one of the most valued commodities produced by California's forest lands. Small streams in the Sierra Nevada provide 60% of the state's water. Protecting and restoring headwater streams, many of which are within U.S. national forests, will help ensure a sustainable, reliable source of clean water for Californians.

Unfortunately, extensive networks of both outdated (legacy) and modern forest roads in forested headwater areas are diminishing water quality and altering flows. In addition, excessive sedimentation from roads can reduce the storage life of California's reservoirs.

Forest road impacts to water quality and quantity are often cumulative, escalating as road mileage increases. Inadequate maintenance compounds these problems. Full road reclamation can eliminate many of these impacts, while effective road maintenance and stormproofing helps mitigate them.



Approximately 60% of Californians rely on healthy forests for their drinking water supplies.

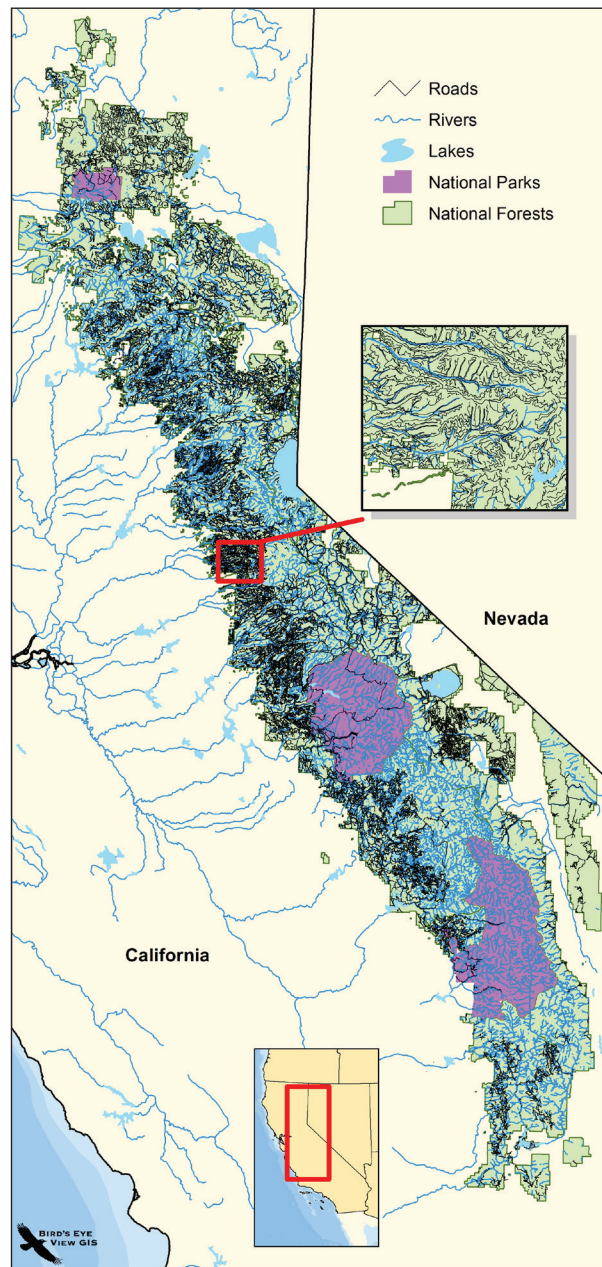
FAST FACTS ABOUT CALIFORNIA ROADS		
Miles of federal interstate highways located in CA		2,460
Miles of federal interstate highways nationally		47,700
Miles of U.S. Forest Service roads located in CA		47,000
Miles of U.S. Forest Service roads nationally		373,000



FOR MORE INFORMATION CONTACT:
 Bryan Bird, Wild Places Program Director
 505-699-4719
 bbird@wildearthguardians.org

WILDEARTH GUARDIANS
 516 Alto Street
 Santa Fe, NM 87501
 505-988-9126

ROADS AND HEADWATERS: A CLOSER LOOK AT THE SIERRA NEVADA



Sediment delivery to streams is typically most problematic where roads cross streams. In California, the Sierra Nevada alone has 7,948 road/stream intersections on federal land – many of which are likely undermaintained and causing significant stream sedimentation.



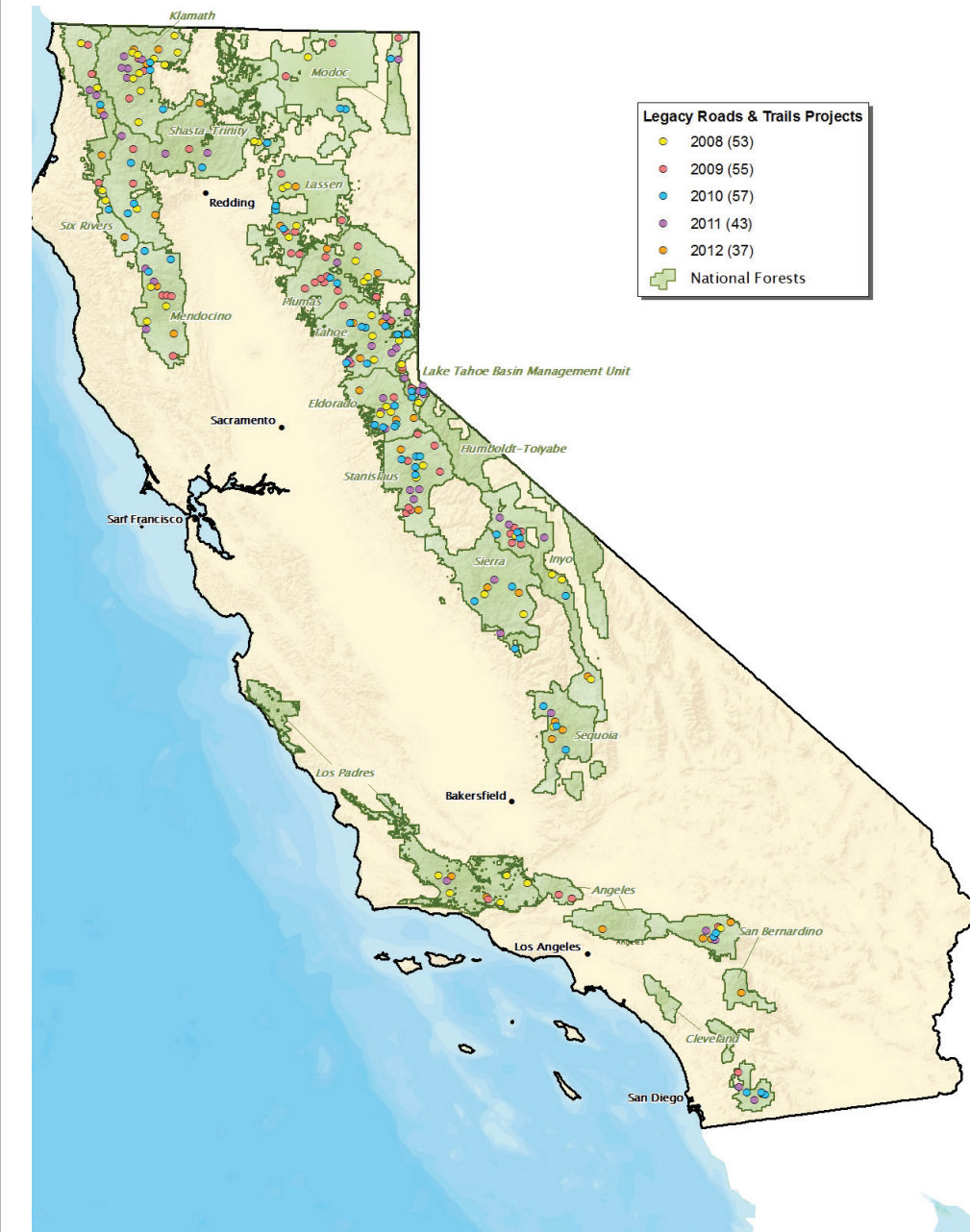
U.S. FOREST SERVICE

In addition, 3,173 miles of streams in the Sierra Nevada are within 300 feet of a U.S. Forest Service or National Park Service road. Sediment delivery to streams is greater where roads and streams share the same corridor.



U.S. FOREST SERVICE

LEGACY ROADS AND TRAILS PROJECTS IN CA: 2008-2012



Congress created the Legacy Roads and Trails Remediation Program to fix environmental problems resulting from the Forest Service's extensive road and trail system. Legacy Roads and Trails has reduced stream pollution, restored fish and wildlife habitat, created jobs, and improved essential roads to ensure safe access. Legacy Roads and Trails is highly successful and achieves on-the-ground results in real time. Through FY14, Congress had appropriated \$48.4 million in Legacy Roads and Trails funding to the Pacific Southwest (California) region. Through FY12, the agency had used these funds to reclaim ~100 miles of roads, to fix or stormproof ~2,350 miles of roads, and to fix or upgrade 8 culverts in the state.

Map courtesy of The Wilderness Society. Data points come from Forest Service Legacy Roads and Trails project lists. Portions of this map include intellectual property of ESRI and its licensors and are used herein under license. Copyright 1999-2010 ESRI and its licensors. All rights reserved.

Road Impacts on Water Quality

Roads reduce water quality by increasing sedimentation, turbidity, and the delivery of contaminants (e.g. chemical and petroleum contaminants). These impacts can increase water filtration costs and degrade fisheries habitat. They can also reduce the life of reservoirs. These impacts are most problematic where roads and streams intersect, making stream crossings such as culverts the primary problem. Sedimentation typically occurs through two key mechanisms:

1. Chronic erosion – this is exacerbated by vehicle use which breaks down the road surface into fine sediments

which are more easily transported to streams during rain/runoff events

2. Episodic erosion – this typically occurs during severe weather events (e.g. rain on snow events), through:

a. Culvert failures (especially when culverts are undersized, or undermaintained), which can cause debris torrents and/or stream diversions

b. Landslides and mass wasting, which can be triggered by culvert failures or hillslope failures



Road Impacts on Hydrology

- Road compaction decreases infiltration and increases surface runoff
- Road cuts intercept subsurface flow, significantly increasing surface runoff
- Road ditches and gullies concentrate water, extending stream networks and increasing sedimentation associated with surface runoff
- Roads can increase the magnitude and frequency of peak runoff, thus changing base stream function.