Water and the Sierra Nevada
The Sierra Nevada provides drinking water to a majority of Californians and western Nevadans.

The Sierra’s water values are threatened by many factors, including high intensity wildfire and climate change.

Investments in Sierra forest and meadow restoration are necessary to protect the Sierra’s water.
Investing in Sierra Watersheds Has Multiple Water Benefits

- Forest thinning can reduce the risk of high-severity wildfire risk and related sedimentation
- Meadow restoration can increase summer base flows
- Forest and riparian restoration can decrease stream temperatures
- Road restoration can reduce sedimentation
Perazzo Meadows: Plug and Pond Restoration
Forest Thinning: Before

- Over a century of fire suppression
- Overly dense stands of small trees
- Significant risk of uncharacteristic, severe wildfire
- High risk of major sedimentation events
Forest Thinning: After
Payments for Watershed Services

- Latin America Water Funds
- Denver: Forests to Faucets
- Santa Fe Water Fund
- Independence Lake, Sierra Nevada
Mokelumne Environmental Benefits Program
Mokelumne Environmental Benefits Program

- Quantifying environmental and economic benefits of watershed restoration
- Analyzing avoided costs of watershed investment
- Promoting triple bottom line of environment, economy, community
- Establishing a rigorous credit program
Mokelumne Environmental Benefits Program

- Sierra Nevada Conservancy
- Environmental Defense Fund
- Sustainable Conservation
- U.S. Forest Service
- East Bay Municipal Utility District
- Amador Calaveras Consensus Group
- Many other stakeholders and partners
Sierra Nevada Ecosystem Services

- Pollination
- Carbon Sequestration
- Water quality
- Water quantity and timing
- Commodity production
- Biodiversity
- Recreation
- Cultural and non-use
The Natural Capital Project

- Incorporate multiple ecosystem services into natural resource decisions

- First step toward quantifying values provided by natural systems to assess trade-offs

- InVEST: GIS tools that allow mapping of bundled ecosystem services driven by land use scenarios, currently limited in complexity
Water related services – Sierra scale

Yield

Water yield is defined as the volume of water that does not evaporate and is therefore potentially available for use. Water yield may occur as storm runoff, baseflow, or go to deep groundwater. Yield values are average annual yield values, given in acre-feet/year. Water yield as shown here is a function of average annual precipitation, annual reference evapotranspiration, and depth of plant available water content and plant root depth.

Average Annual Water Yield (acre-feet)

- D-1
- D-2
- D-3
- D-4
- D-5
- D-6
- Watersheds
- Counties
- Developed Areas

Retention

Water retention is defined as the potential water yield that is not available instantly. It is a measure of the storage of natural capital. This map shows average annual water retention, which is modeled as a function of slope, watershed area, and the movement of water across the surface and through subsurface soil layers.

Average Annual Water Retention (acre-ft)

- D-1
- D-2
- D-3
- D-4
- D-5
- Watershed Boundary
- Watersheds
- Developed Areas
- Regional Water-Quality Control Board

Data Sources:
- USGS for Environmental Modeling
- USGS Water-Resources Division: Watershed Information System
- USGS for reference data.
“Hotspots”: Carbon, water yield, habitat integrity

- Showing aggregate provision (and value) of services can tell simple, powerful story
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