

Southern Sierra Climate Change Impacts and Adaptation

Climate Change Workshop

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REGIONAL WATER MANAGEMENT GROUP

Southern Sierra Work

- Climate Change studies
  - Federal Agencies – Scenario Planning
    - US Forest Service
    - National Park Service
    - Bureau of Land Management
    - US Fish and Wildlife Service
  - California State Agencies
    - Department of Water Resources Integrate Regional Water Management

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Local Studies and Work

- Southern Sierra Partnership
  - Climate Adapted Conservation Plan
- Southern Sierra RWMG, GEOS Institute
  - Southern Sierra Integrated Regional Water Management Plan
- Local Government Commission, Partnership for San Joaquin Valley, Fresno County,
  - Fresno Area Climate Adaptation

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- Sierra Nevada Research Institute/UC Merced
  - Climate Change, Water Supply and Quality Study – Kings, Kaweah, Tule

What can we expect?

Temperature

4° F higher by 2055

5-7° F higher by 2085

More increase in summer (7-13° F) than winter (5-7° F)

Precipitation

Similar on average, but with greater evaporation (drier conditions overall)

Shift to more extreme downpours

75-85% or greater decline in snowpack

Wildfire

2-3 times more severe by mid-century

3-4 times more severe by late-century

Streamflow

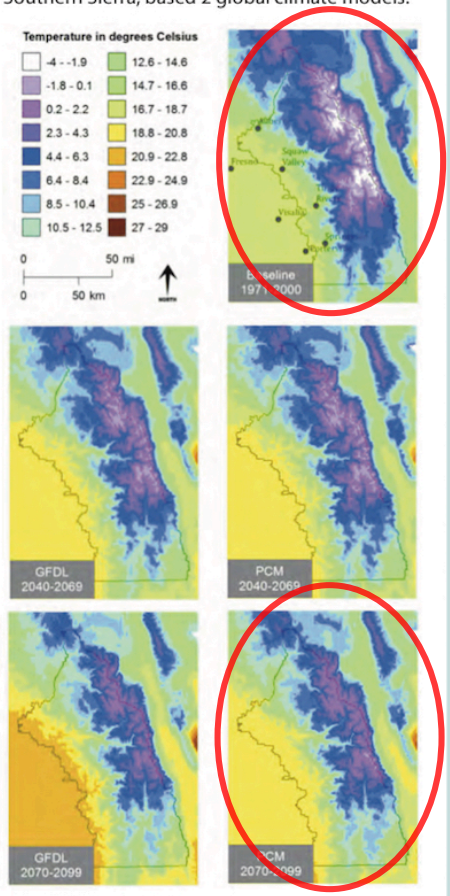
Late summer flows are expected to be lower and warmer

Peak flows are expected to be higher and occur earlier

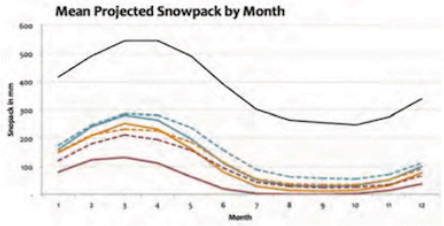
Water quality and supply are both expected to decline

Temperature and Snowpack Change

Historic (top), future mid-century (middle) and late-century (bottom) average temperature in the Southern Sierra, based 2 global climate models.



Historic (black), future early-century (green), mid-century (orange), and late-century (red) average snowpack across the Southern Sierra.



Water Resources and Infrastructure - Water supply shortages, reduced groundwater recharge, higher demand, greater flood risk, and lower water quality.

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Ecosystems - Severe declines in native species and habitats, as well as nature's benefits to communities. Strategies to maintain fish, wildlife, and plants included reducing water residential and agricultural water demand; restoring degraded key habitats and landscapes; and conserving wildlife corridors.

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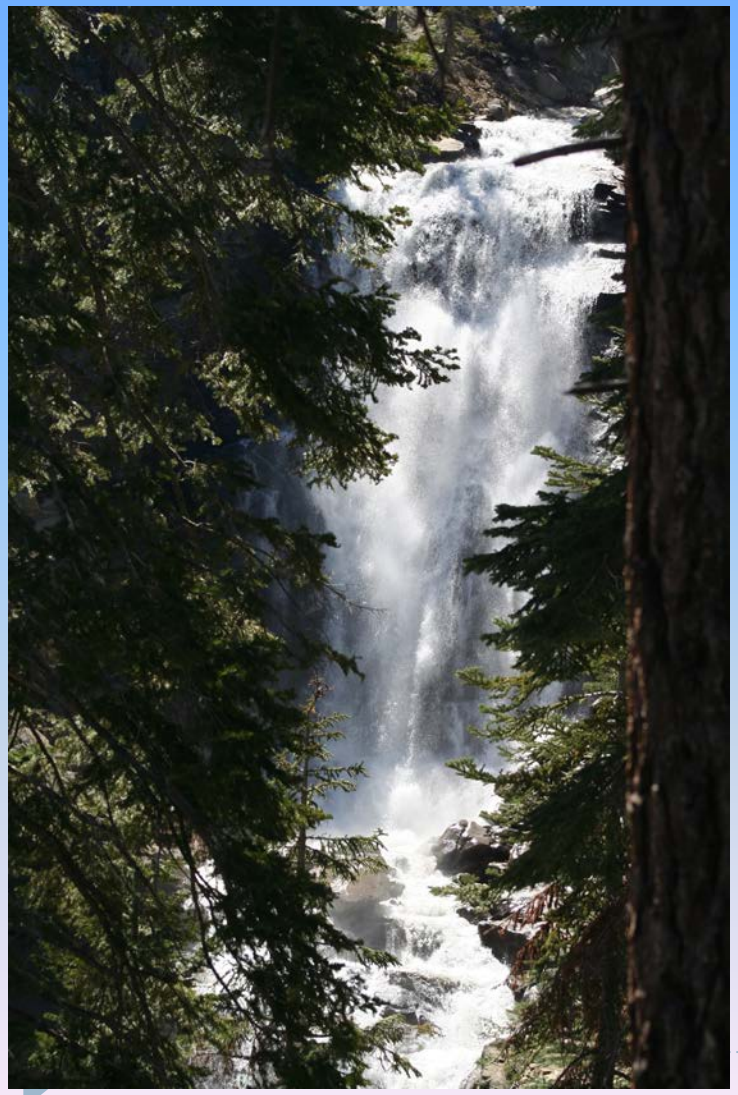
Adaptation - Water



- Restore/protect natural floodplains and wetlands to improve water quality
- Recharge groundwater
- Water conservation
- Upgrade flood and water supply infrastructure
- Know Community supply

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Drought and Fire

- Climate change and drought = tree mortality
- Tree mortality, climate change, fire = floods
- Fire, floods, tree mortality, climate change = lower water quality and quantity

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Questions

- Will water yield increase as trees die?
- How do we supply water to communities?
- How do we treat water in our communities?
- How will we deal with wildfire and flood impacts?
- What will be recreation and economical impacts?

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Common Themes

- Climate change impacts and vulnerability occur on a scale at least as large as watersheds
  - Adaptation and mitigation strategies at large scales

- Challenges in the southern Sierra include capacity (staffing, planning implementation), infrastructure and population
- Need for watershed plans and collaborative project implementation
- No regrets strategies, co-benefits, conjunctive uses
- Resiliency

Implementing Solutions - Projects

- Three Rivers Water Supply Study
- Mill Flat Creek Watershed Restoration
- Kings, Kaweah and Tule Climate Change and Water Supply Study
- Little Dry Creek Watershed Protection
- Meadow Restoration – National Forests and Parks
- Fuel projects – thinning and prescribed burning

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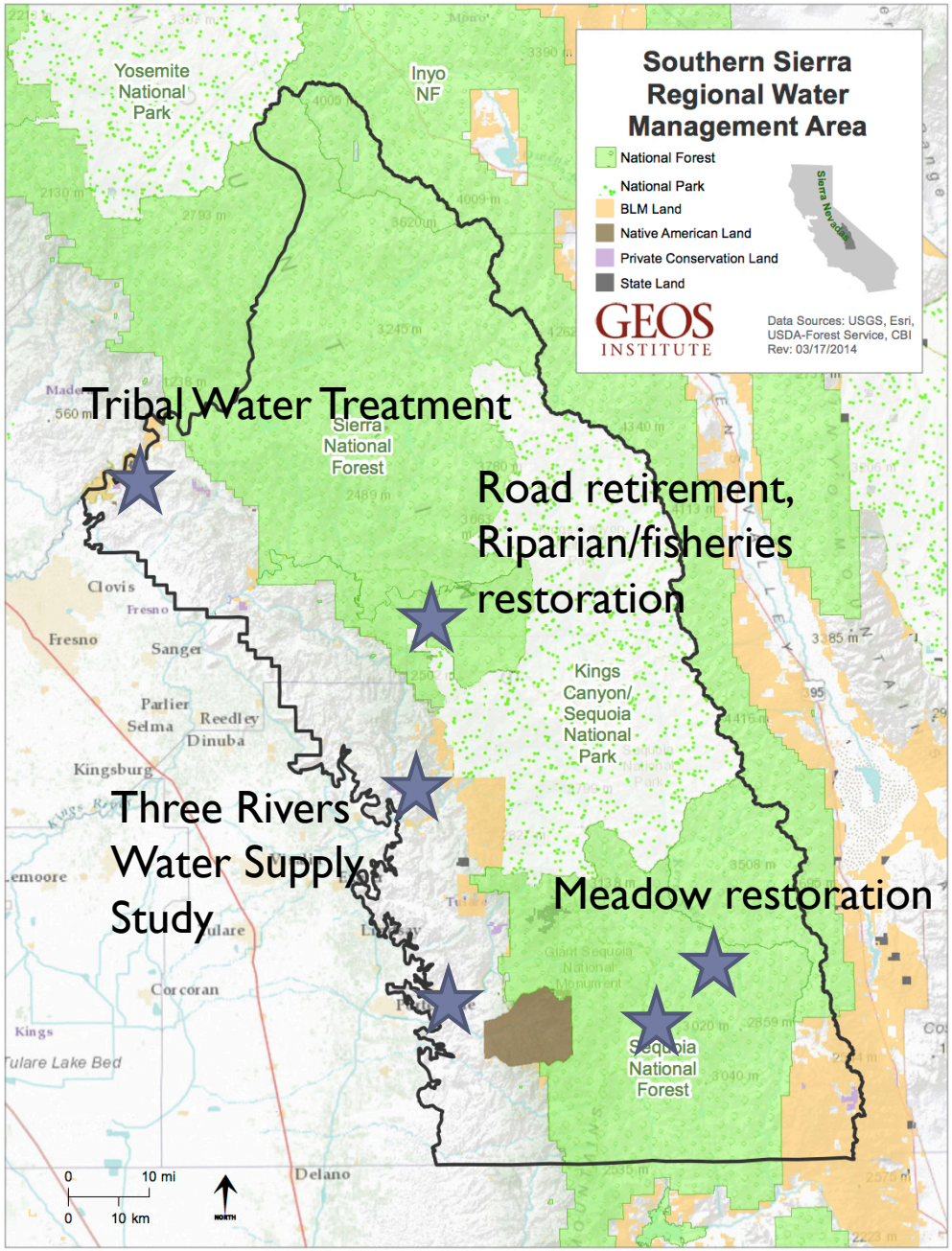
Southern Sierra Regional Water Management Area
National Forest
National Park
BLM Land
Native American Land
Private Conservation Land
State Land
Sierra Nevada
GEOS INSTITUTE
Data Sources: USGS, Esri, USDA-Forest Service, CBI
Rev: 03/17/2014
Yosemite National Park
Inyo NF
Sierra National Forest
Kings Canyon/ Sequoia National Park
Sequoia National Forest
Tribal Water Treatment
Road retirement, Riparian/fisheries restoration
Three Rivers Water Supply Study
Meadow restoration
Clovis
Fresno
Sanger
Parlier
Selma
Reedley
Dinuba
Kingsburg
Corcoran
Delano
Tulare Lake Bed
0 10 mi
0 10 km
NORTH