

# ClimateWise:

## Helping the Southern Sierra Prepare for Climate Change

### Why do we need to prepare?

Climate change presents an uncertain future for California communities. Our economy and quality of life are at risk from changes in temperature, stream flow, and precipitation. Reducing emissions is vital to preventing the most severe impacts. But many changes are inevitable due to greenhouse gases already emitted. Preparing for these changes is similar to preparing for other uncertain events, like drought or earthquakes. Preparation will save lives, reduce costs, and lead to more vibrant and resilient communities.

At risk are many highly valued assets, including abundant water, healthy forests, amazing fish and wildlife, and important agricultural commodities.

Changes are already being seen and felt across the region. Temperatures are rising and storms are becoming more severe. Spring thaw occurs earlier while late summer flows are lower. Plants and animals are moving to new locations.

In 2009-2010, four California Counties (Kings, Tulare, Madera, and Fresno) explored the impacts of climate change and began to develop solutions. We held a series of workshops with experts from across the region to assess model outputs, identify vulnerabilities, and develop recommendations. The results of these efforts can be found at [www.geosinstitute.org/climatewiseservices/completed-climatewise-projects.html](http://www.geosinstitute.org/climatewiseservices/completed-climatewise-projects.html)

### 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)



#### 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



#### 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

Some examples of climate change risks and potential solutions include:

**Agriculture - Risk to local crops from increased drought, heat stress, loss of chill hours, and increased pests and disease.**

Experts recommended researching new varieties of crops and sustainable practices for farming under more variable conditions. They also recommended new water conservation measures and additional support for farmers.

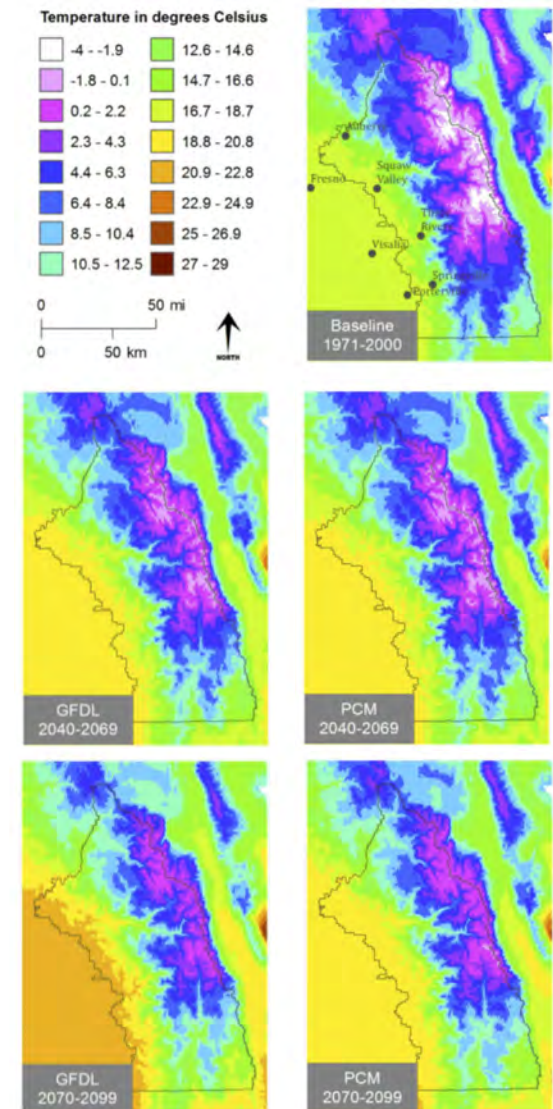
**Human Health and Safety - Increased demand for health and emergency services due to increases in wildfire, flooding, and disease. Also of concern were cardiovascular and respiratory impacts from declining air quality.** Recommended strategies included restricting growth in high risk areas like floodplains, reducing growth where there is no water supply, and promoting “smart growth” principles that promote alternative transportation and improve air quality. Increased education on disease prevention and vector control were also recommended.

**Water Resources and Infrastructure - Water supply shortages, reduced groundwater recharge, higher demand, greater flood risk, and lower water quality.** Local participants identified potential solutions, including restoring natural flood protection and water filtration (wetlands, floodplains, etc.), and protecting groundwater recharge areas. They also recommended linking water resources to development practices and upgrading water and flood control infrastructure. Finally, promoting water conservation was a priority.

**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.

## 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.

