INDICATORS OF CLIMATE CHANGE IN CALIFORNIA

Climate is a key factor that affects natural systems. Temperature and precipitation can influence physical systems: streams, rivers, lakes, coastal zones and oceans. Terrestrial, marine and freshwater biological systems also respond to changes in climate.

Darwin Glacier

Source: Basagic, 2008

Glaciers respond to the combination of winter snow and spring and summer temperatures. The surface areas of seven Sierra Nevada glaciers studied have decreased by about 20 to 70 percent in the past century. This coincides with warmer temperatures in the region, especially in the spring.

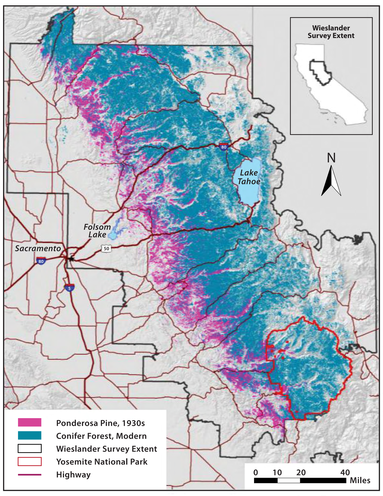
IMPACTS ON PHYSICAL SYSTEMS

- Over the past century, spring runoff to the Sacramento River has decreased by 10 percent.
- The average amount of water stored in the state's snowpacks is largely unchanged, although snow-water content has declined in the northern Sierra Nevada but increased in the southern Sierra Nevada.
- Sea levels measured at stations in San Francisco and La Jolla have been rising.
- Water temperatures in Lake Tahoe over the past 30 years, and ocean water temperatures at La Jolla over the past century, are rising. However, water temperatures in the southern Sacramento-San Joaquin River Delta over the past decade have stayed roughly the same.

IMPACTS ON BIOLOGICAL SYSTEMS

- Tree deaths in the Sierra Nevada have increased with rising temperatures.
- Large wildfires are becoming more frequent.
- Some small mammals in Yosemite National Park have moved to higher elevations by approximately 500 meters compared to earlier in the century.
- The spring and fall arrivals of some migratory birds are changing.
- Butterflies in the Central Valley have been arriving earlier in the spring over the past four decades.
- Auklet breeding success on the Southeast Farallon Islands off the California coast has been more variable, with unprecedented reproductive failures in 2005 and 2006.

Ponderosa Pine Transition



Source: Thorne, et al., 2006

Plant and animal species may respond to climatic and environmental changes by a shift in their habitat range. The lower edge of the Sierra Nevada Mountains' conifer-dominated forests has been retreating upslope over the past 60 years. The map shows the present-day Ponderosa Pine (conifer) forest as blue areas. In the 1930s, the range of the Ponderosa Pine extended into the area in pink which is now experiencing warmer winter nights.