

## Indicators of Climate Change Impacts in California

The below table provides an example of actual impact indicators used to monitor climate change by decision makers in California. The lack of indicators on the costs and benefits of the impacts of climate change and on its social impacts underlines the current difficulty to link socio-economic data with climate change information.

**Table: Indicators of Climate Change Impacts in California**

*Indicators of Climate Change in California* include indicators that characterize the multiple facets of climate change; specifically:

- human-induced drivers of climate change;
- changes to California’s climate;
- impacts of climate change on physical and biological systems in the state.

The indicators convey scientific information on the status of, and trends in, environmental conditions in California. They help the state track, evaluate and report on the climate change issues it is working to address, as well as the outcomes of these efforts. Taken collectively, the indicators help portray the interrelationships between climate and other physical and biological elements of the environment.

The table below provides a list of California’s indicators. They rely on monitoring and research activities carried out by state and federal agencies, universities and research institutions, and include a lot of biophysical data not collected by NSOs but sometimes available from the statistical system.

Physical systems	Humans	Vegetation	Animals
Annual Sierra Nevada snowmelt runoff and snow-water content	Mosquito-borne diseases	Tree mortality	Migratory bird arrivals
Glacier change	Heat-related mortality and morbidity	Large wildfires	Small mammal range shifts
Sea level rise	Exposure to urban heat islands	Forest vegetation patterns	Spring flight of Central Valley butterflies
Lake water, delta water and coastal ocean temperature		Subalpine forest density	Effects of ocean acidification on marine organisms
Oxygen concentrations in the California Current		Vegetation distribution shifts	Copepod populations
		Alpine and subalpine plant changes	Sacramento fall run Chinook salmon abundance
		Wine grape bloom	Cassin’s auklet populations, Shearwater and auklet populations off Southern California
			Sea lion pup mortality and coastal stranding

Source: Office of Environmental Health Hazard Assessment, California Environmental Protection Agency, 2013, *Indicators of Climate Change in California* ([www.oehha.ca.gov/multimedia/epic/2013EnvIndicatorReport.html](http://www.oehha.ca.gov/multimedia/epic/2013EnvIndicatorReport.html)).