

Agency finds climate change taking toll on California



In this 2009 file photo, the water level sits at 71 feet below normal at Shasta Lake in Northern California. A new state report stated Californians will have to deal with worsening droughts in the coming decades as a result of climate changes.

By [David Perlman](#)

August 8, 2013

California lakes are warming, sea levels are rising, wildfires are spreading, and mountain plants and animals are migrating to higher ground as the impact of climate change takes hold throughout the state, a new report says.

The evidence of the effects of the warming trend emerged in an analysis of 36 "indicators" - warning signs of changes - that are detailed in the 240-page report released Wednesday by the state's Environmental Protection Agency.

While many California scientists have previously reported the impact of global warming on the state's environment, the new report shows the effects of global warming more clearly than ever.

"The combined impact described by the indicators is dramatic," said Matthew Rodriquez, California's secretary for environmental protection, whose agency specialists prepared the report.

"The science is clear that we're already seeing significant changes in every part of the state," he said Wednesday. "If you look at these indicators, you can't really debate that climate change, and

its impact, is here."

Over the past 20 years, California industries have become more efficient in limiting their emissions, but the state's overall discharge of heat-trapping gases like carbon dioxide and methane has continued to rise, the report notes.

Temperature swings

Average annual temperatures throughout the state, despite periodic swings up and down, have increased by about 1.5 degrees Fahrenheit since 1895, and the pace of warming has picked up speed since 1975, the state's scientists reported.

The impact of that warming is reflected in spring runoff from melting Sierra snows on the Sacramento River watershed, which like others in the state is crucial for down-stream farmers and their crops. In the century after 1906, the report says, that runoff decreased - again with many fluctuations - by 9 percent.

The report "paints a disturbing picture of how climate change is affecting our state and its growing threats to our future," said George Alexeeff, the EPA's health hazards chief.

Sea-level rise is another ominous sign. Over the past century, sea levels have risen along the California coast by an average of 7 inches, and levels have risen by 8 inches at the Golden Gate.

"Sea-level rise could lead to flooding of low-lying areas, loss of coastal wetlands, erosion of coastal beaches, saltwater contamination of groundwater aquifers and impacts on roads, sewage treatment plants and other coastal infrastructure," the report warns.

Nor are the state's inland waters immune: "Lake waters have been warming at Lake Tahoe, Lake Almanor, Clear Lake and Mono Lake since the 1990s," the report says.

Separate Tahoe study

Confirming that evidence, an annual report on Tahoe's condition, released Wednesday by the UC Davis Tahoe Center for Environmental Studies, said "climate change is impacting the entire Tahoe basin with drier years, less precipitation, higher lake temperatures and projected lower lake levels."

Tahoe's average annual surface temperature in 2012 was 52.8 degrees Fahrenheit, the highest ever recorded for the lake, the report said.

There was a bit of good Tahoe news, however: "an amazing increase in clarity" - meaning the water was clear down to 75.3 feet this year- better by 6.4 feet compared with the year before.

Effect on animals

While the impact of climate change on living organisms is less certain, population changes

among many ocean animals "may be related to ocean warming," according to the EPA report's authors. Those include:

- A "dramatic" decline in fall-run chinook salmon in Central California.
- Varied success in breeding by Cassin's auklets on the southeast Farallon Islands, with unprecedented failures in 2005 and 2006 and record high productivity in 2010.
- Increases in both California sea lion pup mortality and the stranding of yearling pups, which the report's scientists said were too weak to handle climate changes.

Fire trending upward

The total number of acres burned in the state by wildfire due to drying landscapes has varied widely in any single year - from only 31,000 acres in 1963 to 1.4 million acres in 2008. Yet an upward trend in acreage burned suggests another indicator, the report notes: The annual average acres burned by California wildfires in the dozen years since 2000 (598,000 acres) is more than double the acreage burned in the 50 years between 1950 and 2000 (264,000 acres).

Climate change is impacting living systems too, the report maintains, with effects on both plants and animals.

A study on Southern California's Santa Rosa Mountains shows that dominant plant species have moved upward - by an average of 213 feet over the past 30 years. And in the Sierra Nevada, the lower edge of conifer-dominated forests has been retreating upslope for the past 60 years.

About half the species of small mammals in Yosemite National Park similarly have moved their habitat ranges, compared with earlier in the century, and "most of these changes involved movement to higher elevations," the report's wildlife section notes.

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