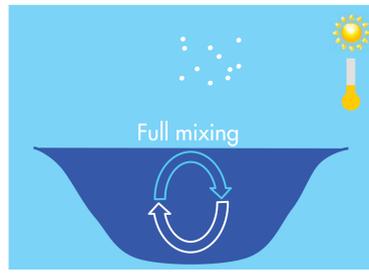
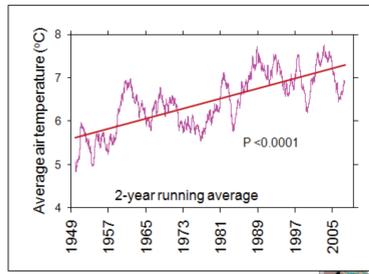


# Keeping Lake Tahoe Healthy

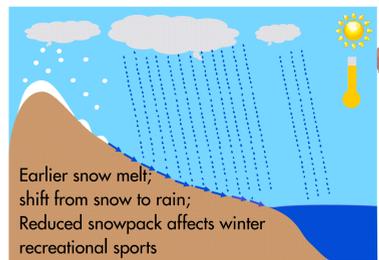
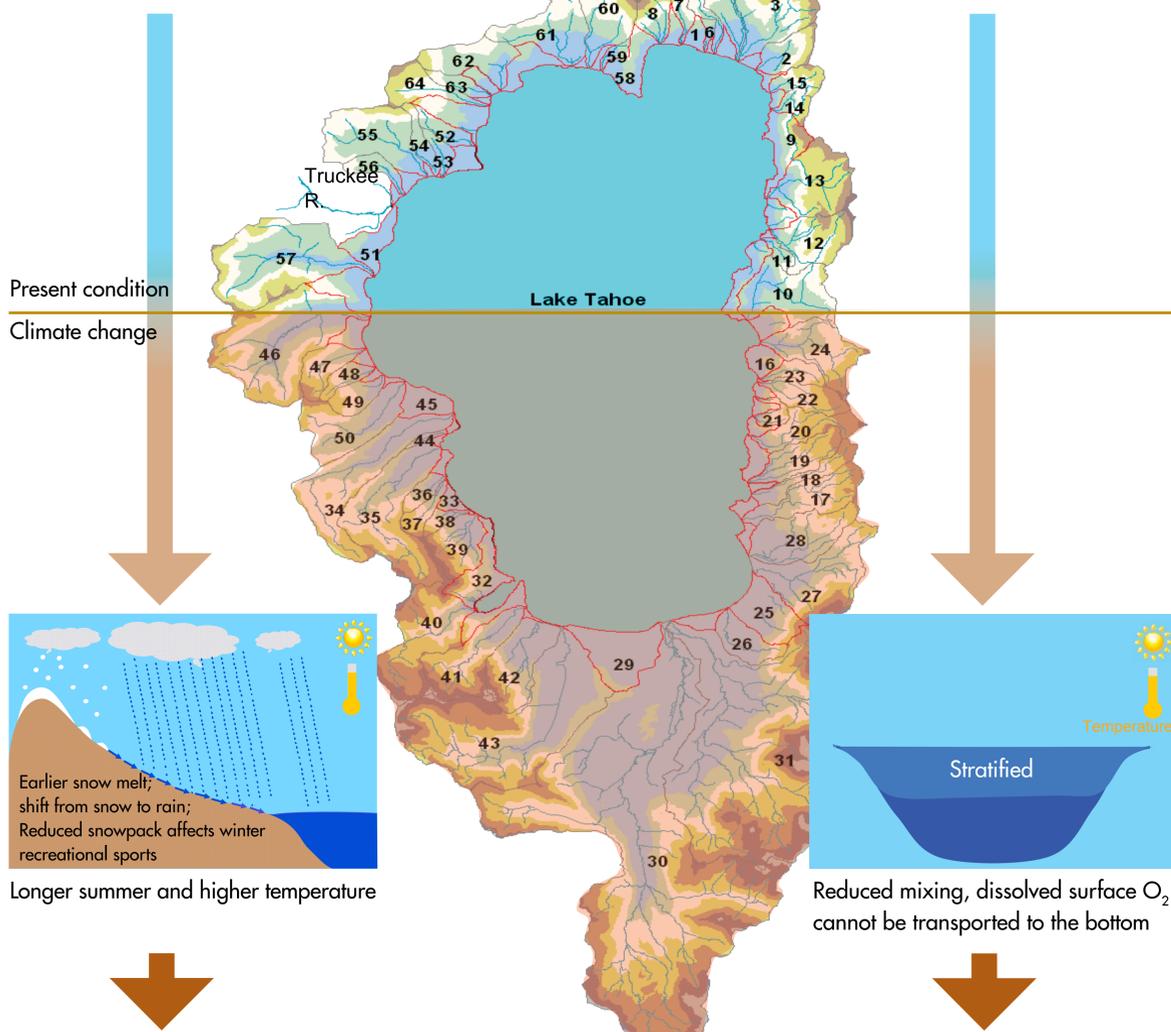
Potential impact of climate change on water supply, the winter recreational sport industry and aquatic ecosystems at Lake Tahoe.



Release downstream for water supply



Lake is homogenous in dissolved O<sub>2</sub>



Earlier snow melt; shift from snow to rain; Reduced snowpack affects winter recreational sports



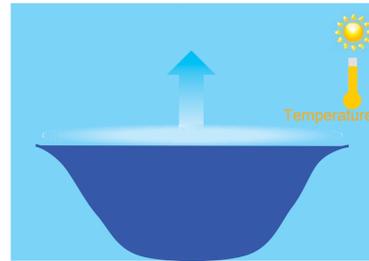
Reduced mixing, dissolved surface O<sub>2</sub> cannot be transported to the bottom



Increased flood magnitude



Increased wildfires frequency/severity



Higher evaporation

LAKES ARE IMPORTANT RESOURCES for water supply, fishing, and recreation. Theoretical and observational studies indicate a vulnerability of lakes' aquatic ecosystems to ongoing climate change. The impact of climate change on a deep and large lake (Lake Tahoe, which straddles the California-Nevada border) was investigated using a suite of models and bias-corrected downscaled climate dataset generated from global circulation models.

Our results indicate a shift of snow to rainfall during the 21st Century along with an onset of earlier snowmelt. Combined, these changes could affect water supply and the winter recreational sport industry. The lake may fail to mix completely by the middle of this Century due to lake warming. Under this condition bottom dissolved oxygen would not be replenished, leading to the significant release of ammonium-nitrogen and soluble phosphorus from the sediment. Both these nutrients are known to cause increased algal growth in the lake and would likely result in major changes to the lake's water quality and food web. Lake warming also increases water loss through evaporation, resulting in less available water for downstream domestic supply, agriculture, and recreation. Increased human demand for water will compound severity of problems in water quantity and quality. Thus, watershed planning and management should assess vulnerability to climatic variations through the application of basinwide hydro-climatology, watershed soils, and lake response models to (1) improve drought, flood, and forest-fire forecasting, (2) assess hydrological trends, (3) estimate the potential effects of climate change on surface runoff and pollutant loads, and (4) evaluate response from various adaptation strategies.

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