SCOTT RIVER STATE OF THE BASIN

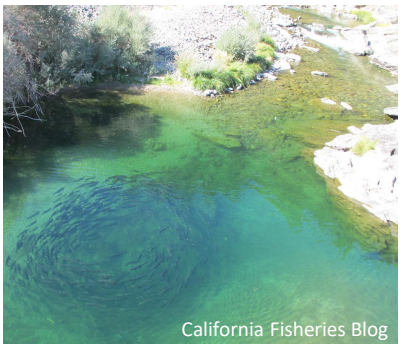
Background The Scott River is a large tributary of the Klamath River and is listed for multiple water quality impairments. Increased water temperatures, caused in part by decreases in river flow, have contributed to declines in culturally and economically important fish like coho salmon.

Summary of Findings Climate change and human activities have increased water temperatures and reduced flows.

Climate change continues to increase air temperatures, which increases both water temperatures and the amount of water required to grow crops.

Human activities have removed streamside vegetation, reducing stream shade. Water diversions and groundwater pumping have reduced river flows, increasing water temperatures.

Efforts to restore streamside vegetation in Scott Valley include planting trees and cattle exclusion fencing. Streamside tree cover is improving; however, water temperatures are still increasing because these improvements are not enough to offset rising air temperature and declining flows.



Water temperature, flow, and salmonids

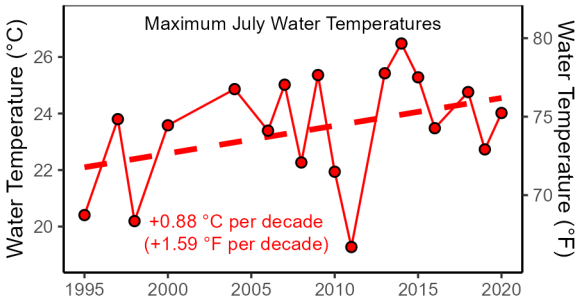
- Salmonids require sufficient in-stream flows, streamside shade, and access to cool water.
- High water temperatures can stress and kill salmonids by hindering fish growth, reducing oxygen supply, increasing susceptibility to disease, and changing migratory patterns.
- Low flows can cut off important habitat, including preventing fall-run chinook salmon from accessing prime Scott River spawning grounds (left).

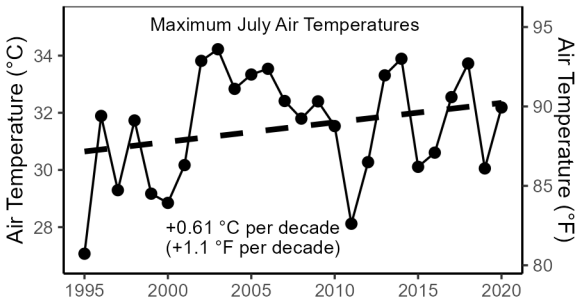
While data show considerable year-to-year variability, there are clear long-term trends in water quality and quantity caused by a combination of climate change, increased water consumption, and other human activities in the Scott Valley.

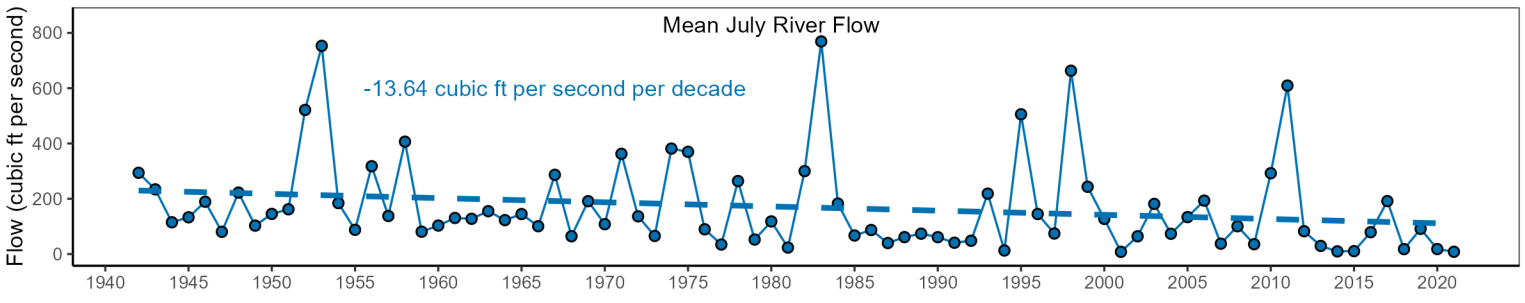
Water temperatures have risen over the past two decades at the U.S. Geological Survey gage according to measurements by the Quartz Valley Indian Reservation, Klamath National Forest, and U.S. Bureau of Reclamation. Increased water temperatures are likely caused by increasing air temperatures and declining flows.

Air temperature transfers heat from air to water. July air temperatures at Klamath National Forest's Quartz Hill weather station have increased over the past two decades, consistent with rising concentrations of greenhouse gases and air temperatures around the world.

River flow is a measure of water quantity. Average July flows have declined since the mid-1940s. The U.S. Geological Survey measures flow at the outlet of Scott Valley.







Climate change, people, and water temperature

Climate

- Climate change and drought decrease snowpack, resulting in reduced flows and groundwater inputs to the river.
- Climate change increases air temperatures, resulting in increased water temperatures.
- Wildfire smoke acts like a cloud, shading the river and cooling water temperatures

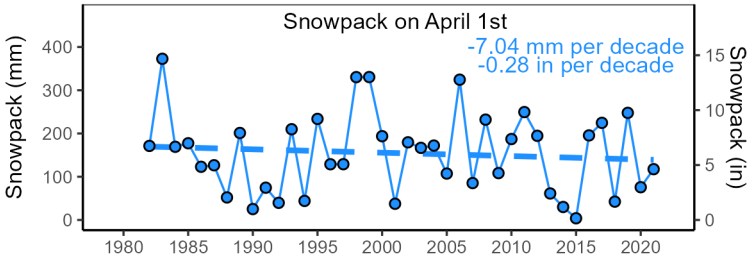
People

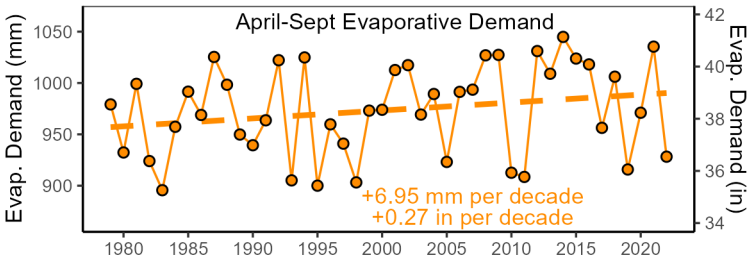
- Agricultural diversions reduce stream flows, making water more vulnerable to warming
- Alterations to the river system like the removal of streamside vegetation (reduced shade) and historic mining increase solar radiation and heat storage in streams.
- At a global scale, emissions of carbon dioxide and other greenhouse gases heat the planet

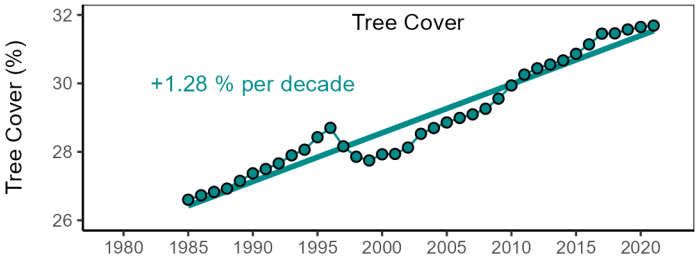
Mountain **snowpack** provides water to Scott Valley and strongly influences summer flows. University of Arizona's analysis integrating California Dept. of Water Resources' measurements at sites in the Scott River watershed shows snowpack declines over the past four decades.

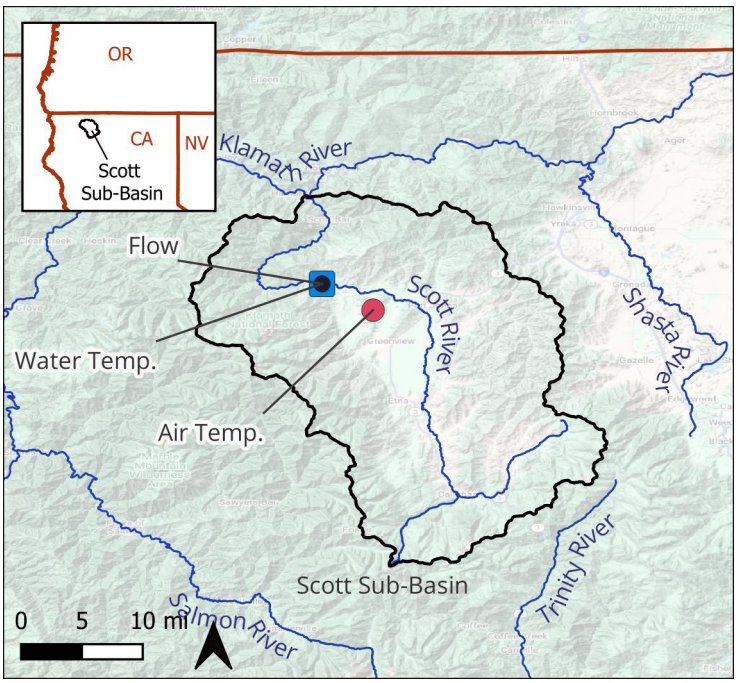
Evaporative demand is the amount of water consumed by irrigated grass, assuming no water limitation. University of California Merced calculations based on Scott Valley weather data indicate increasing evaporative demand over the past four decades, due to hotter air temperatures. As a result, irrigated lands now consume more water per acre than in previous decades.

Streamside tree cover provides shade, cooling the water. University of California data derived from NASA satellites in a 60-meter zone around the Scott River and its tributaries in Scott Valley show tree cover has increased over the past three decades.









Klamath Tribal Water Quality Consortium

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The Klamath Tribal Water Quality Consortium created this handout using funding U.S. EPA Region 9. Published May 2024. For other reporting and more information please visit www.klamathwaterquality.com