SHASTA RIVER STATE OF THE BASIN

Volcanic Geology, Cold Springs, and a Warm River

- The Shasta River is a large tributary of the Klamath River. It is a major producer of Chinook Salmon and also has Coho Salmon and steelhead.
- Groundwater from volcanic geology feeds springs that provide abundant flow even during months with no rain or snowmelt. If protected, this groundwater could buffer critical salmon habitats from the effects of a warming climate.
- During summer, most flow originates from the cold Big Springs Creek.
- Water diversions, groundwater pumping, and Dwinnell Dam reduce flows. With low flows and little shade provided by streamside vegetation, the river water warms rapidly as it flows downstream.
- Warm water and low flows contribute to declines in salmon populations. People are trying to address these impacts with voluntary activities (e.g., fencing and dam removals), land acquisition, and government regulations.

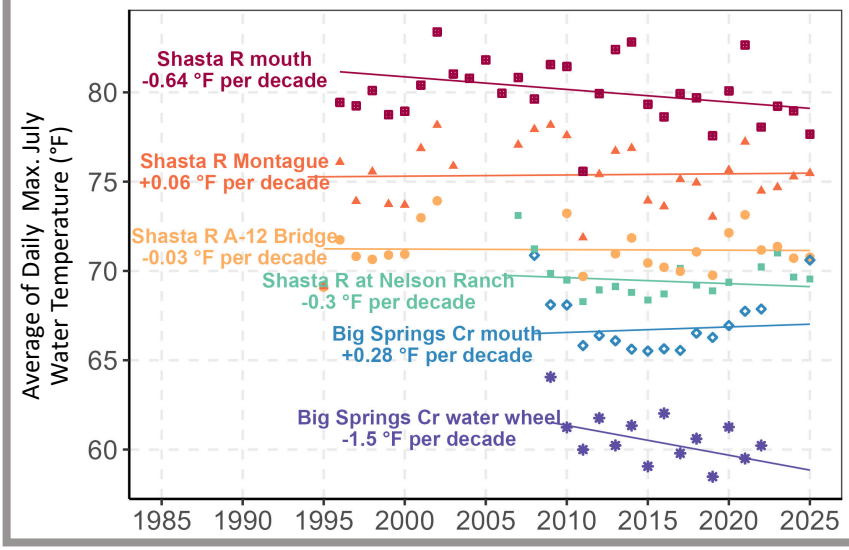
Summary of Findings

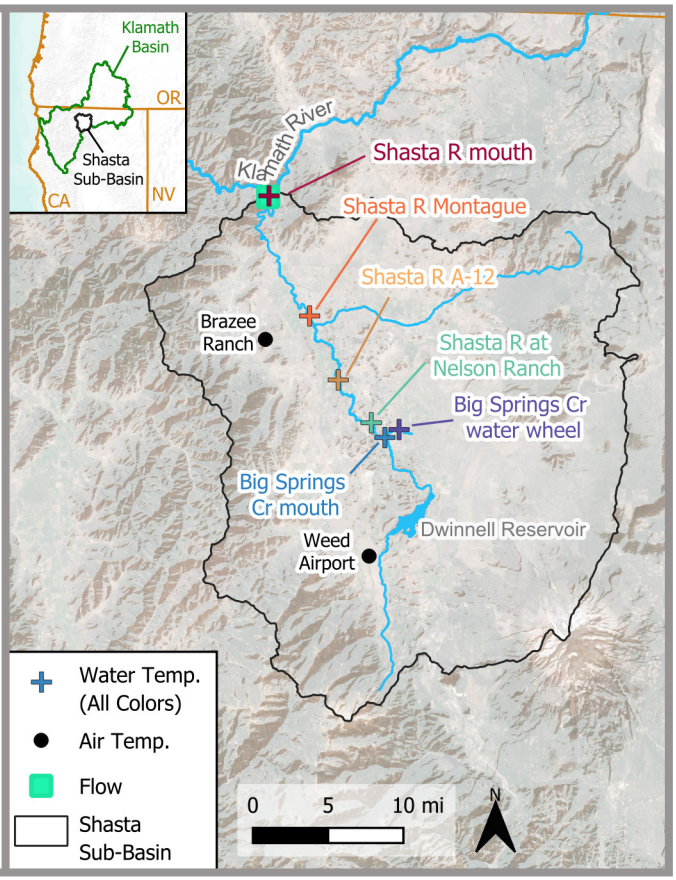
Despite tree planting and installation of extensive cattle exclusion fencing intended to increase streamside vegetation, tree cover has declined over the past three decades. Fencing improved bank stability, but recruitment of new trees has not kept pace with declines in existing trees.

Climate change has increased air temperatures, which should reduce water availability and increase water temperatures. However, water temperatures have cooled slightly at most sites, and larger decreases have occurred at upper Big Springs Creek than the Shasta River.

New state regulations reduced irrigation quantities, increasing stream flows from 2022–2025 and supporting cooler river water temperatures.

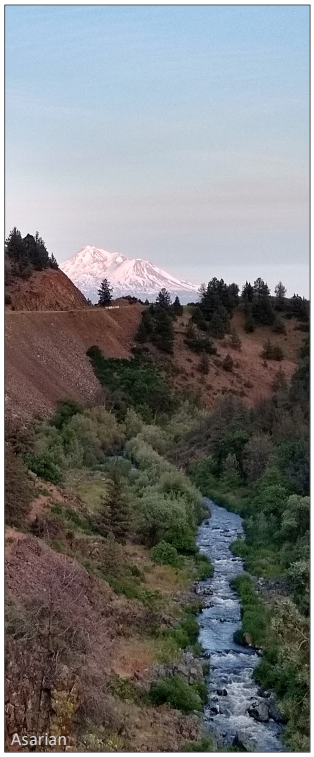
Water temperatures are coldest in upper Big Springs Creek and increase downstream. Upper Big Springs Creek has cooled since 2008 because cattle exclusion increased growth of aquatic plants that emerge from the water and provide shade during summer. Lower Big Springs Creek temperatures declined from 2008 to 2017, but then increased. Shasta River temperatures have cooled slightly at most sites since 1994, possibly due to flow regulations (see next page). Water temperature data were collected by the State of California (CDFW, CDWR, NCRWQCB), Shasta Valley RCD, Karuk Tribe, Yurok Tribe, The Nature Conservancy, USGS, USFS, ARS, and UC Davis.



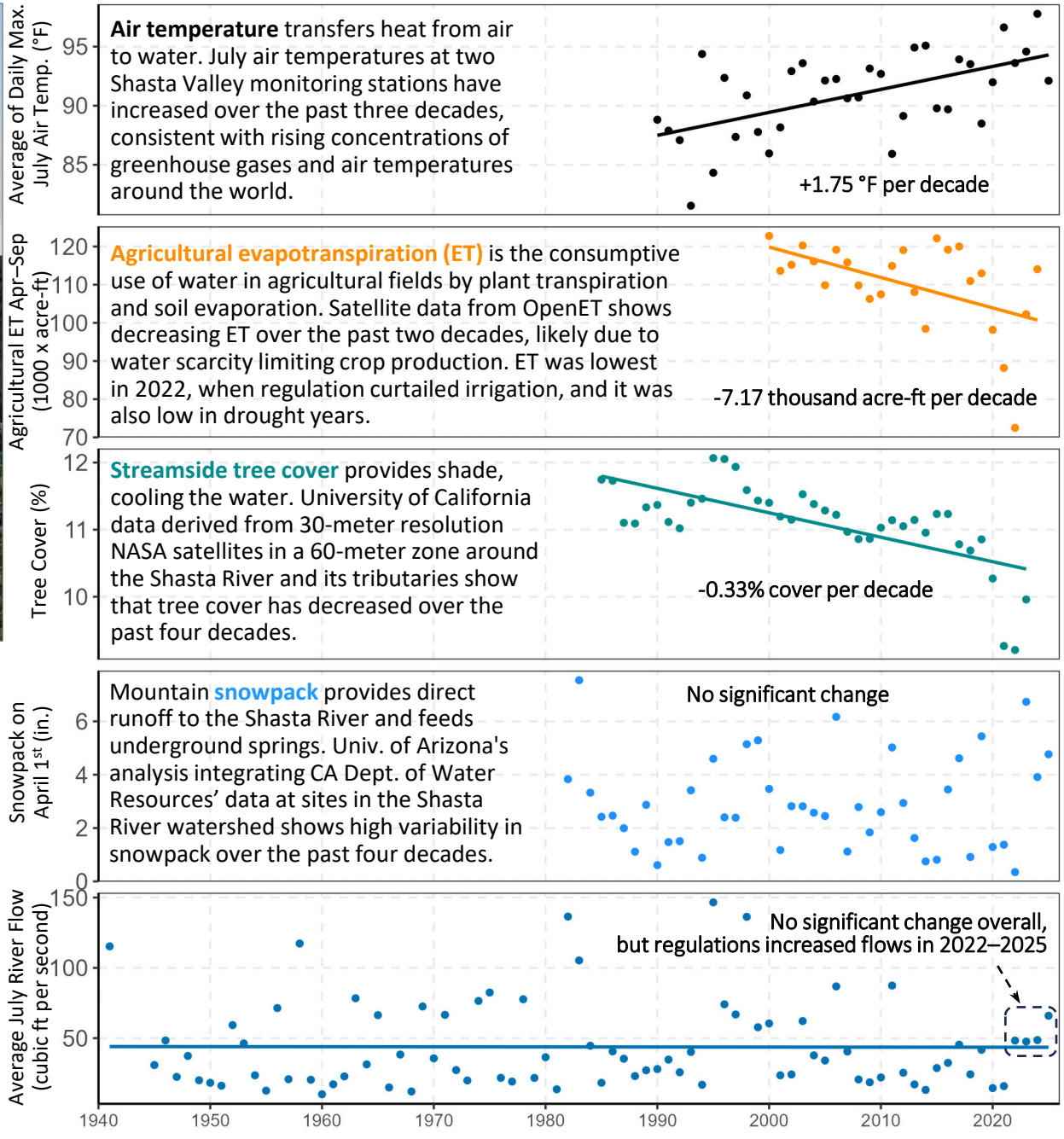


Water Temperature, Instream Flows, & Water Regulations

- Water diversions from the Shasta River and its tributaries are governed by a 1932 adjudication that did not consider instream flows for fish.
- In response to a petition by the Karuk Tribe to protect salmon, California's State Water Resources Control Board issued emergency regulations establishing minimum instream flows. Under these regulations, which took full effect in 2022, junior-priority diverters are curtailed when flows are below the minimum levels.
- Previous studies found that flow was an important driver of water temperatures in the Shasta River. Studies are currently underway to evaluate the effects of the recent curtailments on water temperatures.



River flow is a measure of water quantity. While there is substantial variability, average July flows slightly decreased from 1941–2021 until instream flow requirements (50 cubic feet per second for July) were instigated and met in 2022–2025. The U.S. Geological Survey measures flow at the Shasta River's mouth.



Karuk Tribe · Yurok Tribe · Hoopa Valley Tribe · Quartz Valley Indian Reservation · Pulikla Tribe of Yurok People

The **Klamath Tribal Water Quality Consortium** created this handout using funding U.S. EPA Region 9. Published January 2026. For more information, visit www.klamathwaterquality.com