Examining Water Scarcity

California's future climate will likely be warmer; researchers are investigating whether it will be wetter or drier and how the state can cope.

CLIMATE STUDIES OF CALIFORNIA generally agree that future climate will have warmer temperatures. However, whether more or less precipitation will occur in the future is more uncertain. Two simulated climate scenarios were used to analyze the independent and combined effects of temperature and precipitation on California's water supply:

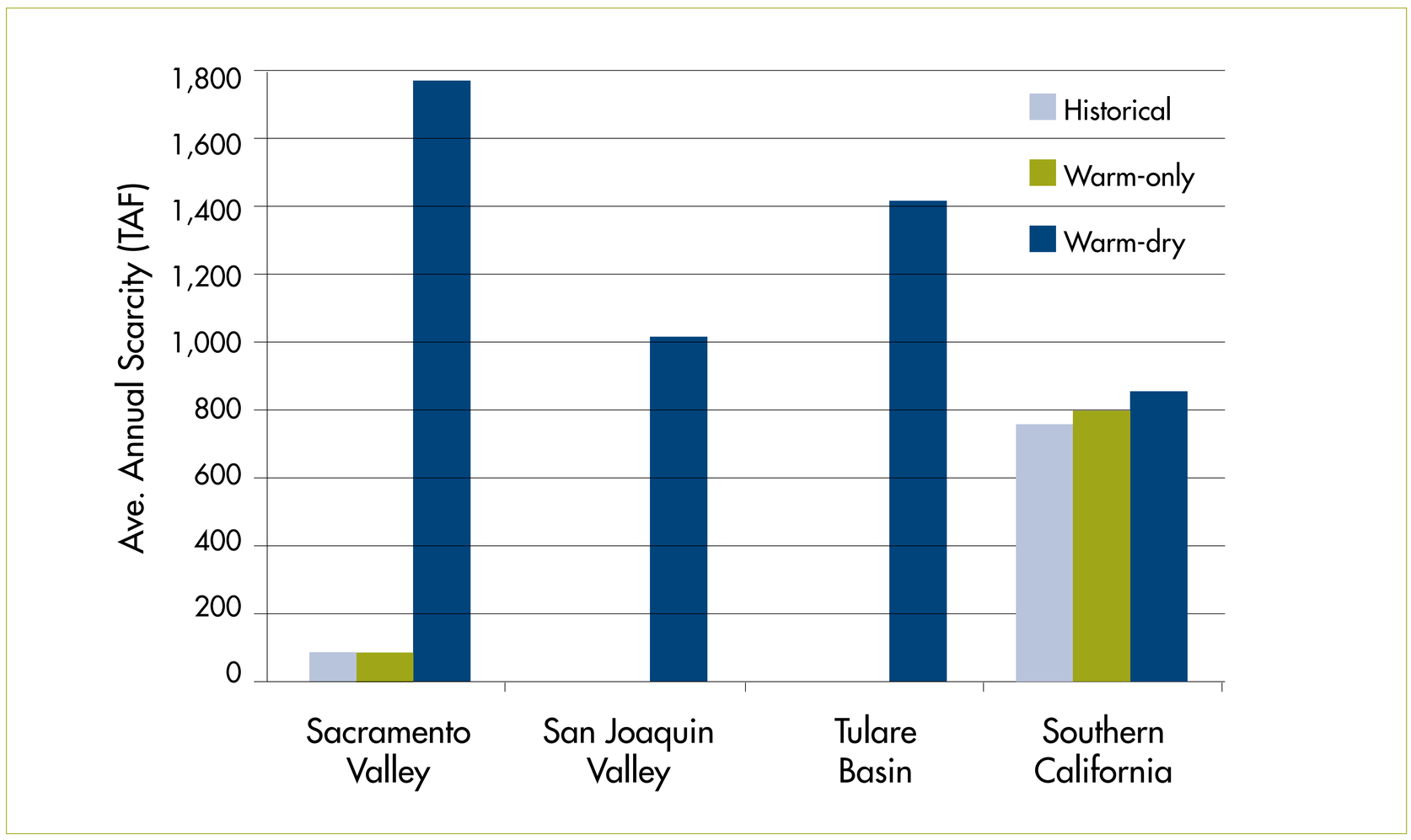
1. a warmer climate with historically observed pattern of precipitation; and

2. a warmer and drier climate where precipitation is reduced based on a downscaled climate model simulation for California (GFDL A2). These two climate scenarios are compared to historical hydrology conditions.

The economic effects and adaption of California's water supply to three climate change scenarios is explored using CALVIN, a hydro-economic optimization model. CALVIN is a statewide water supply model that includes most agricultural and urban demands and major infrastructure in the Central Valley and Southern California.

Water deliveries and scarcity under economically optimal conditions are obtained along with other CALVIN model results. Water scarcity, which represents the difference between water deliveries and user's water demands, is compared among the three climate scenarios. Other results include changes in water supply, reservoir operation adaptations, and regional changes in water supply portfolios including surface water diversions, groundwater, and water transfers for each climate condition.

This study suggests that water scarcity tends to be more sensitive to decreased precipitation and warming compared to higher temperatures alone. Excess storage capacity exists in the system statewide under warmer-drier conditions. Coordinated resource management serves well to reduce water scarcity under all scenarios.



Regional agricultural scarcity for each climate scenario.

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