

Basin Report: Sacramento and San Joaquin Rivers

The Sacramento and San Joaquin Basins include three major Central Valley watersheds – the Sacramento River in the north and the San Joaquin River and Tulare Lake Basins in the south. The combined watersheds extend nearly 500 miles from northwest to southeast and range from 60 to 100 miles wide. The rivers – the two largest in California - meet in the Sacramento-San Joaquin Delta, the largest estuary on the West Coast and the hub of California's complex water supply system. They play a key role in supporting California's powerful economy, providing water for six of the top 10 agricultural counties in the nation's leading farm state. In addition to water for farms, homes and industry in California's Central Valley and major urban centers in the San Francisco Bay and Central Coast areas, the rivers sustain aquatic and terrestrial habitats along with numerous managed waterfowl refuges. To protect these critical resources, Reclamation must continually evaluate the risks and impacts from a changing climate and identify appropriate adaptation and mitigation strategies utilizing the best available science in conjunction with stakeholders.



Future Changes in Climate and Hydrology

Reclamation's 2016 SECURE Water Act Report identifies multiple potential climate challenges that the Sacramento and San Joaquin River Basins may face including:

- Temperature is projected to increase in the Sacramento and San Joaquin River Basins by roughly 5-6 °F during the 21st century.
- Projections suggest annual precipitation in the Sacramento and San Joaquin River Basins will remain variable over the next century with a slight increase in the Sacramento River Basin.
- In the Sacramento and San Joaquin River Basins warming is projected to reduce snowpack in the basin and result in moisture falling as rain instead of snow at lower elevations increasing wintertime runoff and decreasing summertime runoff.
- Mean sea level was projected to accelerate during the century about 1 foot by mid-century and approximately 3 feet of sea level rise by the end of the century.

Future Impacts for Water and Environmental Resources

Projected climate changes have potentially significant impacts on water management the basins:

- Increasing temperature will result more precipitation occurring as rainfall, decrease in snowpack and a shift in peak season runoff to earlier in the year.
- Earlier season runoff combined with potentially increased upper watershed evapotranspiration will reduce the capacity to store watershed runoff in Central Valley Project and State Water Project Reservoirs.
- Reduced water supplies combined with increasing river water temperature and salinity in the Delta will result in increasing challenges to management of deliveries for agricultural and urban water users as well as for sustaining favorable habitat conditions for aquatic species in rivers and the Delta.

Sacramento and San Joaquin River Basins Water Resource Studies

Adequate and safe water supplies are fundamental to the health, economy and ecology of the United States and global climate change poses a significant challenge to the protection of these resources. Reclamation is taking a leading role in assessing risks to Western U.S. water resources and is dedicated to mitigating and adapting to these risks to ensure long-term water resource sustainability. To accomplish this, Reclamation has conducted or initiated a climate impact and a basin study in the Sacramento and San Joaquin River Basins under its WaterSMART program:

- **Central Valley Project Integrated Resource Plan** – Reclamation completed Central Valley Project Integrated Resource Plan in 2013. Through this study, a scenario based technical approach and modeling tools were developed to characterize the climate and socioeconomic future uncertainties associated with long range planning. Focusing primarily on potential impacts to the Central Valley Project (CVP), a variety of exploratory adaptation strategies were developed and evaluated to provide insights for future studies such as the WaterSMART basin studies.
- **Sacramento and San Joaquin River Basins Climate Impact Assessment** – Reclamation completed the Sacramento and San Joaquin River Basins Climate Impact Assessment Report in 2014. Based on climate projections included in the Secure Water Report 2011, it presents an overview of the hydro-climate in the Sacramento, San Joaquin and Tulare Lake basins and how projected climatic and socioeconomic changes might impact water and related resources by employing a multi-scenario approach to characterize the range of uncertainties and impacts.
- **Sacramento and San Joaquin River Basins Study** – The Sacramento and San Joaquin River Basins Study updates and extends the previous studies by incorporating the most recent climate and socioeconomic projections. Completed in 2015, the Basin Study was developed in partnership with California Department of Water Resources, California Partnership for the San Joaquin Valley, Stockton East Water District, El Dorado County Water Agency and Madera County Resources Management Agency. In addition to providing an improved understanding of potential impacts, the study takes the next step by formulating with partner and stakeholder agencies multiple portfolios of water management actions addressing a wide variety of potential adaptive management strategies.

Moving Forward, Adaptation, and Coordination

Where opportunities exist, Reclamation participates in coordinated adaptation actions in response to climate stresses as well as changes in land use, population growth invasive species and others. These activities include extending water supplies, water conservation, hydropower production, planning for future operations and supporting rural water development. Specific examples of coordination for the management of the Central Valley Project in the Sacramento and San Joaquin River Basins River Basin include:

- In the Central Valley Basins and beyond, Reclamation's CVP and the State Water Project (SWP) closely coordinate operations to maintain flows to meet multiple water delivery, water quality and ecological objectives.
- Reclamation continues to coordinate with the State of California and other stakeholders to conduct feasibility investigations and environmental analyses of climate change impacts on projects such as the Bay Delta Conservation Plan, Shasta Lake Enlargement, North of Delta Offstream Storage, Temperance Flat, Trinity River and San Joaquin River restorations.

