

Climate Change Will Dramatically Increase Flood Risks Facing Stockton and Communities along San Joaquin River

January 4 – California’s historic atmospheric river event in October reminds us that climate change is already affecting the world we live in—including increasing the risk of damaging floods. A new [analysis by the California Department of Water Resources](#) (DWR) predicts dramatic increases in the flood risk facing California communities as a result of our warming climate.

California’s historic 1997 flood that centered in the town of Vernalis along the San Joaquin River was the second largest in a century. It affected nearly 300 square miles, set rainfall records for a wide swath of California’s Central Valley, resulted in nine deaths, and caused \$2 billion in damage. The new DWR analysis anticipates far larger and more damaging floods in the future. Responding to this risk will require large public investments in the most effective flood management strategies.

Dramatic New DWR Flood Projections for the San Joaquin River: [DWR’s new analysis](#) projects that climate change will increase the severity of the historic 1997 flood on the San Joaquin River by 1.5- to nearly 5-fold. The mid-range estimate is that climate change will increase the volume of water flows from this “100 year” flood event by 2.5 times by 2070. The high-end estimate is a 4.9-fold increase in the 100-year event.

DWR projects that the expected annual damages from these increased floods, a measure of the risk in any given year, would be over \$2 billion. The damage caused by the most severe floods would be dramatically higher.

These projections have noteworthy implications for communities along San Joaquin Valley rivers, including large cities like Stockton and Modesto, as well as for smaller agricultural communities, such as Firebaugh. Many of these communities are economically disadvantaged with community members who are predominantly people of color.

Central Valley Flood Protection Plan Update: DWR’s new flood projections will be incorporated into the revised [Central Valley Flood Protection Plan](#), which will be completed in 2022. The plan, which was adopted in 2012 and is updated every five years, represents California’s blueprint for reducing long-term flood risk in the Central Valley through 2050.

DWR’s Previous Estimate of Flood Risk: In DWR’s previous analysis of the impact of climate change on flood risk in California, which was integrated in the [2017 Central Valley Flood Protection Plan](#), the agency projected that peak San Joaquin River flood flows would increase by 80 percent. The new projections represent a dramatic increase in anticipated flood risk.

Climate Change and Floods: October’s atmospheric river storm was not only unusually powerful, it also was unusually warm. Climate change is anticipated to increase the intensity of storms, increasing flood risk. In addition, climate change-driven storms will be warmer, significantly increasing flood risk. During warmer storms, more precipitation falls as rain rather than snow. Snow accumulates as snowpack and gradually melts during spring and summer. By contrast, warm storms bring rain to upland slopes of the Sierra that can rapidly run off, creating very large floods in a short period of time.

The historic flood of 1997 is an example of this phenomenon in the San Joaquin Valley. The 1997 flood was much larger than anything previously recorded and now approximates what the Federal Emergency Management Administration and flood planners call a 100-year flood. A 100-year flood has a 1% chance of occurring in any given year or a 26% chance of occurring over a 30-year period—the typical span of a home mortgage.

Climate change will not only increase the size of the largest floods, it will also increase the size of potentially damaging floods that occur more frequently—every 5-10 years.

Solutions that Can Meet this Challenge: Analyses have shown that simply strengthening existing levees would fail to protect communities from growing flood risks. Flood planners, scientists, city leaders, and other stakeholders all agree that the cornerstone strategy to meet this increasing threat to vulnerable communities must be to expand floodplain and flood bypass capacity to accommodate higher flood flows. Fortunately, restoring floodplains provides [broad benefits](#) beyond reduced flood risk, including increased groundwater recharge and dry-year water supplies, improved water quality, restored fish and wildlife habitat, expanded recreational opportunities, carbon sequestration, and more. DWR’s analysis shows that this approach could reduce expected annual flood damage along the San Joaquin River by 80 to 90 percent. This strategy is recognized in Action 6 in the California Natural Resources Agency’s recently released [draft Climate Adaptation Strategy](#) as well as in action 25.4 in Governor Newsom’s [Water Resilience Portfolio](#).

Floodplain Funding to Drive Solutions: At the end of California’s 2021 legislative session, Governor Newsom, the leaders of the Senate and Assembly, and Assemblyman Adam Gray dedicated \$60 million in funds to floodplain restoration in the San Joaquin Valley, with a focus on maximizing groundwater recharge benefits. These funds will help prepare for both floods and droughts, and represent an important down payment toward increasing climate change resiliency for vulnerable San Joaquin Valley communities.

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