INFORMATION ITEM

Lead Scientist Report

Summary

A strong El Niño can bring both opportunities and challenges for California and the Sacramento-San Joaquin Delta. Increased winter precipitation could help replenish California's water supplies by building Sierra Nevada snowpack, refilling reservoirs, and creating opportunities to recharge groundwater. However, El Niño also increases the risk of severe storms and flooding. The Delta is particularly vulnerable because heavy rainfall can increase river flows and put greater pressure on levees, while elevated coastal sea levels can push water levels higher in tidal waterways. (These increased sea levels are caused by El Niño, a marine heatwave, storm surges, and unusually high tides) The greatest concern is compound flooding, when high river flows and elevated coastal water levels occur simultaneously. State and local agencies are preparing through levee inspections, emergency planning, improved storm forecasting, and flood-response measures. Longer-term efforts, including levee investments, floodplain restoration, and development of a Delta-wide flood model, aim to strengthen the region's resilience to future flooding.

What the 2026/27 El Niño Means for California and the Delta

You have no doubt heard that a very strong and historic El Niño is currently underway, and that governments and people around the world are racing to prepare. In California, for example, Governor Newsom issued a state of emergency in September. This was a proactive step to help free up state resources and kickstart preparations ahead of potentially severe weather. But what exactly is an El Niño and what might it mean for California and the Delta?

What is El Niño?

Normally the trade winds (a major global wind system) blow from east to west across the equatorial Pacific Ocean, and sea surface temperatures in the Western

Pacific are higher than in the Eastern Pacific. During an El Niño event these trade winds weaken or even reverse direction. This causes unusually warm water to spread eastward, making the Central and Eastern Pacific much warmer than usual. **This changes where rain falls and how storms behave.** It is the warm phase of a natural climate cycle called the El Niño–Southern Oscillation, or ENSO, which influences weather patterns around the world.

In the United States, El Niño winters tend to be milder in northern states and wetter across the south. **In California, El Niño often produces more frequent and more intense winter storms, especially in the south.** These storms can potentially cause flooding, erosion, landslides, and other dangerous hazards. It's important to note that El Niño does not *guarantee* a wet winter in California. However, it does *increase the risk* of strong storms, even if specific localized impacts are hard to predict in advance. Furthermore, El Niño does bring potential advantages to California alongside the challenges.

El Niño 2026/27 is a chance to replenish California's water supplies

A wetter winter could help to replenish California's water supplies. There are three main ways this could happen:

1. **Snowpack:** If enough precipitation falls as snow in the Sierra Nevada, the snowpack accumulates and acts as natural water storage. As the snowpack melts, it gradually feeds rivers and reservoirs.
2. **Reservoirs:** Rainfall and runoff can also refill reservoirs. However, reservoir operators need to consider flood protection. They must ensure there is enough surplus reservoir capacity to hold the extra water from heavy rains, and may need to release water ahead of storms to maintain that space.
3. **Flood-managed aquifer recharge:** High river flows can create opportunities for flood-managed aquifer recharge (flood-MAR). This involves diverting excess water to suitable land where it can soak into underground water supplies. This can reduce downstream flood risk as well as increasing groundwater storage for dry years.

El Niño 2026/27 poses significant flood risks to the Delta

Over time, much of the land in the Delta has subsided below the level of the surrounding water. The communities, farms, and infrastructure of the region—including water conveyance infrastructure that services much of California—are protected by some 1,100 miles of earthen levees. **However, these levees were built under very different environmental conditions, and climate change is worsening some of the stresses they must withstand.**

Two factors that contribute toward potential El Niño flooding in the Delta are:

1. **High river flows can overtop or weaken levees.** Heavy rainfall can increase river flows and water levels. Higher water levels increase the risk of levees overtopping (when high waters spill over the top of the levee). Faster water flow can rapidly erode (or "scour") riverbeds and levee bases and increase the force of water dragging along exposed banks ("shear stress"). This may make levees weaker and more vulnerable to breach.
2. **Elevated coastal water levels.** Sea level is expected to be higher along the California coast, which can push up water levels in tidal parts of the Delta. This makes it harder for rivers to drain toward the ocean and increases the risk of flooding. The causes of elevated sea level include:
    - **Marine heatwave:** While not directly related to El Niño, a record-breaking marine heatwave has been underway off the California coast since December 2025. Warmer seawater expands, raising sea levels.
    - **El Niño:** Changes in ocean temperature, winds, and currents caused by El Niño can also raise sea levels. One way this happens is via **Kelvin waves,** which are slow movements of vast amounts of warm water that can temporarily raise sea level as they pass along the coast.
    - **Storm surges:** These occur when strong winds from storms (combined with changes in air pressure) push extra water toward the shore.
    - **Unusually high tides:** As luck would have it, three particularly high tides (often called "king tides") are due to hit California around Thanksgiving, Christmas, and Martin Luther King Jr. Day in January.

Compound flooding is of particular concern. Compound flooding is flooding caused or made worse by multiple factors interacting. Sea levels off the California

coast are already elevated due to El Niño and the marine heatwave. The storm surge from a large storm or series of storms could raise sea level even further, while the increased precipitation from the storms could create unusually high river flows. These compounding conditions could cause flooding in the Delta. Any overlap with extreme tides would increase the risk.

How is California preparing?

As mentioned earlier, California declared a state of emergency in September to prepare for this El Niño. This allowed state agencies to mobilize resources and streamline procurement and permitting, and authorized the National Guard to assist with flood response if needed.

The California Department of Water Resources (DWR) and Office of Emergency Services (OES) are coordinating with local agencies on **levee inspection and other flood-control infrastructure,** to strengthen emergency plans, and to pre-position emergency supplies such as sandbags, portable flood barriers, and rock for levee repairs. In the Delta, local agencies are continuing levee maintenance and improvements and will **conduct round-the-clock levee patrols during periods of high water.** DWR is also working with researchers at Scripps Institution of Oceanography to **improve storm forecasting,** helping water managers anticipate high flows and make better decisions about reservoir storage and flood-control releases.

Longer-term investments are also improving Delta flood resilience. The **Lookout Slough restoration** in the western Delta, for example, created more than 3,000 acres of tidal wetland habitat and constructed a new levee. This added around 40,000 acre-feet of flood storage to the Yolo Bypass, giving floodwaters more space to safely spread out.

Looking ahead, the Council is working to improve long-term flood planning. The **Delta Levees Investment Strategy** prioritizes investments in levees according to risk, directing limited funding in ways that maximize flood protection for people, property, and state interests in the Delta. And as we reported in March, the Council and its partners are collaborating on a new, high-resolution elevation map of the Bay-Delta. Among other things, Council staff are currently working with DWR to use these data to develop a **Delta-wide two-dimensional flood model.** This is a

computer tool showing how and where floodwaters could move across the landscape and is intended to improve future flood planning and emergency response.

Delta Science Program Activities

Bay-Delta Science Conference

The 2026 Bay-Delta Science Conference (BDSC), held September 28–30, was a huge success. The conference brought together nearly 1,000 attendees from all levels of government, Tribes, academia, non-profits, and the private sector. Many of the 60+ oral sessions were multidisciplinary and focused on building collaborative solutions to Bay-Delta science and management problems. The plenary session included talks on future visioning and storytelling. This sense of inspiration was woven throughout the conference, with attendees encouraged to reflect on what motivates them in their work as scientists.

New this year, conference organizers also intentionally curated and highlighted more science and water policy activities, including communication training for presenters, a science policy showcase, and interactive panels on bridging science to policy. There were also more than 30 art displays throughout the conference halls for attendees to explore and discuss with the artists. The planning team is already looking forward to 2028, and encourages participation from the Bay-Delta community. The conference program, abstract booklets, and information on various award winners can be found at the conference website: https://www.baydeltascienceconference.com/.

CCST Science Day

In early October, multiple staff from the Council's Delta Science Program participated in Science Day 2026. Hosted by the California Council on Science and Technology and the California Natural Resources Agency, Science Day aims to connect policy with state-level science and research happening in California universities, labs, and institutions. The event featured plenary panels, breakout sessions, a Science Translators showcase, and a poster session. Day 1 focused on strengthening the foundation for science to action and day 2 emphasized Tribal science partnerships. Staff shared information about the Council during the

lunchtime Partner Showcase and presented posters to highlight the 2026 Delta Science Plan, 2026 Research Impact Report, and more. Read the official event recap here: https://ccst.us/from-science-to-action-researchers-and-state-leaders-build-lasting-partnerships-at-science-day-2026/.

Resilient California Summit

The inaugural Resilient California Summit, held October 20–22, convened people from across the state who are working to build resilience as climate change accelerates. The conference's three days were organized around *exploring* key insights from California's Fifth Climate Change Assessment, *imagining* the best possible future that remains within reach, and *catalyzing* the actions needed to turn that vision into reality. For the first time, the Sacramento-San Joaquin Delta was included as a report in the Assessment, which was produced by the Governor's Office of Land Use and Climate Innovation.

Council staff organized a session titled "Why the Sacramento-San Joaquin Delta is critical to California's climate future." The session opened with a Delta 101 from Delta Lead Scientist Dr. Lisamarie Windham-Myers. This was followed by presentations from each of the three Delta agencies (the Council, the Delta Conservancy, and the Delta Protection Commission) on how their work supports California's climate future, framed around findings from the Fifth Assessment's Delta report. The session drew a full room and helped participants make new connections between their work and the Delta.

Sea Grant Matching Workshop

The California Sea Grant State Fellowship Program provides a unique educational and professional opportunity for post-graduate students who are interested in coastal and marine resources in California, and the policy decisions affecting those resources. Since 2013, the Council has participated in the California Sea Grant State Fellowship Program and has hosted more than 50 fellows. Fellows have gone on to pursue a wide range of careers, with 39% going on to careers in state government, 20% to academia, 17% to private industry, 15% to the federal government, and 9% to a non-profit. In 2027, the Council will host three fellowships:

- Independent Science Board and Adaptive Management Fellowship
- Research Impact and Policy Fellowship

- Planning, Resilience, and Environmental Hazards Fellowship

For this cohort, there were 24 finalists for the 20 fellowship opportunities across 11 host organizations. Council staff participated in a matching workshop from October 5–7 where finalists and hosts attended interviews to discuss mutual interests, daily responsibilities, and team culture. Council staff has submitted its rankings of the finalists, and California Sea Grant will be announcing the matching results later this year.

National Academies public meeting

On November 4–5, the National Academies of Sciences, Engineering, and Medicine (National Academies) held a public information gathering meeting at the Embassy Suites in Sacramento. This meeting kicked off the second biennial review intended to evaluate the monitoring, modeling, and other relevant scientific activities that support the long-term operations of the Central Valley Project (CVP) and the State Water Project (SWP).

The 2-day event featured introductory presentations to the distinguished 18-person committee about the CVP and the SWP, including by Delta Lead Scientist Dr. Lisamarie Windham-Myers. There were also presentations from the sponsoring agency, a panel of state and federal agency representatives, and an open mic session. The Committee will meet six times (some of the meetings will be open to the public) and conclude their work in approximately 1.5 years with a consensus report addressing modeling, monitoring, and metrics to inform decision-making.

On Your Radar

2026 American Geophysical Union Annual Meeting

The 2026 American Geophysical Union (AGU) annual meeting will be held in San Francisco from December 7–11, 2026. AGU is a global scientific community dedicated to advancing solution-oriented science for the benefit of people and the environment, with a mission that emphasizes collaboration, education, and communication among scientists, decision-makers, and the public. Delta Lead Scientist Dr. Lisamarie Windham-Myers is organizing a special session on December 10 titled "Scalability of Nature-Based Solutions for Climate Challenges: Linking Science to Solutions for California and Beyond." The session aims to advance conversations about science and policy needs for implementing nature-based solutions at a broad scale. Other Delta Science Program staff sharing presentations at the conference include:

- Dr. Michelle Stern, who will present posters on recent modeling initiatives coordinated by the Delta Science Program and the Elevate Bay-Delta lidar mapping project.
- Dr. Stephen Elser, who will present a poster sharing lessons learned for adaptive management from case studies of nature-based solutions in the Delta.

By the Numbers

Science Program staff will summarize current numbers related to Delta water and environmental management. The summary figures (Attachment 1) will inform the Council of recent counts, measurements, and monitoring data driving water and environmental management issues.

Fiscal Information

Not applicable.

List of Attachments

Attachment 1: By the Numbers with Water Year and Harmful Algal Bloom 2026 Summary

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A recording of the presentation will be available on the Delta Council's YouTube page at https://www.youtube.com/@DeltaCouncil.