



Winter Storm Readiness Fact Sheet November 2015

Each year, California prepares for severe winter storms. These storms often result in flooding, landslides, electrical outages, and damage to highways and other important infrastructure. Over the last two decades, every one of California's 58 counties has been declared a disaster area at least once due to storm impacts. In 1995 alone, 48 counties were declared federal disaster areas due to a single set of winter storms.

California's current drought conditions do not reduce the risks of winter storms. Over the last four years of this historic drought, winter storms have caused localized flooding, loss of life and property damage. Californians must continue to conserve water, while preparing for winter storms.

Impacts of El Niño

This year, the State has re-doubled preparation efforts given the warming trend in the Pacific Ocean known as El Niño. This year's El Niño condition is among the strongest on record and is expected to influence weather patterns by impacting the position of the Pacific jet stream. Scientific data shows that a strong El Niño condition increases the likelihood of above average winter rains. Climate experts indicate that this year's strong El Niño conditions provide higher odds of heavy precipitation this winter, especially in southern and central California.

El Niño warming of the Pacific Ocean also increases the sea level along California's coast. As water molecules in the Pacific Ocean warm, they expand and result in a temporary rise in sea level. Increased sea levels to date this season along California's coast measure between 6 and 11 inches. This increased static sea level may increase flooding and other impacts in coastal communities.

For updated information on El Niño conditions, please visit this [El Niño portal](#) maintained by the National Oceanic and Atmospheric Administration (NOAA).

Impacts of Large and Sustained Winter Storms

California receives much of its winter rain through relatively few, very large and sustained storms that come off the Pacific Ocean. Some of these storms are known as "Atmospheric River Events" because they transport a long band of moisture that resembles a river in the sky on weather maps. A well-known example of this type of storm is the so-called "Pineapple Express," a storm named for the moisture it brings to the west coast from the tropics near Hawaii.

These types of storms typically deliver between 30 to 50 percent of California's winter precipitation. While these storms are an important source of water supply for the State, they can also bring flooding and other impacts.

The correlation between strong El Niño conditions and the number of winter Atmospheric River Events is not well documented. El Niño does not guarantee an increase in Atmospheric River Events. However, an above average likelihood of increased seasonal precipitation due to El Niño, combined with the annual prevalence of Atmospheric River Events, means that Californians should prepare for the potential of major winter storm impacts.

For more information on these types of storms, please visit NOAA's [Atmospheric River Information webpage](#).

Emergency Response to Winter Storms

Emergency response to flooding and other disasters in California is led by local emergency responders, utilizing the Standardized Emergency Management System (SEMS) and in coordination with the National Incident Management System (NIMS). Under this framework, local agencies initially respond to emergencies and then receive State support and resources when their capacities are exceeded.

The Governor's Office of Emergency Services (CalOES) helps to build the readiness of local emergency responders and State agencies, and coordinates State support for local emergency responders as needed during emergencies. CalOES maintains the comprehensive State Emergency Plan (SEP) that establishes a consistent, statewide framework to organize emergency response for floods and other disasters between local emergency responders and State and federal agencies. In addition, Cal OES maintains the State Hazard Mitigation Plan, which outlines resiliency plans to reduce impacts of all hazards faced by the State, including storms and floods. The California Master Mutual Aid Agreement further details how different levels of government will support each other in flooding emergencies and other disasters. In preparing and responding to floods, Cal OES manages statewide situational awareness in coordination with the State Flood Operations Center. They facilitate resource prioritization, tasking and tracking, as well as coordination of state agencies and mutual aid response through its Regional Emergency Operations Centers (REOCS) located throughout the State, and the State Operations Center (SOC), located in Sacramento.

California's Department of Water Resources (DWR) maintains six Incident Command Teams for deployment to major flood incidents across the State in order to support county and local flood responders. The California Conservation Corps (CCC) crews throughout the State are trained in sandbagging and other flood fighting techniques including: levee reinforcement, debris removal, evacuation assistance, as well as contracting in advance with local government to provide immediate assistance following storms, floods' and other emergency situations. In addition to CCC crews, CAL FIRE crews and inmate crews from the California Department of Corrections and Rehabilitation can to play an important role in flood response.

This year, significant coordination has taken place between local, State and federal agencies to re-double preparedness for potential winter storms. CalOES and the Federal Emergency Management Agency (FEMA) participate with several other agencies on an El Niño Taskforce that has reviewed potential impacts from current climate conditions and confirms agency coordination during storm emergencies. CalOES has also conducted several briefings among local, State and federal agencies on specific topics including; coastal storm surge threats, debris flows and landslide threats, and flood risks to the Sacramento-San Joaquin Bay Delta.

Readiness for Flooding

More than 7 million people and \$580 billion in assets are exposed to flood hazards in the State. State efforts are focused on reducing flood risks and improving response when flooding inevitably occurs.

Winter storm risks differ significantly across the State, and storm preparedness is led by local agencies such as flood control districts, water agencies, and cities and counties. Information about local storm preparedness and response plans in each county across the State can be found on the [State's Storm Readiness Portal](#).

California's State-Federal Flood Operations Center (FOC), which is located in Sacramento, monitors winter weather and real-time conditions of the State's rivers and streams. It is the only Joint State-federal co-located flood operations center in the country. When winter storms increase flood risks, the FOC issues warnings to local emergency response agencies. DWR maintains the FOC in partnership with NOAA.

Equipment and materials have been positioned across the State to fight floods by State agencies, including bulldozers and other heavy equipment and materials such as rock and sand. These pre-positioned materials reduce response times to protect areas from flooding when storm emergencies occur. The California Utilities Emergency Association is assisting by identifying and repositioning telecommunication assets in a similar manner.

DWR maintains a full-time flood management division that facilitates flood control projects and trains local partners across the State in flood prevention and response. Activities include helping local entities to refine their flood response plans and procedures, establishing flood management workgroups, conduct drills, tabletop and field exercises, and developing consistent public messaging to prepare for winter floods.

To support local storm preparedness, DWR and State and federal agencies conducted preseason flood coordination meetings this fall across the State. These meetings provided a winter weather outlook by the National Weather Service, discussed flood vulnerabilities by county, and reviewed flood fighting techniques, roles and responsibilities in a flood emergency, and available resources from the U.S. Army Corps of Engineers (USACE), Department of Forestry and Fire Protection (CAL FIRE) and the CCC. In addition, Cal OES held Mutual Aid Regional Advisory Committee (MARAC) meetings throughout the State with each of the Counties about El Niño and its potential impacts to the region. The MARACs bring together Cal OES, state agency partners, and local government emergency managers to coordinate on emergency preparedness and response issues. These meetings focused on unique emergency management challenges related to a strong El Niño/flooding event that could affect the regions. Participants shared what planning and preparation actions are being taken, experiences with past mud flow and flooding events, and how resources and personnel will be managed in a flooding event.

Flood Preparedness Week in California occurred from October 19 to 23 and included news conferences, webinars, public events and social media platforms to encourage residents to learn more about the flood threats in California including: steps to take to guard their lives and property against flood threats, prepare a family evacuation plan, and purchase flood insurance as appropriate. Specific information provided to the public during these events can be found on the [Flood Prepare California](#) website. The State volunteer coordination entity, CalVolunteers, is partnering with State agencies to conduct on-the-ground flood preparation outreach to community groups, such as Neighborhood Watch organizations.

Readiness for Coastal Storm Surges

Coastal communities in California are required to maintain hazard mitigation plans that anticipate certain threats due to their coastal locations, such as tsunamis and storm surges off the ocean. This year, due to warming of the Pacific Ocean, sea levels along California's coast have risen. This El Niño-driven sea level rise was recorded in October at between 6 and 11 inches, and is anticipated to increase if ocean waters continue to warm later in the winter.

Coastal communities should anticipate the impacts of this current increase in sea level on seasonal high-tides (known as king tides) and coastal storms surges that can bring temporary increases in sea level up to three feet.

The California Coastal Commission, the California Ocean Protection Council and the California Coastal Conservancy have provided funding for projects including sea-level rise vulnerability assessments and updates to Local Coastal Programs to address sea-level rise. The Coastal Commission has developed [El Niño preparedness checklists](#) to assist coastal residents and communities to prepare for coastal impacts. Additionally State and Federal agencies have collaborated on the [Adapting to Rising Tides Project](#), which provides guidance to coastal communities on this threat. Several mapping tools that help local communities to identify increased risks from current increased sea levels can be found [here](#).

Readiness for mudslides and landslides

Debris flows, also known as mudslides, result from heavy downpours of rain. Major debris flows can develop quite quickly depending on local conditions, and can at times represent significant danger to local residents. In October 2015 for example, several cars were trapped on the Interstate 5 and State Route 58 as a result of a major mudslide caused by a localized 1,000-year storm.

While it is impossible to predict damaging debris flows well in advance, local emergency response agencies have identified areas most susceptible to debris flows and monitor real-time conditions closely during major storms. Evacuations of residents are often ordered downslope from potential debris flow areas.

Recently burned areas are particularly susceptible to debris flows due to the charred composition of land surface and a lack of plants to stabilize soils. Several State and federal agencies are coordinating through Post-Fire Watershed Emergency Response Teams to identify life-safety threats and potential environmental impacts resulting from debris flows following the recent Valley Fire (Lake County) and Butte Fire (Calaveras County). These teams are identifying greatest risks for debris flow and taking emergency measures to protect life and safety, as well as environmental habitat.

Additionally, CAL FIRE has compiled maps of burn scar areas throughout the State that local governments can use to identify areas of concern for potential debris flow. These maps can be found [here](#). Local emergency response agencies prioritize monitoring of these areas during storms to provide warning and order evacuations, as needed.

Heavy sustained winter rains increase the risk of landslides in certain areas of the State. Landslides are a geological phenomenon that includes the movement of a large area of land down a slope due to unstable conditions. Landslides can be caused by a number of factors, including soaked earth from heavy rains.

Local emergency response agencies are aware of areas most susceptible to landslides as a result of slope, soil conditions, earthquake activity, and human activity. During periods of heavy precipitation, these areas should be closely monitored for signs of potential landslide activity. The California Geological Survey maintains maps that can be used by local emergency responders to identify areas of greatest threat for landslides. These maps can be found [here](#).

Capturing Winter Precipitation for Water Supply

California's system of reservoirs is positioned to capture winter storms as they have historically occurred. Most of these reservoirs are positioned in the northern portion of the State and capture both winter rains and melting spring snow to provide a large portion of water used by California communities and agricultural producers. Due to drought, most of these reservoirs have significant capacity to capture winter rains and snow run off that will develop in watersheds above the reservoirs this winter. Federal, State and local agencies that manage reservoirs have prioritized maximizing the capture of winter precipitation.

However, California's pattern of receiving a large portion of its winter rain through large sustained storms presents a challenge, given our State's existing infrastructure to convey and supply water. A large portion of water used by California's communities and agriculture flows through the Sacramento-San Joaquin Bay Delta. Simply put, our current infrastructure to capture water for use through winter storms travelling through the Delta is severely outdated. During each storm, operations of the pumping facilities that convey water from the Delta must be closely managed to minimize impacts on threatened and endangered wildlife.

The State Water Resources Control Board (SWRCB), DWR, and the California Department of Fish and Wildlife will work with partner federal agencies to continue coordination on a daily basis through the winter to manage storm-driven water flows in real-time through the Delta and maximize water storage for future use while adequately protecting fish, wildlife, and ecosystems. These agencies are also updating the State's Drought Contingency Plan to identify planned actions if and when the drought continues into 2016.

Additionally, the State is expediting approval of projects that can capture winter rains to recharge local groundwater basins while minimizing flood risks and protecting fish and wildlife. These projects, which largely include flooding appropriate agricultural fields, can help replenish underground aquifers that have been significantly depleted during the drought.

Flood Protection Investments

California State and local governments have invested billions of dollars over the last several years to reduce winter flood risks. Between 2007 and 2014, the State invested \$3.16 billion in flood management through direct funding, competitive grant programs, and reimbursements to local agencies. This State funding complements significant local investments in flood protection throughout the State, and has been directed to projects that significantly reduce flood risks and improve long-term flood management.

These investments are aligned with the State Plan for Flood Control, which provides a framework for flood safety improvements on 1,800 miles of levees through the Central Valley. Additionally, the State's long-term coordination effort called FloodSAFE California highlights State and local investments, and other efforts. The latest annual report highlights over 55 key accomplishments of Flood Management Planning, Floodplain Risk Management, Flood Risk Reduction Projects, Flood System Operations and Maintenance, and the Flood Emergency Response Programs. For more information, please review the [FloodSAFE California](#) Report.

In partnership with the U.S. Army Corps of Engineers, DWR developed California's Flood Future: Recommendations for Managing the State's Flood Risk. This report is a comprehensive look at flooding throughout the State and makes recommendations for future actions to reduce flood risk. California's Flood Future was developed as a companion plan to the California Water Plan Update 2013. To learn more California's Flood Future findings and recommendations visit [this link](#).

WINTER STORM PREPAREDNESS RELATED WEBSITES FOR MORE INFORMATION

[Drought.CA.gov](#): State's central website for information on winter storms

[FloodPrepareCA](#): Winter Preparedness Website

California Department of Water Resources, [Flood & Safety Topics](#)

Federal Emergency Management Agency, [Flood Map Service Center](#)

FEMA National Flood Insurance Program, [Flood Smart](#)

Ready.gov, [Ready.gov: Prepare. Plan. Stay Informed.](#)

National Oceanic Atmospheric Administration, [Climate Prediction Center](#)

National Oceanic Atmospheric Administration, [Active Weather Alerts](#)

National Oceanic Atmospheric Administration, [California Nevada River Forecast Center](#)

California Department of Water Resources, [Current Water Conditions](#)

California Department of Water Resources, [California Data Exchange Center](#)

Governor's Office of Emergency Services, [State of California Emergency Plan](#)

Governor's Office of Emergency Services, [My Hazards Tool](#)

California State Transportation Agency: [Statewide Road Closures Map](#)

California State Transportation Agency: [Winter is Coming](#)

California King Tides Project, [King Tides Project](#)

California Data Exchange Center, [Snow Pack/Water Levels](#)