SENATE COMMITTEE ON GOVERNMENTAL ORGANIZATION
Senator Bill Dodd
Chair
2023 - 2024 Regular

Bill No:	AB 277	**Hearing Date:**	7/11/2023
Author:	Rodriguez		
Version:	6/26/2023 Amended		
Urgency:	No	**Fiscal:**	Yes
Consultant:	Brian Duke		

SUBJECT: Extreme Weather Forecast and Threat Intelligence Integration Center

DIGEST: This bill establishes the State-Federal Flood Operations Center (FOC), within the Department of Water Resources (DWR), for the purposes of functioning as the focal point for gathering, analyzing, and disseminating flood and water-related information to stakeholders, as specified. Additionally, this bill requires the FOC to develop and submit a report to the Legislature outlining necessary technological advancements for agile forecasting, as specified.

ANALYSIS:

Existing law:

1) The California Emergency Services Act (ESA) establishes the Office of Emergency Services (OES) for the purpose of mitigating the effects of natural, human-made, or war-caused emergencies.

2) Establishes the Department of Water Resources (DWR) and sets forth its powers and duties relating to water resources, as specified.

3) Establishes the Atmospheric Rivers: Research, Mitigation, and Climate Forecasting Program (AR Program) within the DWR to, upon appropriation of special fund moneys, research climate forecasting and the causes and impacts that climate change has on ARs, to operate reservoirs in a manner that improves flood protection in the state, and to reoperate flood control and water storage facilities to capture water generated by ARs.

4) Provides that any report required or requested by law to be submitted by a state or local agency to the Members of either house of the Legislature, shall, generally, instead be submitted as a printed copy to the Secretary of the Senate,

as an electronic copy to the Chief Clerk of the Assembly, and as an electronic or printed copy to the Legislative Counsel.

This bill:

1) Establishes the FOC within DWR, which may be administered within the department's divisions, offices, or programs.

2) The purpose of the FOC is to function as the focal point for gathering, analyzing, and disseminating flood and water-related information to stakeholders. To achieve this purpose, the FOC may do, but is not limited to doing, all of the following:

    a. Function during emergency situations to enable the department to centrally coordinate statewide emergency responses.
    b. Coordinate with the National Weather Service (NWS) to provide river forecasts based on expected precipitation and reservoir operations.
    c. Declare flood alerts and support those activities in coordination with relevant cooperating agencies and academic partners, including the ARs: Research, Mitigation, and Climate Forecasting Program, or its successor.
    d. Provide timely updates on activities relevant to cooperating agencies.

3) Requires the FOC and OES, in consultation with cooperating agencies, to develop and submit a report to the Legislature on or before June 1, 2025, that outlines necessary technological advancements for agile forecasting and identifies all of the following:

    a. Regions that are and were underserved.
    b. Gaps in data that would improve flood response.
    c. Strategies for improving communication and emergency response to identified regions.

4) Defines "cooperating agencies" to mean federal, state, and local agencies that engage in water and emergency management, including, but not limited to, the United States Bureau of Reclamation, the State Water Project, the Central Valley Flood Protection Board, OES, and the Department of Insurance (DOI).

5) Requires the report to be submitted in compliance with existing law and repeals the reporting requirement on June 1, 2026.

6) Includes legislative findings and declarations related to extreme weather incidents, including excessive heat and ARs, that pose an urgent threat to lives, property, and resources in California, as specified.

Background

Author Statement. According to the author's office, "the recent series of atmospheric rivers brought unanticipated devastation across California and has led to multiple fatalities. In response to the storms, over 40 counties proclaimed a local emergency. Subsequently, the Governor declared a state of emergency and ultimately requested a major disaster declaration from the President to provide federal assistance to communities and individuals who suffered damages. Clearly, California would benefit from more accurate forecasts to determine the extent to which extreme weather events, such as atmospheric rivers and extended periods of extreme heat would result in significant damages or disruptions to lifeline infrastructure systems."

Further, the author's office notes, "earlier this year, the Committee on Emergency Management, the Committee on Water, Parks and Wildlife, and the Committee on Utilities and Energy Committee, convened a joint oversight hearing to evaluate California's preparedness for extreme atmospheric river incidents. The hearing was an opportunity to hear from the leading climate scientists and researchers on what type of incidents our emergency managers should be prepared for and how the State could improve local forecast models to more accurately predict local impacts and the need to quickly warn residents of any danger from flooding or extended power outages. The ultimate goal of this bill is identifying ways to improve California's forecasting capabilities and provide state and local emergency management with the information they need to prepare for these extreme atmospheric river incidents."

A History of Floods. California has experienced destructive flood events throughout its history. Before January 2023, the last major and widespread flooding event was 1997 (the New Year's Day floods, when 120,000 people were evacuated and 23,000 homes and businesses flooded). More recently, more local flood disasters include the Oroville Spillway in 2017 and the Russian River floods in 2019. Even before this year's floods, every county in California has been declared a federal disaster area at least once for a flooding event over the last 30 years.

Estimates suggest more than 7.3 million people and structures valued at nearly $600 billion statewide are located in areas that have at least a 1-in-500 probability of flooding in any given year. In the Central Valley, 1.3 million people, $17

billion in agricultural economic activity, and $223 billion in homes, businesses, and structures are in flood risk areas. Factoring in future development, climate change, and potential losses to key infrastructure, those figures could climb much higher. Current projections indicate that peak flood flows will increase up to five times by 2072 in the Central Valley compared to past records. Despite their damaging potential, in some cases floods can have positive effects including replenishing groundwater basins, creating habitat for fish and wildlife, and improving water quality by flushing out contaminants.

A Future of Extreme Weather. In 2010, the United States Geological Survey (USGS) led a multidisciplinary team of leading earth scientists, engineers, and social scientists to create the ARkStorm Scenario: a detailed and realistic depiction of how a severe winter storm could affect the state. The ARkStrom Scenario shows that atmospheric rivers represent a nearly existential threat to California's people, economy, and culture. A new ARkStorm scenario (ARkStorm 2.0) has recently been analyzed to reflect climate change data and advances in modeling to investigate the impact of a 30-day storm in a future climate (2071-2080), called ARkFuture. This new modeling shows that climate change will increase the severity of storms.

Current DWR Extreme Weather and Flooding Programs and Services. Year-round, the FOC is responsible for coordinating local, state, and federal flood operations. The FOC is housed within the DWR's Division of Flood Management and is the facility from which DWR centrally coordinates emergency response state-wide. The FOC, when activated during a major weather event, operates 24 hours a day to monitor changing conditions, coordinate flood response efforts with local and federal partners, and inform the public.

The FOC coordinates with the NWS, among other organizations, to forecast the location, quantity, and timing of expected precipitation and issue river forecasts, high water notifications, flood alerts, and support flood mobilization as appropriate. Responses to this work may include changes in reservoir operations, additional interagency communication, levee patrol, and emergency support. DWR coordinates closely with OES when emergency operation centers are activated during a flood or other emergency follow the Standardized Emergency Management System protocol.

The California AR Program was created by California Senate Bill SB 758 (Block, Chapter 682, Statutes of 2015). The AR Program is housed in DWR in coordination with the Center for Western Weather Extremes (see below) and aims to develop the science of atmospheric rivers to support planning, forecasts and warning elements of flood management and water management in California.

The Flood Emergency Response Information Exchange provides participating agencies an online system to access and exchange current flood information in real-time through Web GIS interface. It integrates geo-referenced databases, a real-time data collection and exchange system, and a decision support system supporting other DWR programs, various hydrologic and hydraulic computer models and tools, and applicable flood-related documents.

The California Data Exchange Center installs, maintains, and operates an extensive hydrologic data collection network including automatic snow reporting gages for the Cooperative Snow Surveys Program and precipitation and river stage sensors for flood forecasting.

Center for Western Weather and Water Extremes, Scripps Institution of Oceanography. Among other initiatives, the Center for Western Weather Extremes coordinates an Atmospheric River Reconnaissance program with U.S. Army Corps of Engineers, DWR, U.S. Air Force 53rd Weather Reconnaissance Squadron, and the National Oceanic and Atmospheric Administration. The goal of this program is to support water management decisions and flood forecasting by developing and testing the potential of targeted airborne and buoy observations over the Northeast Pacific to improve forecasts of the landfall and impacts of atmospheric rivers on the U.S. West Coast at lead times of one to five days. Innovations in targeting methods, data assimilation, and regional forecast skill requirements are pursued through collaborative, cross-disciplinary, science-based strategies.

Challenge and Impact of Forecasting Extreme Weather. Although western U.S. forecasting of floods and the precipitation that causes them has improved over time, major gaps remain. The current science of weather forecasts can generally only support a zero to four-day lead time for decisions that would support water management and hazard mitigation. Many of these challenges result from errors in the prediction of atmospheric river landfall position, intensity, orientation, duration, and temperature.

Flooding disasters caused by extreme storms disproportionally impact vulnerable communities. According to a report by the Legislative Analyst's Office, "much of the new housing construction in the state has occurred in areas that are at significant risk of the effects of climate change…[which means] in many cases, impacts will be felt most acutely by low income households who disproportionately live in areas of the state that will be exposed to higher risks and [live in the] types of housing that are typically less resilient." Sufficient disaster preparedness may be too costly for people of low socioeconomic status, and there

are barriers for vulnerable communities to have agile communication with government agencies.

2022-2023 Winter Storm Disasters in California. California began 2023 with as many as nine major storm events in around three weeks. These storms brought eight–15 inches of rain in the valleys, 20–30 inches of rain in the foothills, and 10–15 feet of snow in the Sierra. While this precipitation did provide much-needed drought relief, it was accompanied by intense floods and winds reaching up to 90 mph that caused over $1 billion in damage and the tragic loss of at least 22 lives.

The phenomenon responsible for exacerbating the impact of these storms was a series of ARs, which are long corridors that transport concentrated water vapor through the air from the tropics to California. These events can be either hazardous or beneficial depending on their intensity. When atmospheric river-fed storms approach land and encounter high elevation mountain ranges, such as the Sierra Nevada, moist air rises and cools producing copious amounts of precipitation. Some of these atmospheric rivers can carry 7.5–15 times the average flow out of the Mississippi River.

Based on forecasts of the high winds, excessive rainfall, and the potential for flooding, local operational areas (counties) began proclaiming local emergencies prior to the damaging New Year's Eve storm. On January 4, 2023 the Governor requested and secured an Emergency Declaration for direct Federal Assistance from the Federal Emergency Management Agency (FEMA). As the series of atmospheric rivers continued to cause floods, extended power outages, and displace thousands of residents, a majority of California's counties proclaimed local emergencies and ultimately the Governor requested an Expedited Major Disaster Declaration on January 12, 2023. President Biden approved the Major Disaster Declaration on January 14, 2023.

State-Federal Flood Operations Center. This bill codifies the FOC, within DWR, to function as the focal point for gathering, analyzing, and disseminating flood and water-related information to stakeholders. This includes coordinating statewide emergency responses, partnering with the NWS for river forecasts, declaring flood alerts, and providing updates on relevant activities to cooperating agencies.

This bill requires the FOC and OES to develop and submit a report to the Legislature, by June 1, 2025, that outlines necessary technological advancements for agile forecasting. The report will identify regions that are and were underserved, gaps in data that would improve flood response, and strategies for improving communication and emergency response to identified regions.

Prior/Related Legislation

SB 366 (Caballero, 2023) revises and recasts the California Water Plan (Water Plan) and requires the Water Plan, commencing with the 2028 update, to be a comprehensive plan for addressing the state's water needs and meeting water specified long-term supply targets. (Pending in the Assembly Water Parks and Wildlife Committee)

SB 638 (Eggman, 2023) the Climate Resiliency and Flood Protection Bond Act of 2024, which would, if approved by voters, authorize $6 billion in general obligation bonds for flood protection and climate resiliency projects, as provided. (Pending in the Assembly Water, Parks, and Wildlife Committee)

SB 659 (Ashby, 2023) establishes the California Water Supply Solutions Act of 2023 to, among other things, require the DWR to develop a groundwater recharge action plan by January 1, 2026, that provides actionable recommendations that result in the ability to create additional groundwater recharge capacity. (Pending in the Assembly Water, Parks, and Wildlife Committee)

AB 30 (Ward, 2023) renames and reconfigures the existing AR Program as the "Atmospheric River Research and Forecast Improvement Program: Enabling Climate Adaptation Through Forecast-Informed Reservoir Operations and Hazard Resiliency Program (AR/FIRO Program), as specified. (Pending in the Senate Appropriations Committee)

SB 129 (Skinner, Chapter 69, Statutes of 2021) appropriated $9.25 million to DWR for the AR Program and $10 million to DWR to pilot FIRO at three reservoirs, among other provisions.

SB 758 (Block, Chapter 682, Statutes of 2015) established the AR Program, within DWR, to conduct research relating to climate forecasting and the causes and impacts that climate change has on ARs, and to take all actions within its existing authority to operate reservoirs in a manner that improves flood protection in the state and to reoperate flood control and water storage facilities to capture water generated by ARs, thereby increasing water supply, hydropower availability, and the reliability of water resources in the state.

FISCAL EFFECT: Appropriation: No Fiscal Com.: Yes Local: No

SUPPORT:

Association of California Water Agencies

Sonoma Water

OPPOSITION:

None received

ARGUMENTS IN SUPPORT: In support of the bill, the Association of California Water Agencies writes that, "California's last round of atmospheric rivers in January 2023, resulted in significant flooding throughout Southern, Central, and Northern California, resulting in the loss of power to homes and businesses, evacuation orders, and damage to infrastructure. As California continues to experience the impacts of climate change, there is a need for improved forecasting capabilities and data to inform emergency response operations for water management and public safety. AB 277 would identify the necessary technological advancements, data gaps, and communication strategies for the State to respond to flood events."

DUAL REFERRAL: Senate Natural Resources & Water Committee (11-0) and Senate Governmental Organization Committee