SENATE COMMITTEE ON APPROPRIATIONS
Senator Anthony Portantino, Chair
2023 - 2024 Regular Session

AB 277 (Rodriguez) - Extreme Weather Forecast and Threat Intelligence Integration Center

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Urgency: No
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Policy Vote: N.R. & W. 11 - 0, G.O. 14 - 0
Mandate: No
Consultant: Ashley Ames

Bill Summary: This bill would codify the State-Federal Flood Operations Center in the Department of Water Resources (DWR), and would require DWR and the Office of Emergency Services (OES) to report on forecasting and data that would improve flood response.

Fiscal Impact:
- DWR estimates one-time costs of about $100,000 (General Fund) to implement the report.
- Unknown, potentially significant costs (General Fund) for OES to collaborate with DWR on the report, forecasting, and data identification.
- Unknown but likely minor costs (General Fund) for other agencies and departments to consult with DWR and OES.

Background: 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.

Proposed Law: This bill would codify the State-Federal Flood Operations Center in the DWR, and would require DWR and OES to report on forecasting and data that would improve flood response. Specifically, this bill would:

1. Establish the State-Federal Flood Operations Center within DWR.
2. Authorize DWR to administer the center in the department's divisions, offices, or programs.

3. Provide that the purpose of the center is to function as the focal point for gathering, analyzing, and disseminating flood and water-related information to stakeholders and would authorize the center to take specified actions for that purpose, including to function during emergency situations to enable the department to centrally coordinate statewide emergency responses.
4. Require the department and OES, in consultation with cooperating agencies, as defined, to develop and submit a report to the Legislature, as specified, on or before October 1, 2025, that outlines necessary technological advancements for agile forecasting and gaps in data that would improve response.

Related Legislation:

SB 366 (Caballero, 2023) would revise and recast the California Water Plan and require 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.

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

SB 659 (Ashby, 2023) would establish 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.

AB 30 (Ward, 2023) would rename and reconfigure 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.

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.

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