Date of Hearing: April 18, 2023

ASSEMBLY COMMITTEE ON WATER, PARKS, AND WILDLIFE
Rebecca Bauer-Kahan, Chair
AB 277 (Rodriguez) – As Amended April 7, 2023

SUBJECT: Extreme Weather Forecast and Threat Intelligence Integration Center

SUMMARY: Codifies the State-Federal Flood Operations Center (FOC) in the Department of Water Resources (DWR) and tasks it with submitting a report to the Legislature. Specifically, **this bill**:

1) Establishes that the purpose of the FOC is to function as a focal point for the collection, analysis, and dissemination of flood and water-related information.

2) Recognizes that the FOC functions during emergency events to coordinate emergency response, coordinates with the National Weather Service to provide river forecasts, and declares flood alerts, and coordinates and updates relevant cooperating agencies.

3) Requires that the cooperating agencies include the U.S. Bureau of Reclamation, the State Water Project, the Central Valley Flood Protection Board, the California Office of Emergency Services (Cal OES), and the Department of Insurance.

4) Requires that the FOC and Cal OES, with the cooperating agencies, develop and submit a report to the Legislature that outlines necessary technological advancements for agile forecasting and identifies gaps in data, underserved regions, and strategies for improving communication and emergency response.

5) Allows Cal OES to expend Federal Emergency Management Agency (FEMA) Preparedness Grant and federal Hazard Mitigation Grant Program funds to fill any technological, operational, or preparedness gaps identified in the report.

6) Makes legislative findings and declarations related to extreme weather incidents.

EXISTING LAW:

1) Establishes DWR within the Natural Resources Agency and sets forth its powers and duties relating to water resources (Water Code § 120).

2) Allows DWR to respond in times of extraordinary stress and disaster caused by storms and flood (Water Code § 128).

3) Establishes the Atmospheric Rivers: Research, Mitigation, and Climate Forecasting Program in DWR. Requires DWR, upon an appropriation for purposes of the program, to research climate forecasting and the causes and impacts that climate change has on atmospheric rivers, to operate reservoirs in a manner that improves flood protection, and to reoperate flood control and water storage facilities to capture water generated by atmospheric rivers (Water Code § 347).

4) Under the California Emergency Services Act, establishes the Cal OES within the office of the Governor for the purpose of mitigating the effects of natural, manmade, or war-caused emergencies (Government Code § 8550).

5) Requires that 180 days after each declared disaster, Cal OES with relevant state and local agencies complete an after-action report to review the public safety response and disaster recovery activities and conclusions and make recommendations based on the findings [Government Code § 8607(f)].

6) Requires that Cal OES give local jurisdictions that do not have a local hazard mitigation plan preference for funding by the Pre-disaster Mitigation Program, the Hazard Mitigation Grant Program, and the Flood Mitigation Assistance Program to assist in developing and adopting a local mitigation plan (Government Code § 65302.6).

FISCAL EFFECT: Unknown. This bill is keyed fiscal.

COMMENTS:

1) **Purpose of this bill.** This bill establishes the FOC in statute and tasks it with generating a report with relevant cooperating agencies on technological advancements needed for more agile forecasting. This bill also allows Cal OES to extend funding to address the needs identified in the report. According to the author, "this bill will 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."

2) **Background.** California began 2023 with as many as nine major storm events in around three weeks. These storms brought 8–15 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 phenomena responsible for exacerbating the impact of these storms: atmospheric rivers (AR). ARs 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 AR-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 ARs can carry 25 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 FEMA. As the series of ARs continued to cause floods, extend 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.

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 agriculture 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. A recent study by researchers at the Center for Western Weather and Water Extremes housed at Scripps examined the February 2017 AR event that contributed to the Oroville crisis and found that "California's reliance on precipitation from (ARs) is expected to increase as our climate warms." Similarly, research published in August 2022 ("ARkFuture") shows how climate change is leading to more extreme AR events. ARkFuture models a 30-day "megastorm" event in which "Atmospheric rivers are the primary storm mode" causing extremely high precipitation and associated runoff that is two to four times higher than historical averages.[1] Such an event would result in a "megaflood." Better modeling and forecasting could help to mitigate the risks associated with such an event.

Current DWR extreme weather and flooding programs and services. Year round, FOC, is responsible for coordinating local, state, and federal flood operations. The FOC is housed within 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, coordinating flood fight efforts with local and federal partners, and informing the public. The FOC coordinates with the National Weather Service, among other organizations, to forecast the location, quantity, and timing of expected precipitation and issues 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 Cal OES when emergency operation centers are activated during a flood or other emergency follow the Standardized Emergency Management System protocol. Agencies including Cal OES, CAL FIRE, U.S. Bureau of Reclamation, the State Water Project, the Central Valley Flood Protection Board, and local agencies are identified as Key Cooperating Agencies in the FOC.

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[1] Xingying Huang and Daniel Swain, "Climate change is increasing the risk of a California megaflood," Science Advances, 8 (2022): eabq0995, https://www.science.org/doi/10.1126/sciadv.abq0995.

The California Atmospheric River Program was created by California Senate Bill SB 758 (Block) in 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 ARs 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 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 ARs on the U.S. West Coast at lead times of 1–5 days. Innovations in targeting methods, data assimilation and regional forecast skill requirements are pursued through collaborative, cross-disciplinary, science-based strategies.

Emergency grant funds. FEMA has the authority to deliver numerous disaster and non-disaster financial assistance programs. One such program is the Emergency Management Performance Grant that provides state, local, tribal and territorial emergency management agencies with the resources required for implementation of the National Preparedness System and works toward the National Preparedness Goal of a secure and resilient nation. The EMPG's allowable costs support efforts to build and sustain core capabilities across the prevention, protection, mitigation, response and recovery mission areas. FEMA Hazard Mitigation Grant Program provides funding to state, local, tribal and territorial governments so they can develop hazard mitigation plans and rebuild in a way that reduces, or mitigates, future disaster losses in their communities. When requested by an authorized representative, this grant funding is available after a presidentially declared disaster.

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 0–4-day lead time for decisions that would support water management and hazard mitigation. Many of these

challenges result from errors in the prediction of AR landfall position, intensity, orientation, duration, and temperature.[2]

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."[3] 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.[4]

Reporting requirements. Within 180 days a declared emergency, Cal OES with other involved agencies is responsible review of the public safety response and disaster recovery activities and conclusions and recommendations based on findings (Government Code § 8607). Further, any state agency responding to an emergency declared by the governor, has 90 days to submit an after action report to Cal OES. This after action report should include a review of response actions taken, application of the Standardized Emergency Management System (SEMS), suggested modifications to SEMS, necessary modifications to plans and procedures, identified training needs, and recovery activities to date.

This seems to be interpreted as a *federally* declared emergency as the last available DWR after action report is from 2017 in response to a president and governor declared emergency for winter storms. There have, however been several other governor-only declared emergencies, including for atmospheric river storm systems in the winters of 2019 and 2021.[5] The report required in this bill is distinct from the required after action reports as it focuses on the technological advances and related processes that would be needed for better forecasting of such events, which is distinct from the SEMS evaluation of most after action reports.

3) **Double referral**. This bill passed the Assembly Committee on Emergency Management on March 13, 2023 by a vote of 7-0.

4) **Related Legislation.** AB 30 (Ward) of the current legislative session reconfigures the existing Atmospheric Rivers: Research, Mitigation, and Climate Forecasting Program within DWR and tasks the program with developing and implementing new methods to better predict the impact of ARs on water supply, flooding, post-wildfire debris flows, and the environment. AB 30 is pending in the Assembly Appropriations Committee.

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[2] Ralph, M. F. "West Coast Forecast Challenges and Development of Atmospheric River Reconnaissance," Bulletin of the American Meteorological Society, (101) 2020. https://journals.ametsoc.org/view/journals/bams/101/8/bamsD190183.xml

[3] Petek, G. LAO, Climate Change Impact Across California, (2022) https://lao.ca.gov/Publications/Report/4584#Major_Climate_Change_Impacts_on_Housing

[4] Substance Abuse and Mental Health Services Administration. "Disaster Technical Assistance Center supplemental Research Bulletin, Greater Impact: How Disasters Affect People of Low Socioeconomic Status" 2017

[5] List of disasters | FTB.ca.gov

SB 231 (Hurtado) of the current legislative session requires the State Water Resources Control Board and DWR, and the State Department of Public Health to report on the feasibility, estimated costs, and means of financing a coordinated water measurement database. SB 231 is pending in the Senate Natural Resources and Water Committee.

SB 262 (Hurtado) of the current legislative session requires DWR, subject to an appropriation by the Legislature, to administer the California Farmworkers Drought and Flood Resilience Pilot Project, as specified. SB 262 is pending in the Senate Governance and Finance Committee.

SB 209 (Dodd), Chapter 405, Statutes of 2019, establishes a multi-agency California Wildfire Warning Center to monitor fire-weather and threat condition and to enhance fire-weather forecasting models.

SB 758 (Block), Chapter 682, Statutes of 2015, establishes the Atmospheric Rivers Program at the DWR to research, contingent on appropriation of special fund monies, the causes and effects of atmospheric rivers in order to increase California's water supply and water reliability and improve flood control.

REGISTERED SUPPORT / OPPOSITION:

Support

None on file

Opposition

None on file

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