Date of Hearing: July 16, 2025

ASSEMBLY COMMITTEE ON APPROPRIATIONS
Buffy Wicks, Chair
SB 599 (Caballero) – As Amended April 24, 2025

Policy Committee: Water, Parks and Wildlife Vote: 12 - 0

Urgency: No State Mandated Local Program: No Reimbursable: No

SUMMARY:

This bill requires the Department of Water Resources (DWR) to research, develop, and implement experimental tools that produce seasonal and sub-seasonal atmospheric river (AR) forecasts, as defined, under the Atmospheric Rivers Research and Forecast Improvement Program: Enabling Climate Adaptation Through Forecast-Informed Reservoir Operations and Hazard Resiliency (AR/ FIRO) Program.

FISCAL EFFECT:

DWR will likely incur significant ongoing costs to update and expand its work on ARs to include experimental tools that produce seasonal and sub-seasonal forecasts.

For its part, DWR estimates ongoing annual General Fund costs of approximately $5.5 million to implement the bill. DWR's AR/ FIRO Program has a $4 million annual operating budget. Improving the department's ability to forecast AR events beyond the current four-to-10 day period to sub-seasonal (two-to-six weeks) and seasonal (one-to-six months) periods will require new and expanded research, study, and testing of novel forecasting tools and modeling.

COMMENTS:

1) **Purpose.** According to the author:

> [This bill] builds upon [DWR's] current research operations to advance extended range AR forecasts, to provide emergency operations ample lead-time for effective decision-making. With more accurate data and longer-range certainty, we can better prepare and protect our communities from catastrophic flood and other severe weather events, improve our water management and storage capabilities, and reduce financial devastation caused by flooding.

2) **Background.** ***ARs.*** ARs are long narrow bands of atmospheric water vapor pushed along by strong winds. They transport large amounts of water vapor from the tropics to higher latitudes and strike coastlines globally from California to Europe to Antarctica. They can transport moisture equivalent to more than 25 times the amount of liquid water flowing through the mouth of the Mississippi River.

   ARs and their intense precipitation can be both beneficial and hazardous, presenting a special

challenge to California's water managers and flood control planners. According to the Scripps Institution of Oceanography (Scripps) at the University of California, San Diego and the National Oceanic and Atmospheric Administration (NOAA), a small number of ARs supply on average between 40% to 50% of California's precipitation and snowpack annually. Problems occur when AR events last for more than one day or when several occur back-to-back such as those that occurred in January 2023; several ARs in sequence can cause hazards like flooding, mudslides, or ash flows in areas of recent wildfires. NOAA and Scripps research has shown ARs are implicated in most of the extreme precipitation and flooding events in California. Nearly 80% of levee breaches in the Central Valley have been associated with AR events.

FIRO. FIRO is a reservoir operations strategy that, in effect, allows reservoirs to be managed in "real-time" so that operators can keep water in the reservoir if the weather forecast shows no imminent precipitation in a reservoir's watershed or, alternatively, release water from the reservoir to free up space for additional flow (thereby maintaining flood protection) when the forecast indicates an AR is headed towards a reservoir's watershed. Enhanced forecasting capability is essential to implementing FIRO. Sonoma Water Agency has piloted and implemented FIRO at Lake Mendocino since 2019 and has increased water stored in that reservoir by nearly 20% while maintaining flood protection. This additional water was immensely helpful in 2021 when the Russian River basin experienced extreme drought conditions.

Among others in support of the bill, the Association of California Water Agencies writes:

> SB 599 would increase DWR's AR forecast capacity which would provide emergency operations with ample lead-time for effective decision-making and allow DWR and water managers across the state to better understand atmospheric rivers and their impacts, more effectively manage water resources, and prepare for natural disasters. These investments will save significant funding over time as the State is better able to manage this limited resource and plan for and avert potential disasters.

Analysis Prepared by: Nikita Koraddi / APPR. / (916) 319-2081