
SENATE COMMITTEE ON NATURAL RESOURCES AND WATER

Senator Dave Min, Chair
2023 - 2024 Regular

Bill No:	AB 30	Hearing Date:	June 22, 2023
Author:	Ward		
Version:	December 5, 2022	Introduced	
Urgency:	No	Fiscal:	Yes
Consultant:	Genevieve Wong		

Subject: Atmospheric Rivers: Research, Mitigation, and Climate Forecasting Program

BACKGROUND AND EXISTING LAW

An (atmospheric) river runs through it. An atmospheric river is a column of condensed water vapor in the atmosphere that flows in the direction of moving air created by weather systems. When atmospheric rivers move inland and sweep over the mountains, clouds form as the water vapor rises and condenses and heavy precipitation ensues. Although many atmospheric rivers are weak systems that provide a fresh source of water and snow, some of the larger, more powerful atmospheric rivers can create extreme rainfall and floods capable of causing severe damage to life and property. Atmospheric rivers are approximately 250 – 375 miles wide on average and account for, on average, about 30-50% of annual precipitation in the western states.¹

While atmospheric rivers are the source of most of California's water supply, they can cause most of the state's flood damage. According to the Department of Water Resources (DWR), about 80 percent of levee breaches in California's Central Valley are associated with atmospheric rivers.²

California experienced 12 significant atmospheric rivers between late December 2022 and late March of this year. Additionally, the number of intense atmospheric rivers is likely to increase as a result of climate change.

DWR Atmospheric Rivers Program. Existing law establishes the Atmospheric Rivers program within DWR and requires DWR, upon appropriation, to research climate forecasting and the impacts climate change has on atmospheric rivers. DWR is required to take all actions within its authority to reoperate flood control and water storage facilities to capture water generated by atmospheric rivers. (Water Code (Wat.) §347).

The Legislature has made three previous appropriations to support this research: \$3 million in the 2016-17 Budget, \$9.25 million in the 2019-20 Budget, and \$10 million in the 2021-22 Budget. This funding has allowed DWR to leverage funding and participation from federal and local agencies to deepen the understanding of atmospheric rivers (ARs) and implement (forecast-informed reservoir operations (FIRO)) at Lake Mendocino. DWR and water agencies are also seeking to implement FIRO in the Feather-Yuba River basin and the Santa Ana River basin.

¹ <https://psl.noaa.gov/arportal/about/>; last accessed 6/4/2023

² <https://water.ca.gov/News/Blog/2019/Feb-19/New-Scale-for-Atmospheric-Rivers-Impact>; last accessed 6/6/2023

Forecast-informed reservoir operations. FIRO is a flexible water management approach that uses forecasts to help water managers selectively retain or release water from reservoirs. FIRO uses data from watershed monitoring and improved water forecasting to help reservoir managers release water in advance of heavy storms, or to store extra water when the forecast is dry. FIRO helps managers know when and where atmospheric rivers will occur and how much precipitation they will bring. Managers may opt to keep water in the reservoir if the weather forecast shows no imminent precipitation in the reservoir's watershed or, alternatively, release water from the reservoir to free up space for additional flow if the forecast indicates an atmospheric river is headed towards the watershed. This flexibility helps water managers increase their resilience to droughts and floods.

According to a publication by the Center for Western Weather and Water Extremes at the Scripps Institution of Oceanography at UC San Diego (hereafter, CW3E), *Better Forecasting of Atmospheric Rivers Mitigates Impact of 2021 Drought*, implementing FIRO throughout California could provide more than 150 billion gallons of water annually. CW3E has developed a forecasting model which is able to predict where atmospheric rivers will make landfall and how much precipitation the atmospheric rivers will bring up to seven days before the event. According to CW3E's *Atmospheric Rivers Research Powers Forecast Informed Reservoir Operations*, the use of FIRO allowed Lake Mendocino to store an additional 20 percent more water in water year 2020. Additionally, within California, widespread FIRO could save 500,000 acre-feet of water per year.

PROPOSED LAW

This bill:

- 1) Makes legislative findings and declarations regarding the significance of atmospheric rivers to the state's water supply.
- 2) Renames the Atmospheric Rivers program as the *Atmospheric Rivers Research and Forecast Improvement Program: Enabling Climate Adaption Through Forecast-Informed Reservoir Operations and Hazard Resiliency (AR/FIRO) Program*.
- 3) Requires DWR to research, develop, and implement new observations, prediction models, novel forecasting methods, and tailored decision support systems to improve predictions of atmospheric rivers and their impacts on water supply, flooding, post-wildfire debris flows, and environmental conditions.
- 4) Requires DWR 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 facilities to capture water generated by atmospheric rivers.
- 5) Declares that the goals of integrating forecast informed reservoir operations into DWR operations is to increase water supply, hydropower availability, and water supply reliability.
- 6) Authorizes DWR to use research generated by the new program to refine climate projections of extreme weather and water events and changes in Sierra snow.

ARGUMENTS IN SUPPORT

According to the author, “Without efficient and reliable predictions of AR, many communities cannot prepare for floods, resulting in wasted water from dam overflow, hindering hydroelectric power, less water for agriculture use, and less water for rural residential communities that all too often go dry. ARs and their patterns can also help us to better understand climate change and the environmental implications too much or too little water can have on our state.”

ARGUMENTS IN OPPOSITION

None received

COMMENTS

Sharing is caring. Incorporating FIRO considerations into DWR’s Atmospheric Rivers Program may help DWR predict how much water is needed in our reservoirs at any given moment. However, other agencies or entities may also benefit from DWR’s work on atmospheric rivers. The author may wish to consider ways DWR may make its work in the *Atmospheric Rivers Research and Forecast Improvement Program: Enabling Climate Adaption Through Forecast-Informed Reservoir Operations and Hazard Resiliency (AR/FIRO) Program* available to others.

Prior, related legislation

AB 2078 (Flora, 2021) was substantially similar to this bill. AB 2078 died in the Assembly Appropriations Committee.

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

AB 74 (Ting, Chapter 23, Statutes of 2019) appropriated \$9.25 million to DWR for the Atmospheric Rivers Program, among other provisions.

AB 557 (Wood, 2019) would have made minor revisions to the Atmospheric Rivers Program and appropriated \$9.25 million to DWR to implement it. AB 557 died in the Assembly Appropriations Committee.

AB 1623 (Committee on Budget, Chapter 318, Statutes of 2016) appropriated \$3 million to DWR for research on atmospheric rivers, among other provisions.

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

SUPPORT

Sonoma County Water Agency (sponsor)

Association of California Water Agencies
CalChamber
California Association of Professional Scientists
California Association of Recreation & Park Districts
California Central Valley Flood Control Association
California Groundwater Coalition
California Municipal Utilities Association
California Special Districts Association
City of Santa Rosa
East Bay Municipal Utility District
El Dorado Irrigation District
Irvine Ranch Water District
Mojave Water Agency
Northern California Water Association
Olivenhain Municipal Water District
Orange County Water District
San Bernardino Valley Municipal Water District
San Diego County Water Authority
San Diego Regional Chamber of Commerce
Santa Clara Valley Water District
Solano County Water Agency
Turlock Irrigation District
Upper San Gabriel Valley Municipal Water District
Urban Counties Caucus
Valley Ag Water Coalition
Yuba Water Agency

OPPOSITION

None Received

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