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Weather Research and Forecasting Innovation Reauthorization Act of 2023 (H.R. 6093)

Hazardous weather and climate events kill hundreds of people and cause billions of dollars of property damage in the United States each year. As of November 1, 2024, for instance, the United States experienced 24 weather and climate disasters with billion-dollar or greater costs and an estimated total cost of \$61.6 billion for the year. Such costs result from a combination of weather and climate-related hazards; the presence of populations, crops, and infrastructure; and their vulnerability and resilience to hazards.

The National Oceanic and Atmospheric Administration (NOAA) is the primary civilian agency with responsibility for weather forecasting. The Weather Research and Forecasting Innovation Reauthorization Act of 2023 (H.R. 6093) in the 118th Congress aimed to improve NOAA's weather research, support improvements in weather forecasting and prediction, and expand commercial opportunities for the provision of weather data. This product describes H.R. 6093 and selected related considerations for Congress. (For more about NOAA, see CRS Report R47636, *National Oceanic and Atmospheric Administration (NOAA): Overview and Issues for Congress*.)

Congress has long shown interest in improving NOAA's forecasts of weather and climate events. In 2017, Congress passed the Weather Research and Forecasting Innovation Act (Weather Act; P.L. 115-25). The Weather Act included five titles addressing (1) the transition of NOAA research and development (R&D) to operations, (2) improvements to sub-seasonal and seasonal forecasts, (3) the future of weather satellites and the agency's use of commercial data, (4) coordination and communication of weather data and observations, and (5) tsunami program activities. (For more information about the Weather Act, see CRS Report R44838, *The Weather Research and Forecasting Innovation Act of 2017: Congressional Direction to NOAA in P.L. 115-25*, and CRS Report R44834, *The U.S. Tsunami Program Reauthorization in P.L. 115-25: Section-by-Section Comparison to P.L. 109-479, Title VIII*.) Congress has amended the Weather Act several times, including via P.L. 115-423, P.L. 116-259, and P.L. 117-316. Congress also has directed NOAA to advance weather forecasting via annual and supplemental appropriations (e.g., explanatory statement accompanying P.L. 118-42).

H.R. 6093: Weather Research and Forecasting Innovation Reauthorization Act of 2023

H.R. 6093 would have built upon the Weather Act. Introduced on October 26, 2023, the bill was amended by voice vote and unanimously ordered to be reported, as amended, out of the House Committee on Science, Space,

and Technology on November 8, 2023. It passed in the House on April 29, 2024 (with a vote of 394 to 19). On December 18, 2024, Members in the Senate introduced a bill focused on NOAA weather research, forecasting, prediction, and data (S. 5601), the text of which was not available for review as of the publication of this product.

The five titles of H.R. 6093 would have amended the Weather Act and authorized or directed NOAA to take on new responsibilities. Some provisions would have codified current NOAA activities; others would have directed NOAA in new ways. Some of the provisions in H.R. 6093 were similar or identical to legislation introduced individually in the 118th Congress. Summaries of each title are below.

Title I: Reauthorization of the Weather Act would have amended provisions in the Weather Act related to authorization of appropriations, tornado and hurricane forecasting, observing and satellite planning and testing, computing resources, weather modeling, the Interagency Council for Advancing Meteorological Services, and required reports, among other provisions. It also would have amended the Tsunami Warning, Education, and Research Act of 2017 (part of the Weather Act); the Integrated Coastal and Ocean Observation System Act of 2009 (P.L. 111-11); the National Landslide Preparedness Act (P.L. 116-323); and the Harmful Algal Bloom and Hypoxia Research and Control Act of 1998 (P.L. 105-383).

Title II: Enhancing Federal Weather Forecasting and Innovation would have tasked NOAA with new responsibilities and authorities regarding weather radars; atmospheric river, coastal flooding, and storm surge forecast improvements; aviation-related observations and forecasting; the transition of research to demonstration and operations; the Advanced Weather Interactive Processing System (to process, display, and communicate data); reanalysis and reforecasting; and the National Weather Service's (NWS's) workforce.

Title III: Commercial Weather and Environmental Observations would have amended the Weather Act to codify NOAA's Commercial Data Program and Commercial Data Pilot Program and made changes to its activities. (For more about the program and proposed changes, see CRS In Focus IF12671, *NOAA's Commercial Data Program: Background and Considerations for Congress*.)

Title IV: Communicating Weather to the Public would have amended the Weather Act regarding hazardous weather or water events (e.g., severe storms, flash floods)

risk communication, hazard communication research, and public engagement. It also would have directed NOAA to improve NWS communication services; continue to perform post-storm surveys and assessments; and collect social, behavioral, and economic data on public response to hazardous weather or water communications and events. The title also would have tasked the Government Accountability Office (GAO) with examining NWS's public notification system.

Title V: Improving Weather Information for Agriculture and Water Management would have amended several laws including the Food Security Act of 1985 (P.L. 99-198) to add forecasting pilot projects for water management and agriculture; the National Integrated Drought Information System Act of 2006 (P.L. 109-430) to adjust the system's functions, partnerships, and modeling activities; the Coordinated Ocean Observations and Research Act of 2020 (P.L. 116-271) to make changes to the National Water Center; and the Weather Act to establish a precipitation forecast improvement program. The title would have codified both the National Mesonet Program (a central repository for nonfederal weather data) and the National Coordinated Soil Moisture Monitoring Network initiative. It would have also required a report regarding existing federal authorities and policies related to transferring NOAA weather satellites to another federal agency.

Considerations for Congress

Congress, when considering introducing a similar bill in the future, could consider various issues, including the inclusion of other weather-related bills, NOAA's progress in implementing the existing Weather Act authorities and requirements, and recommendations from experts and stakeholders on weather forecasting topics.

Other weather-related bills in the 118th Congress proposed activities not included in H.R. 6093. In the House, Members introduced bills related to heat preparedness (H.R. 4953), wildfire forecasting (H.R. 550), rural weather (H.R. 4654), and fire weather forecasting (H.R. 4866), for example. In the Senate, some bills concentrated on heat preparedness (S. 2645), automated land and weather observing systems and the cooperative observer program (S. 1939), advanced weather model computing (S. 3642), and artificial intelligence (S. 3888). The 118th Congress also included direction to NOAA regarding weather forecasting in the explanatory statement accompanying FY2024 annual appropriations. For example, Congress directed NOAA to use funding to improve fire weather modeling, prediction, and detection and to evaluate commercial capabilities of hyperspectral microwave sounder data. Congress could consider incorporating directives from these bills and explanatory statements in future bills.

In the Weather Act, Congress directed NOAA to release periodic reports, plans, or resources on certain topics. For example, Section 105 of the Weather Act (15 U.S.C.

§8515) requires NOAA to annually issue an R&D and research-to-operations plan to restore and maintain U.S. leadership in weather prediction and forecasting. (H.R. 6093 would have amended the schedule to every two years.) CRS identified some of these deliverables among NOAA's publicly available resources. The agency was unable to provide CRS the remaining original or updated reports, plans, or resources (although NOAA may have shared them with congressional offices directly). Lack of access to NOAA reports and plans may limit the ability of Congress and other stakeholders to monitor NOAA's weather forecasting research and operations and determine whether additional direction or authority may be needed. H.R. 6093 would have required reports, briefings, plans, and other resources under 20 of its provisions. Congress could consider engaging in oversight on the agency's reporting or further specifying reporting requirements, among other actions.

Since enactment of the Weather Act in 2017, several expert and stakeholder groups have issued reports with recommendations related to weather forecasting at NOAA and other federal agencies. These groups include NOAA's Science Advisory Board (SAB, 2021 report on priorities for weather research), its Environmental Information Services Working Group (EISWG, 2022 report on sub-seasonal to seasonal [S2S] forecasting), the American Meteorological Society (2022 report on adjustments to the Weather Act and other policies from the private sector perspective), and the President's Council of Advisors on Science and Technology (2023 report on extreme weather risk in a changing climate). Other groups have focused their analysis on activities that could impact weather forecasting, including the National Academies of Sciences, Engineering, and Medicine (2018 report on earth observations from space), GAO (2023 report on artificial intelligence in natural hazard modeling), and NOAA's SAB (2024 report on public-private partnerships). Some of these studies were requested by Congress.

The EISWG has also been tracking NOAA's implementation the SAB 2021 and EISWG recommendations through annual reports to Congress. In 2023, EISWG found that the SAB 2021 recommendations have been "frequently referenced by NOAA, the external community, and Congress." For example, NOAA's Weather Program Office *Strategic Plan Fiscal Years 2022-2026* addressed 25 of 33 recommendations. In 2024, EISWG noted issues with progress on topics such as S2S forecasting and the hurricane forecast improvement program. It is unclear if and how NOAA has been implementing recommendations from other groups and reports and whether the provisions in H.R. 6093 would have addressed any outstanding recommendations.

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