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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. In 2023, for instance, the United States experienced 28 weather and climate disasters with billion-dollar or greater costs and an estimated total cost of \$92.9 billion. 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. In the 118<sup>th</sup> Congress, the House passed the Weather Research and Forecasting Innovation Reauthorization Act of 2023 (Weather Act Reauthorization Act; H.R. 6093) which aims 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) 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, 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 support weather forecasting via annual and supplemental appropriations, including funding for oceanic and atmospheric research and forecasting (e.g., P.L. 117-169, §40004).

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

H.R. 6093 builds 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). As of the publication date of this product, Members in the Senate had not taken up the House-passed bill or introduced a companion or competing bill.

H.R. 6093 has five titles. It would amend the Weather Act and authorize or direct NOAA to take on new responsibilities. Some provisions would codify current NOAA activities; others would direct NOAA in new ways. Some of the provisions in H.R. 6093 are similar or identical to those in legislation also introduced individually in the 118<sup>th</sup> Congress. Summaries of each title are below.

**Title I: Reauthorization of the Weather Act** would amend provisions in the Weather Act related to authorization of appropriations, tornado and hurricane forecasting, observing system 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 amend 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 task NOAA with new responsibilities and authorities regarding weather radars; atmospheric rivers, 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 amend the Weather Act to codify NOAA's Commercial Data Program and Commercial Data Pilot Program and make 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 amend 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 direct 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 task the Government Accountability Office with examining NWS's public notification system.

**Title V: Improving Weather Information for Agriculture and Water Management** would amend 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 codify both the National Mesonet Program (a central repository for nonfederal weather data) and the National Coordinated Soil Moisture Monitoring Network initiative. It would also require a report regarding existing federal authorities and policies related to transferring NOAA weather satellites to another federal agency.

### Considerations for Congress

In any future deliberations on H.R. 6093, Congress 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 118<sup>th</sup> Congress propose provisions not included in H.R. 6093. In the House, examples include 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). In the Senate, bills concentrate on heat preparedness (S. 2645), automated surface observation and weather observing systems and the cooperative observer program (S. 1939), advanced weather model computing (S. 3642), and artificial intelligence (S. 3888). One of the above bills (H.R. 4866) has been passed by a chamber. Congress also has included direction to NOAA regarding weather forecasting in its explanatory statements accompanying annual appropriations laws. For example, in FY2024, 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 amending H.R. 6093 to incorporate directives from these bills and explanatory statements or otherwise address their issues of focus.

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 amend 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 understand NOAA's weather forecasting research and operations and whether additional direction or authority may be needed. H.R. 6093 would require reports, briefings, plans, and other resources under 20 of its provisions. Congress could consider engaging in oversight on the issue or amending the Weather Act or H.R. 6093 to further specify reporting requirements, among other actions.

Since the 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 on activities that could impact weather forecasting, including the National Academies of Sciences, Engineering, and Medicine (NASEM, 2018 report on earth observations from space), the Government Accountability Office (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 been tracking NOAA's implementation of recommendations in the SAB 2021 report and its own recommendations on various subjects through annual reports to Congress. In 2023, EISWG found that the 2021 report 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 address any outstanding recommendations.

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