

119TH CONGRESS
1ST SESSION

H. R. 4302

To accelerate subseasonal to seasonal prediction skills related to precipitation forecasts for water management in the western United States, improve atmospheric river forecasts across the country, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JULY 7, 2025

Mr. OBERNOLTE (for himself, Mr. FONG, and Mr. WHITESIDES) introduced the following bill; which was referred to the Committee on Science, Space, and Technology

A BILL

To accelerate subseasonal to seasonal prediction skills related to precipitation forecasts for water management in the western United States, improve atmospheric river forecasts across the country, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Improving Atmos-
5 pheric River Forecasts Act”.

1 **SEC. 2. SUBSEASONAL TO SEASONAL FORECASTING PILOT**
2 **PROJECTS.**

3 (a) IMPROVING SUBSEASONAL AND SEASONAL FORE-
4 CASTS.—Subsection (h) of section 1762 of the Food Secu-
5 rity Act of 1985 (15 U.S.C. 8521) is amended to read
6 as follows:

7 “(h) SUBSEASONAL TO SEASONAL FORECASTING
8 PILOT PROJECTS.—

9 “(1) ESTABLISHMENT.—The Under Secretary
10 shall establish at least one pilot project within the
11 U.S. Weather Research Program of the Oceanic and
12 Atmospheric Research office of the National Oceanic
13 and Atmospheric Administration to support im-
14 proved subseasonal to seasonal precipitation fore-
15 casts for water management in the western United
16 States.

17 “(2) OBJECTIVES.—In carrying out this sub-
18 section, the Under Secretary shall ensure that a
19 pilot project under paragraph (1) addresses key
20 science challenges to improving forecasts and devel-
21 oping related products described in subsection (c)
22 for water management in the western United States,
23 including the following:

24 “(A) Improving model resolution, both hor-
25 izontal and vertical, to resolve issues associated
26 with mountainous terrain, such as intensity of

1 precipitation and relative fraction of rain versus
2 snow precipitation.

3 “(B) Improving fidelity in modeling of—

4 “(i) the atmospheric boundary layer in
5 mountainous regions; and

6 “(ii) atmospheric rivers.

7 “(C) Resolving challenges in predicting
8 winter atmospheric circulation and storm
9 tracks, including periods of blocked versus
10 unblocked flow over the eastern North Pacific
11 Ocean and western United States.

12 “(D) Advancing scientific understanding of
13 the roles of atmospheric rivers in subseasonal to
14 seasonal precipitation, and developing tools to
15 predict periods of active or inactive atmospheric
16 river landfalls and inland penetration over the
17 western United States.

18 “(3) ACTIVITIES.—A pilot project under this
19 subsection shall be carried out in coordination with
20 the Assistant Administrator for the Office of Oce-
21 anic and Atmospheric Research and the Director of
22 the National Weather Service and include activities
23 that carry out the following:

24 “(A) Best implement recommendations of
25 the National Weather Service’s 2019 Report,

1 entitled ‘Subseasonal and Seasonal Forecasting
2 Innovation: Plans for the Twenty-First Cen-
3 tury’.

4 “(B) Achieve measurable objectives for
5 operational forecast improvement.

6 “(C) Engage with, and leverage the re-
7 sources of, institutions of higher education (as
8 such term is defined in section 101 of the High-
9 er Education Act of 1965 (20 U.S.C. 1001))
10 with experience in western precipitation science,
11 as well as entities within the National Oceanic
12 and Atmospheric Administration in existence as
13 of the date of the enactment of this subsection,
14 including the Western Regional Climate Center
15 and the National Centers for Environmental In-
16 formation.

17 “(4) AUTHORIZATION OF APPROPRIATIONS.—
18 From amounts made available to Operations, Re-
19 search, and Facilities at the National Oceanic and
20 Atmospheric Administration, there is authorized to
21 be appropriated \$15,000,000 for each of fiscal years
22 2026 through 2030 to carry out this subsection.

23 “(5) SUNSET.—The authority under this sub-
24 section shall terminate on the date that is five years
25 after the date of the enactment of this subsection.”.

1 **SEC. 3. ATMOSPHERIC RIVERS FORECAST IMPROVEMENT**
2 **PROGRAM.**

3 (a) IN GENERAL.—The Under Secretary, in collabo-
4 ration with the United States weather industry and aca-
5 demic partners, shall establish an atmospheric river fore-
6 cast improvement program (in this section referred to as
7 the “program”).

8 (b) GOAL.—The goal of the program shall be to re-
9 duce the loss of life and property and economic losses from
10 atmospheric rivers through the research, development, and
11 extension of accurate, effective, and actionable forecasts
12 and warnings, including by carrying out the following:

13 (1) Establishing atmospheric river forecast skill
14 metrics that include assessing the benefits of dynam-
15 ical modeling, data assimilation, and machine learn-
16 ing improvements in the probabilistic forecasts of
17 landfall location, extreme wind and precipitation,
18 and cascading impacts.

19 (2) Developing an atmospheric river forecast
20 system within a unified forecast system, and advanc-
21 ing next-generation coupled modeling systems, with
22 the capability of providing seasonal to short-range
23 atmospheric river forecasts that include forecast of
24 snow accumulation and other hydrologic compo-
25 nents.

1 (3) Advancing scientific understanding of the
2 roles of atmospheric rivers in subseasonal to sea-
3 sonal precipitation and probabilistic predictions at
4 subseasonal and seasonal scales.

5 (4) Developing tools and improved forecast
6 products to predict periods of active or inactive at-
7 mospheric river landfalls and inland penetration over
8 the United States with a focus on addressing stake-
9 holder and public needs related to perceiving, com-
10 prehending, and responding to atmospheric river
11 forecast improvements.

12 (5) Enhancing the transition of research to op-
13 erations through the National Oceanic and Atmos-
14 pheric Administration’s testbeds, including the eval-
15 uation of physical and social science, technology, and
16 other research to develop products and services for
17 implementation and use by relevant stakeholders.

18 (6) Incorporating into atmospheric river mod-
19 eling and forecasting, as appropriate, social, behav-
20 ioral, risk, communication, and economic sciences.

21 (c) INNOVATIVE OBSERVATIONS, DATA ASSIMILA-
22 TION, AND MODELING.—The Under Secretary shall en-
23 sure the program periodically examines, tests, and evalu-
24 ates the value of incorporating innovative observations,
25 data, and measurements with respect to the improvement

1 of atmospheric river analysis, modeling, forecasts, pre-
2 dictions, and warnings.

3 (d) PROGRAM PLAN.—Not later than 270 days after
4 the date of the enactment of this Act, the Under Sec-
5 retary, in consultation with the Secretary of the Air Force
6 or the Commander of the 53rd Weather Reconnaissance
7 Squadron of the Air Force Reserve Command, shall de-
8 velop a plan that details the specific research, develop-
9 ment, data acquisition, partnerships with the weather in-
10 dustry and academic partners, and technology transfer ac-
11 tivities, as well as corresponding resources, and timelines,
12 necessary to achieve the goal of the program under sub-
13 section (b). Such plan shall be made available to the public
14 on release.

15 (e) ANNUAL BUDGET FOR PLAN SUBMITTAL.—After
16 the development of the plan pursuant to subsection (d),
17 the Under Secretary shall, not less frequently than annu-
18 ally, submit to Congress a proposed budget corresponding
19 with the activities identified in such plan.

20 (f) IMPROVED MODELING.—In carrying out the pro-
21 gram, the Under Secretary may carry out the following:

22 (1) Develop, test, and operationalize prototype
23 high-resolution Atmospheric River Analysis and
24 Forecasting System models through research and
25 operations partnerships with institutions of higher

1 education and other partners outside the National
2 Oceanic and Atmospheric Administration.

3 (2) Enhance data assimilation of current and
4 new satellite and ocean observations that is useful
5 for atmospheric river analysis and forecasting pre-
6 dictions.

7 (3) Improve data processing techniques related
8 to atmospheric river analysis and forecasting pre-
9 dictions.

10 (4) Use artificial intelligence and machine
11 learning methods as applicable to atmospheric river
12 analysis and forecasting predictions.

13 (5) Ensure the surface and subsurface observa-
14 tions of the ocean meet the needs of atmospheric
15 river analysis and forecasting predictions on dif-
16 ferent time scales.

17 (6) To the maximum extent practicable, im-
18 prove or establish baseline weather monitoring serv-
19 ices in areas that have historically experienced, or
20 are predicted to experience, atmospheric rivers.

21 (g) CONDUCT OF RECONNAISSANCE.—The Under
22 Secretary shall acquire and sustain adequate aircraft, sci-
23 entific equipment, and personnel to meet mission require-
24 ments of the National Hurricane Operations Plan and the

1 National Winter Seasons Operation plan, and to carry out
2 the following:

3 (1) Ensure atmospheric river air reconnaissance
4 observations are available throughout the expected
5 seasons of tropical cyclones and atmospheric rivers.

6 (2) To the maximum extent practicable and in
7 accordance with paragraph (4), ensure data and in-
8 formation collected are made available for research
9 and operations purposes.

10 (3) Participate in research and operations part-
11 nerships that guide flight planning and use research
12 methods to improve and expand the capabilities and
13 effectiveness of atmospheric river reconnaissance
14 over time.

15 (4) Develop data management strategies to en-
16 sure that data and metadata are adequately
17 stewarded, maintained, and archived.

18 (5) Undertake such other additional activities
19 as the Under Secretary, in consultation with the
20 Secretary of the Air Force, considers appropriate to
21 improve and grow the hurricane hunter and atmos-
22 pheric river reconnaissance mission.

23 (h) IMPROVED ATMOSPHERIC RIVER HAZARD COM-
24 MUNICATION.—The Under Secretary may conduct re-

1 search and development activities to carry out the fol-
2 lowing:

3 (1) As appropriate, develop and refine methods
4 to categorize the intensity of weather and oceans
5 hazards, including tropical cyclones and atmospheric
6 rivers, on a quantitative scale and the effectiveness
7 of such scale in hazard communication.

8 (2) Develop best practices for communication of
9 atmospheric river events and hazards across regions
10 of the United States.

11 (3) Gather information from areas prone to
12 hurricanes and atmospheric rivers regarding levels of
13 knowledge and preparedness, including responses to
14 early forecasts and warnings by the National Oce-
15 anic and Atmospheric Administration.

16 (4) Explore strategies and effectiveness of com-
17 municating that hurricane and atmospheric river
18 events are beneficial at lower intensities versus haz-
19 ardous at higher intensity.

20 (i) DEFINITIONS.—In this section, the terms “sea-
21 sonal”, “subseasonal”, “Under Secretary”, and “weather
22 industry” have the meanings given such terms in section
23 2 of the Weather Research and Forecasting Innovation
24 Act of 2017 (15 U.S.C. 8501).

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