

118TH CONGRESS
1ST SESSION

S. 2203

To require the conduct of winter season reconnaissance of atmospheric rivers on the West Coast of the United States, and for other purposes.

IN THE SENATE OF THE UNITED STATES

JUNE 22, 2023

Mr. PADILLA introduced the following bill; which was read twice and referred to the Committee on Armed Services

A BILL

To require the conduct of winter season reconnaissance of atmospheric rivers on the West Coast of the United States, 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 “Atmospheric Rivers
5 Reconnaissance, Observation, and Warning Act” or the
6 “ARROW Act”.

7 **SEC. 2. CONDUCT OF WINTER SEASON RECONNAISSANCE**
8 **OF ATMOSPHERIC RIVERS ON THE WEST**
9 **COAST OF THE UNITED STATES.**

10 (a) FINDINGS.—Congress finds the following:

1 (1) Every year, storms threaten lives and prop-
2 erty and cause significant disruptions to travel and
3 commerce.

4 (2) During the cool season from October
5 through April, the western United States and other
6 regions around the United States are significantly
7 impacted by atmospheric rivers.

8 (3) For key regions across the western United
9 States, 70 to 90 percent of days on which the Na-
10 tional Weather Service issued either watches, warn-
11 ings, or advisories for any hazard type were associ-
12 ated with land-falling atmospheric rivers.

13 (4) Atmospheric rivers are relatively long, nar-
14 row regions in the atmosphere, below 10,000 feet,
15 that behave like rivers of water vapor pushed along
16 by strong winds. Outside the tropics, atmospheric
17 rivers are responsible for more than 90 percent of
18 the horizontal movement of water vapor. Atmos-
19 pheric rivers shift locations following large-scale
20 weather patterns, carrying an amount of water
21 vapor on average equivalent to roughly 25 times the
22 average flow of water at the mouth of the Mis-
23 sissippi River.

24 (5) Precipitation and flooding in the western
25 United States from high-impact storms are largely

1 controlled by characteristics of land-falling atmos-
2 pheric rivers, accounting for up to 50 percent of an-
3 nual precipitation and more than 90 percent of
4 major flood events.

5 (6) Conducting atmospheric river reconnais-
6 sance during the winter season in the United States
7 significantly enhances storm observations and im-
8 proves forecasts of storm landfall and intensity.

9 (7) The National Winter Season Operations
10 Plan, the goal of which is to improve the accuracy
11 and timeliness of severe winter season storm fore-
12 casting and warning services provided by the Na-
13 tional Oceanic and Atmospheric Administration, the
14 Air Force, and the Navy, coordinates Federal efforts
15 to provide enhanced weather observations of extreme
16 winter season storms that impact the United States
17 and calls for atmospheric river reconnaissance to be
18 conducted annually off the West Coast of the United
19 States.

20 (8) The National Winter Season Operations
21 Plan coordinates requirements for winter season re-
22 connaissance observations provided by the 53rd
23 Weather Reconnaissance Squadron of the Air Force
24 Reserve Command and the Aircraft Operations Cen-

1 ter of the National Oceanic and Atmospheric Admin-
2 istration.

3 (9) The 2021 report of the Science Advisory
4 Board of the National Oceanic and Atmospheric Ad-
5 ministration entitled, “Priorities for Weather Re-
6 search” recommended that the Federal Government,
7 “Leverage and expand atmospheric river (AR) obser-
8 vations to improve flood and drought prediction and
9 to enable forecast-informed reservoir operations.
10 Water and emergency managers often cope with too
11 much or too little water and require better informa-
12 tion on storms that produce extreme precipitation.
13 However, precipitation prediction skill has not im-
14 proved substantially in the last 20 years. The multi-
15 agency, OSTP-led Earth System Prediction Road-
16 map (2020) identified expanded research, observa-
17 tions and communication needed to better anticipate
18 and mitigate water cycle extremes and their cas-
19 cading impacts, including atmospheric river type
20 storms.”.

21 (b) CONDUCT OF RECONNAISSANCE.—

22 (1) IN GENERAL.—Subject to the availability of
23 appropriations, the 53rd Weather Reconnaissance
24 Squadron of the Air Force Reserve Command and
25 the National Oceanic and Atmospheric Administra-

1 tion shall provide aircraft, personnel, and equipment
2 necessary to meet the mission requirements for win-
3 ter season atmospheric river reconnaissance on the
4 West Coast of the United States annually from No-
5 vember 1 through March 31.

6 (2) ACTIVITIES.—In carrying out paragraph
7 (1), the 53rd Weather Reconnaissance Squadron of
8 the Air Force Reserve Command, in consultation
9 with the Administrator of the National Oceanic and
10 Atmospheric Administration, shall—

11 (A) improve the accuracy and timeliness of
12 atmospheric river forecasts and warning serv-
13 ices on the West Coast of the United States;

14 (B) collect data in sensitive oceanic regions
15 where conventional, upper-air observations are
16 lacking and satellites are unable to effectively
17 resolve the position and vertical structure of an
18 atmospheric river and of other nearby essential
19 atmospheric structures offshore;

20 (C) support water management decisions
21 and flood forecasting through the execution of
22 targeted airborne dropsonde and buoy observa-
23 tions over the eastern, central, and western
24 north Pacific Ocean to improve forecasts of the

1 landfall and impacts of atmospheric rivers for
2 civil authorities and military decision makers;

3 (D) participate in the research and oper-
4 ations partnership that guides flight planning
5 and uses research methods to improve and ex-
6 pand the capabilities and effectiveness of atmos-
7 pheric river reconnaissance over time; and

8 (E) undertake such other additional activi-
9 ties as the 53rd Weather Reconnaissance
10 Squadron considers appropriate to further the
11 atmospheric river reconnaissance mission.

12 (c) REPORTS.—

13 (1) AIR FORCE.—Not later than 90 days after
14 the date of the enactment of this Act, the Secretary
15 of the Air Force, in consultation with the Adminis-
16 trator of the National Oceanic and Atmospheric Ad-
17 ministration, shall submit to the Committee on
18 Armed Services of the Senate and the Committee on
19 Armed Services of the House of Representatives a
20 comprehensive report on the resources necessary for
21 the 53rd Weather Reconnaissance Squadron of the
22 Air Force Reserve Command to continue to support,
23 through December 31, 2035—

24 (A) the National Hurricane Operations
25 Plan;

1 (B) the National Winter Season Oper-
2 ations Plan; and

3 (C) any other operational requirements re-
4 lating to weather reconnaissance, to include an-
5 nual support from November 1 through March
6 31 for atmospheric river reconnaissance on the
7 West Coast of the United States.

8 (2) COMMERCE.—Not later than 90 days after
9 the date of the enactment of this Act, the Secretary
10 of Commerce shall submit to the Committee on
11 Commerce, Science, and Transportation of the Sen-
12 ate and the Committee on Science, Space, and Tech-
13 nology of the House of Representatives a com-
14 prehensive report on the resources necessary for the
15 National Oceanic and Atmospheric Administration
16 to continue to support, through December 31,
17 2035—

18 (A) the National Hurricane Operations
19 Plan;

20 (B) the National Winter Season Oper-
21 ations Plan; and

22 (C) any other operational requirements re-
23 lating to weather reconnaissance, to include an-
24 nual support from November 1 through March

- 1 31 for atmospheric river reconnaissance on the
- 2 West Coast of the United States.

