

AMENDMENT NO. _____ Calendar No. _____

Purpose: In the nature of a substitute.

IN THE SENATE OF THE UNITED STATES—117th Cong., 1st Sess.

S. 558

To establish a national integrated flood information system within the National Oceanic and Atmospheric Administration, and for other purposes.

Referred to the Committee on _____ and ordered to be printed

Ordered to lie on the table and to be printed

AMENDMENT IN THE NATURE OF A SUBSTITUTE intended to be proposed by Mr. WICKER

Viz:

1 Strike all after the enacting clause and insert the fol-

2 lowing:

3 **SECTION 1. SHORT TITLE; TABLE OF CONTENTS.**

4 (a) **SHORT TITLE.**—This Act may be cited as the

5 “Flood Level Observation, Operations, and Decision Sup-

6 port Act” or the “FLOODS Act”.

7 (b) **TABLE OF CONTENTS.**—The table of contents for

8 this Act is as follows:

Sec. 1. Short title; table of contents.

Sec. 2. Definitions.

Sec. 3. National Integrated Flood Information System.

Sec. 4. Observations and modeling for total water prediction.

Sec. 5. Service coordination hydrologists at River Forecast Centers of the National Weather Service.

- Sec. 6. Improving National Oceanic and Atmospheric Administration communication of future flood risks and hazardous flash flood events.
- Sec. 7. Freshwater monitoring along the coast.
- Sec. 8. Tornado warning improvement.
- Sec. 9. Hurricane forecast improvement program.
- Sec. 10. Weather and water research and development planning.
- Sec. 11. Forecast communication coordinators.
- Sec. 12. Estimates of precipitation frequency in the United States.
- Sec. 13. Interagency Committee on Water Management and Infrastructure.
- Sec. 14. National Weather Service hydrologic research fellowship program.
- Sec. 15. Identification and support of consistent, Federal set of forward-looking, long-term meteorological information.
- Sec. 16. Gap analysis on availability of snow-related data to assess and predict flood and flood impacts.
- Sec. 17. Availability to the public of flood-related data.

1 **SEC. 2. DEFINITIONS.**

2 In this Act:

3 (1) ADMINISTRATOR.—The term “Adminis-
4 trator” means the Administrator of the National
5 Oceanic and Atmospheric Administration.

6 (2) STATE.—The term “State” means each
7 State of the United States, the District of Columbia,
8 the Commonwealth of Puerto Rico, American
9 Samoa, Guam, the Commonwealth of the Northern
10 Mariana Islands, the Virgin Islands of the United
11 States, and any other territory or possession of the
12 United States.

13 **SEC. 3. NATIONAL INTEGRATED FLOOD INFORMATION SYS-
14 TEM.**

15 (a) IN GENERAL.—The Administrator shall establish
16 a system, to be known as the “National Integrated Flood
17 Information System”, to better inform and provide for

1 more timely decision making to reduce flood-related effects
2 and costs.

3 (b) SYSTEM FUNCTIONS.—The Administrator,
4 through the National Integrated Flood Information Sys-
5 tem, shall—

6 (1) provide an effective flood early warning sys-
7 tem that—

8 (A) collects and integrates information on
9 the key indicators of floods and flood impacts,
10 including streamflow, reservoir release and di-
11 version, precipitation, soil moisture, snow water
12 equivalent, land cover, and evaporative demand;

13 (B) makes usable, reliable, and timely fore-
14 casts of floods;

15 (C) assesses the severity of flood conditions
16 and effects;

17 (D) provides information described in sub-
18 paragraph (A), forecasts described in subpara-
19 graph (B), and assessments described in sub-
20 paragraph (C) at the national, regional, and
21 local levels, as appropriate; and

22 (E) communicates flood forecasts, flood
23 conditions, and flood impacts to public and pri-
24 vate entities engaged in flood planning, pre-

1 paredness, and response and post-event flood
2 extent, including—

3 (i) decision makers at the Federal,
4 State, local, and Tribal levels of govern-
5 ment;

6 (ii) the private sector; and

7 (iii) the public;

8 (2) provide timely data, information, and prod-
9 ucts that reflect differences in flood conditions
10 among localities, regions, watersheds, and States;

11 (3) coordinate and integrate, through inter-
12 agency agreements as practicable, Federal research
13 and monitoring in support of the flood early warning
14 information system provided under paragraph (1);

15 (4) use existing forecasting and assessment pro-
16 grams and partnerships;

17 (5) make improvements in seasonal precipita-
18 tion and temperature, subseasonal precipitation and
19 temperature, and flood water prediction; and

20 (6) continue ongoing research and monitoring
21 activities relating to floods, including research activi-
22 ties relating to—

23 (A) the prediction, length, severity, and
24 impacts of floods and improvement of the accu-

1 racy, timing, and specificity of flash flood warn-
2 ings;

3 (B) the role of extreme weather events and
4 climate variability in floods; and

5 (C) how water travels over and through
6 surfaces.

7 (c) PARTNERSHIPS.—The Administrator, through the
8 National Integrated Flood Information System, may—

9 (1) engage with the private sector to improve
10 flood monitoring, forecasts, land and topography
11 data, and communication, if the Administrator de-
12 termines that such engagement is appropriate, cost
13 effective, and beneficial to the public and decision
14 makers described in subsection (b)(1)(E)(i);

15 (2) facilitate the development of 1 or more aca-
16 demic cooperative partnerships to assist in carrying
17 out the functions of the National Integrated Flood
18 Information System described in subsection (b);

19 (3) use and support monitoring by citizen sci-
20 entists, including by developing best practices to fa-
21 cilitate maximum data integration, as the Adminis-
22 trator considers appropriate;

23 (4) engage with, and leverage the resources of,
24 entities within the National Oceanic and Atmos-
25 pheric Administration in existence as of the date of

1 the enactment of this Act, such as the National
2 Weather Service with respect to forecast and warn-
3 ing functions, the National Integrated Drought In-
4 formation System, the Regional Climate Center, and
5 the National Mesonet Program, to improve coordina-
6 tion of water monitoring, forecasting, and manage-
7 ment; and

8 (5) engage with and support water monitoring
9 by the United States Geological Survey—

10 (A) to improve the availability and con-
11 tinuity of streamflow data at critical locations
12 through the deployment of rapid deployment
13 gages and the flood-hardening of at-risk
14 streamflow gauges; and

15 (B) to increase storm surge monitoring
16 data through the deployment of additional
17 storm surge sensors.

18 (d) CONSULTATION.—In developing and maintaining
19 the National Integrated Flood Information System, the
20 Administrator shall consult with relevant Federal, State,
21 local, and Tribal government agencies, research institu-
22 tions, and the private sector.

23 (e) COOPERATION FROM OTHER FEDERAL AGEN-
24 CIES.—Each Federal agency shall cooperate as appro-
25 priate with the Administrator in carrying out this section.

1 **SEC. 4. OBSERVATIONS AND MODELING FOR TOTAL WATER**

2 **PREDICTION.**

3 (a) **PARTNERSHIPS.**—

4 (1) **IN GENERAL.**—The Administrator shall es-
5 tablish partnerships with 1 or more institutions of
6 higher education (as defined in section 101 of the
7 Higher Education Act of 1965 (20 U.S.C. 1001)) to
8 evaluate observations that would improve total water
9 prediction.

10 (2) **PRIORITY OBSERVATIONS.**—In establishing
11 partnerships under paragraph (1), the Administrator
12 shall prioritize partnerships to evaluate observations
13 from uncrewed aerial systems.

14 (b) **MAINTAINED OBSERVATIONS.**—If the Adminis-
15 trator determines that incorporating additional observa-
16 tions improves total water prediction, the Administrator
17 shall, to the extent practicable, continue incorporating
18 those observations.

19 (c) **MODELING IMPROVEMENTS.**—The Administrator
20 shall advance geographic coverage, resolution, skill, and
21 efficiency of coastal oceanographic modeling, including ef-
22 forts that improve the coupling of and interoperability be-
23 tween hydrological models and coastal ocean models.

1 **SEC. 5. SERVICE COORDINATION HYDROLOGISTS AT RIVER**
2 **FORECAST CENTERS OF THE NATIONAL**
3 **WEATHER SERVICE.**

4 (a) DESIGNATION OF SERVICE COORDINATION HY-
5 DROLOGISTS.—

6 (1) IN GENERAL.—The Director of the National
7 Weather Service (in this section referred to as the
8 “Director”) shall designate at least 1 service coordi-
9 nation hydrologist at each River Forecast Center of
10 the National Weather Service.

11 (2) PERFORMANCE BY OTHER EMPLOYEES.—
12 Performance of the responsibilities outlined in this
13 section is not limited to the service coordination hy-
14 drologist position.

15 (b) PRIMARY ROLE OF SERVICE COORDINATION HY-
16 DROLOGISTS.—The primary role of the service coordina-
17 tion hydrologist shall be to carry out the responsibilities
18 required by this section.

19 (c) RESPONSIBILITIES.—

20 (1) IN GENERAL.—Subject to paragraph (2),
21 consistent with the analysis described in section 409
22 of the Weather Research and Forecasting Innovation
23 Act of 2017 (Public Law 115–25; 131 Stat. 112),
24 and in order to increase impact-based decision sup-
25 port services, each service coordination hydrologist

1 designated under subsection (a) shall, with respect
2 to hydrology—

3 (A) be responsible for providing service to
4 the geographic area of responsibility covered by
5 the River Forecast Center at which the service
6 coordination hydrologist is employed to help en-
7 sure that users of products and services of the
8 National Weather Service can respond effec-
9 tively to improve outcomes from flood events;

10 (B) liaise with users of products and serv-
11 ices of the National Weather Service, such as
12 the public, academia, media outlets, users in the
13 hydropower, transportation, recreation, and ag-
14 ricultural communities, and forestry, land, fish-
15 eries, and water management interests, to
16 evaluate the adequacy and usefulness of the
17 products and services of the National Weather
18 Service;

19 (C) collaborate with such River Forecast
20 Centers and Weather Forecast Offices and Fed-
21 eral, State, local, and Tribal government agen-
22 cies as the Director considers appropriate in de-
23 veloping, proposing, and implementing plans to
24 develop, modify, or tailor products and services

1 of the National Weather Service to improve the
2 usefulness of such products and services;

3 (D) engage in interagency partnerships
4 with Federal, State, local, and Tribal govern-
5 ment agencies to explore the use of forecast-in-
6 formed reservoir operations to reduce flood risk;

7 (E) ensure the maintenance and accuracy
8 of flooding call lists, appropriate office flooding
9 policy or procedures, and other flooding infor-
10 mation or dissemination methodologies or strat-
11 egies; and

12 (F) work closely with Federal, State, local,
13 and Tribal emergency and floodplain manage-
14 ment agencies, and other agencies relating to
15 disaster management, to ensure a planned, co-
16 ordinated, and effective preparedness and re-
17 sponse effort.

18 (2) OTHER STAFF.—The Director may assign a
19 responsibility set forth in paragraph (1) to such
20 other staff as the Director considers appropriate to
21 carry out such responsibility.

22 (d) ADDITIONAL RESPONSIBILITIES.—

23 (1) IN GENERAL.—Subject to paragraph (2), a
24 service coordination hydrologist designated under
25 subsection (a) may, with respect to hydrology—

1 (A) work with a State agency to develop
2 plans for promoting more effective use of prod-
3 ucts and services of the National Weather Serv-
4 ice throughout the State;

5 (B) identify priority community prepared-
6 ness objectives;

7 (C) develop plans to meet the objectives
8 identified under subparagraph (B); and

9 (D) conduct flooding event preparedness
10 planning and citizen education efforts with and
11 through various State, local, and Tribal govern-
12 ment agencies and other disaster management-
13 related organizations.

14 (2) OTHER STAFF.—The Director may assign a
15 responsibility set forth in paragraph (1) to such
16 other staff as the Director considers appropriate to
17 carry out such responsibility.

18 **SEC. 6. IMPROVING NATIONAL OCEANIC AND ATMOS-**
19 **PHERIC ADMINISTRATION COMMUNICATION**
20 **OF FUTURE FLOOD RISKS AND HAZARDOUS**
21 **FLASH FLOOD EVENTS.**

22 (a) ASSESSMENT OF FLASH FLOOD WATCHES AND
23 WARNINGS.—

1 (1) IN GENERAL.—Not later than 2 years after
2 the date of the enactment of this Act, the Adminis-
3 trator shall—

4 (A) conduct an assessment of—

5 (i) the flash flood watches and warn-
6 ings of the National Weather Service; and

7 (ii) the information delivery to sup-
8 port preparation and responses to floods;
9 and

10 (B) submit to Congress a report on the
11 findings of the Administrator with respect to
12 the assessment required by subparagraph (A).

13 (2) ELEMENTS.—The assessment required by
14 paragraph (1)(A) shall include the following:

15 (A) An evaluation of whether the watches,
16 warnings, and information described in para-
17 graph (1)(A) effectively—

18 (i) communicate risk to the general
19 public;

20 (ii) inform action to prevent loss of
21 life and property;

22 (iii) inform action to support flood
23 preparation and response; and

24 (iv) deliver information in a manner
25 designed to lead to appropriate action.

1 (B) Subject to subsection (b)(2), such rec-
2 ommendations as the Administrator may have
3 for—

4 (i) legislative and administrative ac-
5 tion to improve the watches and warnings
6 described in paragraph (1)(A)(i); and

7 (ii) such research as the Adminis-
8 trator considers necessary to address the
9 focus areas described in paragraph (3).

10 (3) FOCUS AREAS.—The assessment required
11 by paragraph (1)(A) shall focus on the following
12 areas:

13 (A) Ways to communicate the risks posed
14 by hazardous flash flood events to the public
15 that are most likely to result in informed deci-
16 sion making regarding the mitigation of those
17 risks.

18 (B) Ways to provide actionable geographic
19 information to the recipient of a watch or warn-
20 ing for a flash flood, including partnering with
21 emergency response agencies, as appropriate.

22 (C) Evaluation of information delivery to
23 support the preparation for and response to
24 floods.

1 (4) CONSULTATION.—In conducting the assess-
2 ment required by paragraph (1)(A), the Adminis-
3 trator shall consult with—

4 (A) individuals in the academic sector, in-
5 cluding individuals in the field of social and be-
6 havioral sciences;

7 (B) other weather services;

8 (C) media outlets and other entities that
9 distribute the watches and warnings described
10 in paragraph (1)(A)(i);

11 (D) floodplain managers and emergency
12 planners and responders, including State, local,
13 and Tribal emergency management agencies;

14 (E) other government users of the watches
15 and warnings described in paragraph (1)(A)(i),
16 including the Federal Highway Administration;
17 and

18 (F) such other Federal agencies as the Ad-
19 ministrator determines rely on watches and
20 warnings regarding flash floods for operational
21 decisions.

22 (5) NATIONAL ACADEMY OF SCIENCES.—The
23 Administrator shall engage with the National Acad-
24 emy of Sciences, as the Administrator considers nec-
25 essary and practicable, including by contracting with

1 the National Research Council to review the sci-
2 entific and technical soundness of the assessment re-
3 quired by paragraph (1)(A), including the rec-
4 ommendations under paragraph (2)(B).

5 (6) **METHODOLOGIES.**—In conducting the as-
6 sessment required by paragraph (1)(A), the Admin-
7 istrator shall use such methodologies as the Admin-
8 istrator considers are generally accepted by the
9 weather enterprise, including social and behavioral
10 sciences.

11 (b) **IMPROVEMENTS TO FLASH FLOOD WATCHES**
12 **AND WARNINGS.**—

13 (1) **IN GENERAL.**—Based on the assessment re-
14 quired by subsection (a)(1)(A), the Administrator
15 shall make such improvements to the watches and
16 warnings described in that subsection as the Admin-
17 istrator considers necessary—

18 (A) to improve the communication of the
19 risks posed by hazardous flash flood events; and

20 (B) to provide actionable geographic infor-
21 mation to the recipient of a watch or warning
22 for a flash flood.

23 (2) **REQUIREMENTS REGARDING RECOMMENDA-**
24 **TIONS.**—In conducting the assessment required by
25 subsection (a)(1)(A), the Administrator shall ensure

1 that any recommendation under subsection (a)(2)(B)
2 that the Administrator considers a major change—

3 (A) is validated by social and behavioral
4 science using a generalizable sample;

5 (B) accounts for the needs of various de-
6 mographics, vulnerable populations, and geo-
7 graphic regions;

8 (C) responds to the needs of Federal,
9 State, local, and Tribal government partners
10 and media partners; and

11 (D) accounts for necessary changes to fed-
12 erally operated watch and warning propagation
13 and dissemination infrastructure and protocols.

14 (c) DEFINITIONS.—In this section:

15 (1) WATCH; WARNING.—

16 (A) IN GENERAL.—Except as provided in
17 subparagraph (B), the terms “watch” and
18 “warning”, with respect to a hazardous flash
19 flood event, mean products issued by the Na-
20 tional Oceanic and Atmospheric Administration,
21 intended for use by the general public—

22 (i) to alert the general public to the
23 potential for or presence of the event; and

24 (ii) to inform action to prevent loss of
25 life and property.

1 (B) EXCLUSION.—The terms “watch” and
2 “warning” do not include technical or special-
3 ized meteorological and hydrological forecasts,
4 outlooks, or model guidance products.

5 (2) WEATHER ENTERPRISE.—The term
6 “weather enterprise” has the meaning given that
7 term in section 2 of the Weather Research and
8 Forecasting Innovation Act of 2017 (15 U.S.C.
9 8501).

10 **SEC. 7. FRESHWATER MONITORING ALONG THE COAST.**

11 (a) DATA AVAILABILITY ASSESSMENT.—The Admin-
12 istrator shall assess the availability of short- and long-
13 term data on large-scale freshwater flooding into oceans,
14 bays, and estuaries, including data on—

- 15 (1) flow rate, including discharge;
- 16 (2) conductivity;
- 17 (3) oxygen concentration;
- 18 (4) nutrient load;
- 19 (5) water temperature; and
- 20 (6) sediment load.

21 (b) DATA NEEDS ASSESSMENT.—The Administrator
22 shall assess the need for additional data to assess and pre-
23 dict the effect of the flooding and freshwater discharge
24 described in subsection (a).

1 (c) INVENTORY OF DATA NEEDS.—Based on the as-
2 sessment required by subsections (a) and (b), the Admin-
3 istrator shall create an inventory of data needs with re-
4 spect to the flooding and freshwater discharge described
5 in subsections (a) and (b).

6 (d) PLANNING.—In planning for the collection of ad-
7 ditional data necessary for ecosystem-based modeling of
8 the effect of the flooding and freshwater discharge de-
9 scribed in subsections (a) and (b), the Administrator shall
10 use the inventory created under subsection (c).

11 **SEC. 8. TORNADO WARNING IMPROVEMENT.**

12 Section 103 of the Weather Research and Fore-
13 casting Innovation Act of 2017 (15 U.S.C. 8513) is
14 amended—

15 (1) by redesignating subsections (c) and (d) as
16 subsections (d) and (e), respectively; and

17 (2) by inserting after subsection (b) the fol-
18 lowing:

19 “(c) INNOVATIVE OBSERVATIONS.—The Under Sec-
20 retary shall ensure that the program periodically examines
21 the value of incorporating innovative observations, such as
22 acoustic or infrasonic measurements, observations from
23 phased array radars, and observations from mesonets,
24 with respect to the improvement of tornado forecasts, pre-
25 dictions, and warnings.”.

1 **SEC. 9. HURRICANE FORECAST IMPROVEMENT PROGRAM.**

2 Section 104(b) of the Weather Research and Fore-
3 casting Innovation Act of 2017 (15 U.S.C. 8514(b)) is
4 amended—

5 (1) in paragraph (2), by striking “; and” and
6 inserting a semicolon;

7 (2) in paragraph (3), by striking the period at
8 the end and inserting “; and”; and

9 (3) by adding at the end the following:

10 “(4) evaluating and incorporating, as appro-
11 priate, innovative observations, including acoustic or
12 infrasonic measurements.”.

13 **SEC. 10. WEATHER AND WATER RESEARCH AND DEVELOP-**
14 **MENT PLANNING.**

15 Section 105(2) of the Weather Research and Fore-
16 casting Innovation Act of 2017 (15 U.S.C. 8515(2)) is
17 amended by inserting “and flood-event” after “operational
18 weather”.

19 **SEC. 11. FORECAST COMMUNICATION COORDINATORS.**

20 Section 1762(f)(1) of the Food Security Act of 1985
21 (15 U.S.C. 8521(f)(1)) is amended, in the second sen-
22 tence, by striking “may” and inserting “shall”.

23 **SEC. 12. ESTIMATES OF PRECIPITATION FREQUENCY IN**
24 **THE UNITED STATES.**

25 (a) **DEFINITIONS.**—In this section:

1 (1) FREELY ASSOCIATED STATES.—The term
2 “Freely Associated States” means the Republic of
3 Palau, the Republic of the Marshall Islands, and the
4 Federated States of Micronesia, which have each en-
5 tered into a Compact of Free Association with the
6 United States.

7 (2) UNITED STATES.—The term “United
8 States” means the 50 States of the United States,
9 the District of Columbia, the Commonwealth of
10 Puerto Rico, the United States Virgin Islands,
11 Guam, American Samoa, the Commonwealth of the
12 Northern Mariana Islands, and the Freely Associ-
13 ated States.

14 (b) IN GENERAL.—The Administrator shall establish
15 a program, to be known as the “NOAA Precipitation Fre-
16 quency Atlas of the United States”, to compile, estimate,
17 analyze, and communicate the frequency of precipitation
18 in the United States.

19 (c) FUNCTIONS.—The NOAA Precipitation Fre-
20 quency Atlas of the United States—

21 (1) shall better inform the public and provide
22 information on—

23 (A) temporal and spatial distribution of
24 heavy precipitation;

1 (B) analyses of seasonality in precipitation;

2 and

3 (C) trends in annual maximum series data;

4 and

5 (2) may serve as the official source of the Fed-

6 eral Government on estimates of precipitation fre-

7 quency and associated information with respect to

8 the United States.

9 (d) REQUIREMENTS.—

10 (1) COVERAGE.—The NOAA Precipitation Fre-

11 quency Atlas of the United States shall include such

12 estimates of the frequency of precipitation in the

13 United States as the Administrator determines ap-

14 propriate.

15 (2) FREQUENCY.—Such estimates—

16 (A) shall be conducted not less frequently

17 than once every 10 years; and

18 (B) may be conducted more frequently if

19 determined appropriate by the Administrator.

20 (3) PUBLICATION.—Such estimates and meth-

21 odologies used to conduct such estimates shall be—

22 (A) subject to an appropriate, scientific

23 process, as determined by the Administrator;

24 and

1 (B) published on a publicly accessible
2 website of the National Oceanic and Atmos-
3 pheric Administration.

4 (e) PARTNERSHIPS.—The Administrator may partner
5 with other Federal agencies, members of the private sec-
6 tor, academic cooperative partnerships, or nongovernment
7 associations to assist in carrying out the functions de-
8 scribed in subsection (c).

9 (f) CONSULTATION.—In carrying out this section, the
10 Administrator may consult with relevant Federal, State,
11 local, Tribal, and Territorial government agencies, re-
12 search institutions, and the private sector, as the Adminis-
13 trator determines necessary.

14 (g) COORDINATION.—In carrying out this section, the
15 Administrator may coordinate with other Federal agen-
16 cies.

17 (h) AUTHORIZATION OF APPROPRIATIONS.—There
18 are authorized to be appropriated to carry out this section,
19 from amounts otherwise authorized to be appropriated to
20 the Administrator to carry out this Act, \$3,500,000 for
21 each of fiscal years 2021 through 2030.

22 **SEC. 13. INTERAGENCY COMMITTEE ON WATER MANAGE-**
23 **MENT AND INFRASTRUCTURE.**

24 (a) ESTABLISHMENT.—There is established a com-
25 mittee, to be known as the “Interagency Committee on

1 Water Management and Infrastructure” (in this section
2 referred to as the “Water Policy Committee”).

3 (b) MEMBERSHIP.—The Water Policy Committee
4 shall be composed of the following members:

5 (1) The Administrator.

6 (2) The Secretary of the Interior.

7 (3) The Administrator of the Environmental
8 Protection Agency.

9 (4) The Secretary of Agriculture.

10 (5) The Secretary of Commerce.

11 (6) The Secretary of Energy.

12 (7) The Secretary of the Army.

13 (8) The heads of such other agencies as the co-
14 chairs consider appropriate.

15 (c) CO-CHAIRS.—The Water Policy Committee shall
16 be co-chaired by the Secretary of the Interior and the Ad-
17 ministrator of the Environmental Protection Agency.

18 (d) MEETINGS.—The Water Policy Committee shall
19 meet not less frequently than 6 times each year, at the
20 call of the co-chairs.

21 (e) GENERAL PURPOSE AND DUTIES.—The Water
22 Policy Committee shall ensure that agencies and depart-
23 ments across the Federal Government that engage in
24 water-related matters, including water storage and sup-
25 plies, water quality and restoration activities, water infra-

1 structure, transportation on United States rivers and in-
2 land waterways, and water forecasting, work together
3 where such agencies and departments have joint or over-
4 lapping responsibilities to—

5 (1) improve interagency coordination among
6 Federal agencies and departments on water resource
7 management and water infrastructure issues;

8 (2) coordinate existing water-related Federal
9 task forces, working groups, and other formal cross-
10 agency initiatives, as appropriate;

11 (3) prioritize managing the water resources of
12 the United States and promoting resilience of the
13 water-related infrastructure of the United States, in-
14 cluding—

15 (A) increasing water storage, water supply
16 reliability, and drought resiliency;

17 (B) improving water quality, source water
18 protection, and nutrient management;

19 (C) promoting restoration activities;

20 (D) improving water systems, including
21 with respect to drinking water, desalination,
22 water reuse, wastewater, and flood control; and

23 (E) improving water data management, re-
24 search, modeling, and forecasting;

1 (4) improve interagency coordination of data
2 management, access, modeling, and visualization
3 with respect to water-related matters;

4 (5) promote integrated planning for Federal in-
5 vestments in water-related infrastructure to enhance
6 coordination and protect taxpayer investment; and

7 (6) support workforce development and efforts
8 to recruit, train, and retain professionals to operate
9 and maintain essential drinking water, wastewater,
10 flood control, hydropower, water delivery, and water
11 storage facilities in the United States.

12 (f) **CROSS-AGENCY PRIORITY RESEARCH NEEDS.**—
13 Not later than 1 year after the date of the enactment of
14 this Act, the Water Policy Committee shall develop and
15 submit to Congress a list of research needs that includes
16 needs for cross-agency research and coordination.

17 **SEC. 14. NATIONAL WEATHER SERVICE HYDROLOGIC RE-**
18 **SEARCH FELLOWSHIP PROGRAM.**

19 (a) **DEFINITIONS.**—In this section:

20 (1) **ASSISTANT ADMINISTRATOR.**—The term
21 “Assistant Administrator” means the Assistant Ad-
22 ministrator for Weather Services of the National
23 Oceanic and Atmospheric Administration.

24 (2) **DECISION SUPPORT SERVICES.**—The term
25 “decision support services” means information, in-

1 including data and refined products, that supports
2 water resources-related decision-making processes.

3 (3) INSTITUTION OF HIGHER EDUCATION.—The
4 term “institution of higher education” has the
5 meaning given that term in section 101 of the High-
6 er Education Act of 1965 (20 U.S.C. 1001).

7 (4) NOAA LINE OFFICES.—The term “NOAA
8 line offices” means the following offices of the Na-
9 tional Oceanic and Atmospheric Administration:

10 (A) The National Ocean Service.

11 (B) The National Environmental Satellite,
12 Data, and Information Service.

13 (C) The National Marine Fisheries Service.

14 (D) The Office of Oceanic and Atmos-
15 pheric Research.

16 (E) The Office of Marine and Aviation Op-
17 erations.

18 (b) HYDROLOGIC RESEARCH FELLOWSHIP PRO-
19 GRAM.—

20 (1) ESTABLISHMENT.—The Administrator shall
21 establish a hydrologic research fellowship program
22 (in this section referred to as the “program”) for
23 qualified individuals.

1 (2) QUALIFIED INDIVIDUAL.—For purposes of
2 this section, a qualified individual is an individual
3 who is—

4 (A) a citizen of the United States; and

5 (B) enrolled in a research-based graduate
6 program, at an institution of higher education,
7 in a field that advances the research priorities
8 developed by the Assistant Administrator under
9 paragraph (7), such as—

10 (i) hydrology;

11 (ii) earth sciences;

12 (iii) atmospheric sciences;

13 (iv) computer sciences;

14 (v) engineering;

15 (vi) environmental sciences;

16 (vii) geosciences;

17 (viii) urban planning; or

18 (ix) related social sciences.

19 (3) AWARD GUIDELINES.—Fellowships under
20 the program shall be awarded pursuant to guidelines
21 established by the Assistant Administrator.

22 (4) SELECTION PREFERENCE.—In selecting
23 qualified individuals for participation in the pro-
24 gram, the Assistant Administrator shall give pref-

1 erence to applicants from historically Black colleges
2 and universities and minority-serving institutions.

3 (5) PLACEMENT.—The program shall support
4 the placement of qualified individuals in positions
5 within the executive branch of the Federal Govern-
6 ment where such individuals can address and ad-
7 vance the research priorities developed by the Assist-
8 ant Administrator under paragraph (7).

9 (6) FELLOWSHIP TERM.—A fellowship under
10 the program shall be for a period of up to 2 years.

11 (7) FELLOWSHIP RESEARCH PRIORITIES.—The
12 Assistant Administrator, in consultation with rep-
13 resentatives from the NOAA line offices, the United
14 States Geological Survey, the Federal Emergency
15 Management Agency, and the Army Corps of Engi-
16 neers, as appropriate, shall develop and publish pri-
17 orities for the conduct of research by fellows, which
18 may include the following:

19 (A) Advance the collaborative development
20 of a flexible community-based water resources
21 modeling system.

22 (B) Apply artificial intelligence and ma-
23 chine learning capabilities to advance existing
24 hydrologic modeling capabilities.

1 (C) Support the evolution and integration
2 of hydrologic modeling within an Earth Systems
3 Modeling Framework.

4 (D) Improve visualizations of hydrologic
5 model outputs.

6 (E) Advance the state of coupled fresh-
7 water and salt water modeling and forecasting
8 capabilities.

9 (F) Advance understanding and process
10 representation of water quality parameters.

11 (G) Advance the assimilation of in-situ and
12 remotely sensed observations and data.

13 (H) Support the integration of social
14 science to advance decision support services.

15 (I) Develop methods to study groundwater
16 sustainability and estimate the efficiency of re-
17 charge management.

18 (c) DIRECT HIRING.—

19 (1) AUTHORITY.—During fiscal year 2021 and
20 any fiscal year thereafter, the head of any Federal
21 agency may appoint, without regard to the provi-
22 sions of subchapter I of chapter 33 of title 5, United
23 States Code, other than sections 3303 and 3328 of
24 that title, to a position with the Federal agency a re-
25 cipient of a fellowship under the program who—

1 (A) earned a degree from a program de-
2 scribed in subsection (b)(2)(B);

3 (B) successfully fulfilled the requirements
4 of the fellowship within the executive branch of
5 the Federal Government; and

6 (C) meets qualification standards estab-
7 lished by the Office of Personnel Management.

8 (2) EXERCISE OF AUTHORITY.—The direct hire
9 authority provided by this subsection shall be exer-
10 cised with respect to an individual described in para-
11 graph (1) not later than 2 years after the date on
12 which the individual completed the fellowship under
13 the program.

14 **SEC. 15. IDENTIFICATION AND SUPPORT OF CONSISTENT,**
15 **FEDERAL SET OF FORWARD-LOOKING, LONG-**
16 **TERM METEOROLOGICAL INFORMATION.**

17 (a) DEFINITIONS.—In this section:

18 (1) EXTREME WEATHER.—The term “extreme
19 weather” includes observed or anticipated severe and
20 unseasonable atmospheric conditions, including
21 drought, heavy precipitation, hurricanes, tornadoes
22 and other windstorms (including derechos), large
23 hail, extreme heat, extreme cold, flooding, sustained
24 temperatures or precipitation that deviate substan-
25 tially from historical averages, and any other weath-

1 er event that the Administrator determines qualifies
2 as extreme weather.

3 (2) LONG-TERM.—The term “long-term” shall
4 have such meaning as the Director of the National
5 Institute of Standards and Technology, in consulta-
6 tion with the Administrator, considers appropriate
7 for purposes of this section.

8 (3) OTHER ENVIRONMENTAL TRENDS.—The
9 term “other environmental trends” means wildfires,
10 coastal flooding, inland flooding, land subsidence,
11 rising sea levels, and any other challenges relating to
12 changes in environmental systems over time that the
13 Administrator determines qualify as environmental
14 challenges other than extreme weather.

15 (b) IDENTIFICATION AND SUPPORT OF CONSISTENT,
16 FEDERAL SET OF FORWARD-LOOKING, LONG-TERM ME-
17 TEOROLOGICAL INFORMATION.—The Administrator shall
18 identify, and support research that enables, a consistent,
19 Federal set of forward-looking, long-term meteorological
20 information that models future extreme weather events,
21 other environmental trends, projections, and up-to-date
22 observations, including mesoscale information as deter-
23 mined appropriate by the Administrator.

1 **SEC. 16. GAP ANALYSIS ON AVAILABILITY OF SNOW-RE-**
2 **LATED DATA TO ASSESS AND PREDICT**
3 **FLOOD AND FLOOD IMPACTS.**

4 (a) IN GENERAL.—The Administrator, in consulta-
5 tion with the Department of Agriculture, the Department
6 of the Interior, and the Army Corps of Engineers, shall
7 conduct an analysis of gaps in the availability of snow-
8 related data to assess and predict floods and flood im-
9 pacts, including data on the following:

- 10 (1) Snow water equivalent.
- 11 (2) Snow depth.
- 12 (3) Snowpack temperature.
- 13 (4) Snow and mixed-phase precipitation.
- 14 (5) Snow melt.
- 15 (6) Rain-snow line.

16 (b) REPORT.—Not later than 180 days after the date
17 of the enactment of this Act, the Administrator shall sub-
18 mit to the Committee on Commerce, Science, and Trans-
19 portation of the Senate and the Committee on Science,
20 Space, and Technology of the House of Representatives
21 a report on—

- 22 (1) the findings of the gap analysis required by
23 subsection (a); and
- 24 (2) opportunities for additional collaboration
25 among Federal agencies to collect snow-related data

1 to better assess and predict floods and flood im-
2 pacts.

3 **SEC. 17. AVAILABILITY TO THE PUBLIC OF FLOOD-RE-**
4 **LATED DATA.**

5 (a) **IN GENERAL.**—The Administrator shall make
6 flood-related data available to the public on the website
7 of the National Oceanic and Atmospheric Administration.

8 (b) **COST.**—The Administrator may make the data
9 under subsection (a) freely accessible or available at a cost
10 that does not exceed the cost of preparing the data.