

117TH CONGRESS
1ST SESSION

H. R. 1438

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

IN THE HOUSE OF REPRESENTATIVES

FEBRUARY 26, 2021

Ms. SHERRILL (for herself, Ms. ROSS, Ms. NORTON, Mr. PASCRELL, Ms. JOHNSON of Texas, Mr. CRIST, Mr. FITZPATRICK, Mr. SIRES, and Ms. MOORE of Wisconsin) introduced the following bill; which was referred to the Committee on Science, Space, and Technology, and in addition to the Committees on Natural Resources, and Transportation and Infrastructure, for a period to be subsequently determined by the Speaker, in each case for consideration of such provisions as fall within the jurisdiction of the committee concerned

A BILL

To establish a national integrated flood information system within the National Oceanic and Atmospheric Administration, 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; 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”.

1 (b) TABLE OF CONTENTS.—The table of contents for
 2 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. Improving precipitation frequency estimates.
- Sec. 13. Interagency Coordinating Committee on Water Management.
- Sec. 14. 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.

3 **SEC. 2. DEFINITIONS.**

4 In this Act:

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

12 (2) ADMINISTRATOR.—The term “Adminis-
 13 trator” means the Administrator of the National
 14 Oceanic and Atmospheric Administration.

1 **SEC. 3. NATIONAL INTEGRATED FLOOD INFORMATION SYS-**
2 **TEM.**

3 (a) IN GENERAL.—The Administrator shall establish
4 a system, to be known as the “National Integrated Flood
5 Information System”, to better inform and provide for
6 more timely decision making to reduce flood-related effects
7 and costs.

8 (b) SYSTEM FUNCTIONS.—The Administrator,
9 through the National Integrated Flood Information Sys-
10 tem, shall—

11 (1) provide an effective flood early warning sys-
12 tem that—

13 (A) collects and integrates information on
14 the key indicators of floods and flood impacts,
15 including streamflow, reservoir release and di-
16 version, precipitation, soil moisture, snow water
17 equivalent, land cover, and evaporative demand;

18 (B) makes usable, reliable, and timely fore-
19 casts of floods;

20 (C) assesses the severity of flood conditions
21 and effects;

22 (D) issues flood watches and warnings
23 when necessary;

24 (E) provides information described in sub-
25 paragraph (A), forecasts described in subpara-
26 graph (B), and assessments described in sub-

paragraph (C) at the national, regional, and local levels, as appropriate; and

(F) communicates flood forecasts, flood conditions, and flood impacts to public and private entities engaged in flood planning, preparedness, response, and post-event flood extent including—

(i) decision makers at the Federal, State, local, and Tribal levels of government;

(ii) the private sector; and

(iii) the public;

(2) provide timely data, information, and products that reflect differences in flood conditions among localities, regions, watersheds, and States;

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

(4) use existing forecasting and assessment programs and partnerships;

(5) make improvements in seasonal precipitation and temperature, subseasonal precipitation and temperature, and flood water prediction; and

1 (6) continue ongoing research and monitoring
2 activities relating to floods, including research activi-
3 ties relating to—

4 (A) the prediction, length, severity, and
5 impacts of floods and improvement of the accu-
6 racy, timing, and specificity of flash flood warn-
7 ings;

8 (B) the role of extreme weather events and
9 climate variability in floods; and

10 (C) how water travels over and through
11 surfaces.

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

14 (1) engage with the private sector to improve
15 flood monitoring, forecasts, land and topography
16 data, and communication, if the Administrator de-
17 termines that such engagement is appropriate, cost
18 effective, and beneficial to the public and decision
19 makers described in subsection (b)(1)(F)(i);

20 (2) facilitate the development of 1 or more aca-
21 demic cooperative partnerships to assist in carrying
22 out the functions of the National Integrated Flood
23 Information System described in subsection (b);

24 (3) use and support monitoring by citizen sci-
25 entists, including by developing best practices to fa-

1 cilitate maximum data integration, as the Adminis-
2 trator considers appropriate;

3 (4) engage with, and leverage the resources of,
4 entities within the National Oceanic and Atmos-
5 pheric Administration in existence as of the date of
6 the enactment of this Act, such as the National
7 Weather Service with respect to forecast and warn-
8 ing functions, the National Integrated Drought In-
9 formation System, the Regional Climate Center, and
10 the National Mesonet Program, to improve coordina-
11 tion of water monitoring, forecasting, and manage-
12 ment; and

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

15 (A) to improve the availability and con-
16 tinuity of streamflow data at critical locations
17 through the deployment of Rapid Deployment
18 Gages and the flood-hardening of at-risk
19 streamflow gages; and

20 (B) to increase storm surge monitoring
21 data through the deployment of additional
22 storm surge sensors.

23 (d) CONSULTATION.—In developing and maintaining
24 the National Integrated Flood Information System, the
25 Administrator shall consult with relevant Federal, State,

1 local, and Tribal government agencies, research institu-
2 tions, and the private sector.

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

6 **SEC. 4. OBSERVATIONS AND MODELING FOR TOTAL WATER**
7 **PREDICTION.**

8 (a) PARTNERSHIPS.—

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

15 (2) PRIORITY OBSERVATIONS.—In establishing
16 partnerships under paragraph (1), the Administrator
17 shall prioritize partnerships to evaluate observations
18 from uncrewed aerial systems.

19 (b) MAINTAINED OBSERVATIONS.—If the Adminis-
20 trator determines that incorporating additional observa-
21 tions improves total water prediction, the Administrator
22 shall, to the extent practicable, continue incorporating
23 those observations.

24 (c) MODELING IMPROVEMENTS.—The Administrator
25 shall advance geographic coverage, resolution, skill, and

1 efficiency of coastal oceanographic modeling, including ef-
 2 fects that improve the coupling of and interoperability be-
 3 tween hydrological models and coastal ocean models.

4 (d) GEOSPATIAL DATA.—The Administrator shall ad-
 5 vance the development of models to vertically transform
 6 geospatial data into a common system for use as the Fed-
 7 eral standard for surveys and mapping, and engage with
 8 the United States Geological Survey to collaborate and im-
 9 plement the National Hydrography Datasets as the
 10 geospatial underpinning of the system, and to collaborate
 11 and implement the National Hydrography Infrastructure
 12 to improve discovery and access to flood and other water-
 13 related information.

14 **SEC. 5. SERVICE COORDINATION HYDROLOGISTS AT RIVER**
 15 **FORECAST CENTERS OF THE NATIONAL**
 16 **WEATHER SERVICE.**

17 (a) DESIGNATION OF SERVICE COORDINATION HY-
 18 DROLOGISTS.—

19 (1) IN GENERAL.—The Director of the National
 20 Weather Service (in this section referred to as the
 21 “Director”) shall designate at least 1 service coordi-
 22 nation hydrologist at each River Forecast Center of
 23 the National Weather Service.

24 (2) PERFORMANCE BY OTHER EMPLOYEES.—
 25 Performance of the responsibilities outlined in this

1 section is not limited to the service coordination hy-
2 drologist position.

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

7 (c) RESPONSIBILITIES.—

8 (1) IN GENERAL.—Subject to paragraph (2),
9 consistent with the analysis described in section 409
10 of the Weather Research and Forecasting Innovation
11 Act of 2017 (Public Law 115–25; 131 Stat. 112),
12 and in order to increase impact-based decision sup-
13 port services, each service coordination hydrologist
14 designated under subsection (a) shall, with respect
15 to hydrology—

16 (A) be responsible for providing service to
17 the geographic area of responsibility covered by
18 the River Forecast Center at which the service
19 coordination hydrologist is employed to help en-
20 sure that users of products and services of the
21 National Weather Service can respond effec-
22 tively to improve outcomes from flood events;

23 (B) liaise with users of products and serv-
24 ices of the National Weather Service, such as
25 the public, academia, media outlets, users in the

1 hydropower, transportation, recreation, and ag-
2 ricultural communities, and forestry, land, fish-
3 eries, and water management interests, to
4 evaluate the adequacy and usefulness of the
5 products and services of the National Weather
6 Service;

7 (C) collaborate with such River Forecast
8 Centers and Weather Forecast Offices and Fed-
9 eral, State, local, and Tribal government agen-
10 cies as the Director considers appropriate in de-
11 veloping, proposing, and implementing plans to
12 develop, modify, or tailor products and services
13 of the National Weather Service to improve the
14 usefulness of such products and services;

15 (D) engage in interagency partnerships
16 with Federal, State, local, and Tribal govern-
17 ment agencies to explore the use of forecast-in-
18 formed reservoir operations to reduce flood risk;

19 (E) ensure the maintenance and accuracy
20 of flooding call lists, appropriate office flooding
21 policy or procedures, and other flooding infor-
22 mation or dissemination methodologies or strat-
23 egies; and

24 (F) work closely with Federal, State, local,
25 and Tribal emergency and floodplain manage-

1 ment agencies, and other agencies relating to
2 disaster management, to ensure a planned, co-
3 ordinated, and effective preparedness and re-
4 sponse effort.

5 (2) OTHER STAFF.—The Director may assign a
6 responsibility set forth in paragraph (1) to such
7 other staff as the Director considers appropriate to
8 carry out such responsibility.

9 (d) ADDITIONAL RESPONSIBILITIES.—

10 (1) IN GENERAL.—Subject to paragraph (2), a
11 service coordination hydrologist designated under
12 subsection (a) may, with respect to hydrology—

13 (A) work with a State agency to develop
14 plans for promoting more effective use of prod-
15 ucts and services of the National Weather Serv-
16 ice throughout the State;

17 (B) identify priority community prepared-
18 ness objectives;

19 (C) develop plans to meet the objectives
20 identified under subparagraph (B); and

21 (D) conduct flooding event preparedness
22 planning and citizen education efforts with and
23 through various State, local, and Tribal govern-
24 ment agencies and other disaster management-
25 related organizations.

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

5 (e) PLACEMENT WITH STATE AND LOCAL EMER-
6 GENCY AND FLOODPLAIN MANAGERS.—

7 (1) IN GENERAL.—In carrying out this section,
8 the Director may place a service coordination hy-
9 drologist designated under subsection (a) with a
10 State or local emergency or floodplain manager, if
11 the Director determines that such placement is nec-
12 essary or convenient to carry out this section.

13 (2) TREATMENT.—If the Director determines
14 that the placement of a service coordination hydrolo-
15 gist with a State or local emergency or floodplain
16 manager under paragraph (1) is near a River Fore-
17 cast Center of the National Weather Service, such
18 placement shall be treated as designation of the
19 service coordination hydrologist at such River Fore-
20 cast Center for purposes of subsection (a).

1 **SEC. 6. IMPROVING NATIONAL OCEANIC AND ATMOS-**
2 **PHERIC ADMINISTRATION COMMUNICATION**
3 **OF FUTURE FLOOD RISKS AND HAZARDOUS**
4 **FLASH FLOOD EVENTS.**

5 (a) ASSESSMENT OF FLASH FLOOD WATCHES AND
6 WARNINGS.—

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

10 (A) conduct an assessment of—

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

13 (ii) the information delivery to sup-
14 port preparation and responses to floods;
15 and

16 (B) submit to Congress a report on the
17 findings of the Administrator with respect to
18 the assessment required by subparagraph (A).

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

21 (A) An evaluation of whether the watches,
22 warnings, and information described in para-
23 graph (1)(A)—

24 (i) effectively communicate risk to the
25 general public;

- 1 (ii) inform action to prevent loss of
2 life and property;
3 (iii) inform action to support flood
4 preparation and response; and
5 (iv) deliver information in a manner
6 designed to lead to appropriate action.

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

- 10 (i) legislative and administrative ac-
11 tion to improve the watches and warnings
12 described in paragraph (1)(A)(i); and
13 (ii) such research as the Adminis-
14 trator considers necessary to address the
15 focus areas described in paragraph (3).

16 (3) FOCUS AREAS.—The assessment required
17 by paragraph (1)(A) shall focus on the following
18 areas:

19 (A) Ways to communicate the risks posed
20 by hazardous flash flood events to the public
21 that are most likely to result in informed deci-
22 sion making regarding the mitigation of those
23 risks.

24 (B) Ways to provide actionable geographic
25 information to the recipient of a watch or warn-

1 ing for a flash flood, including partnering with
2 emergency response agencies, as appropriate.

3 (C) Evaluation of information delivery to
4 support the preparation for and response to
5 floods.

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

9 (A) individuals in the academic sector, in-
10 cluding individuals in the field of social and be-
11 havioral sciences;

12 (B) other weather services;

13 (C) media outlets and other entities that
14 distribute the watches and warnings described
15 in paragraph (1)(A)(i);

16 (D) floodplain managers and emergency
17 planners and responders, including State, local,
18 and Tribal emergency management agencies;

19 (E) other government users of the watches
20 and warnings described in paragraph (1)(A)(i),
21 including the Federal Highway Administration;
22 and

23 (F) such other Federal agencies as the Ad-
24 ministrator determines rely on watches and

1 warnings regarding flash floods for operational
2 decisions.

3 (5) NATIONAL ACADEMY OF SCIENCES.—The
4 Administrator shall engage with the National Acad-
5 emy of Sciences, as the Administrator considers nec-
6 essary and practicable, including by contracting with
7 the National Research Council to review the sci-
8 entific and technical soundness of the assessment re-
9 quired by paragraph (1)(A), including the rec-
10 ommendations under paragraph (2)(B).

11 (6) METHODOLOGIES.—In conducting the as-
12 sessment required by paragraph (1)(A), the Admin-
13 istrator shall use such methodologies as the Admin-
14 istrator considers are generally accepted by the
15 weather enterprise, including social and behavioral
16 sciences.

17 (b) IMPROVEMENTS TO FLASH FLOOD WATCHES
18 AND WARNINGS.—

19 (1) IN GENERAL.—Based on the assessment re-
20 quired by subsection (a)(1)(A), the Administrator
21 shall make such improvements to the watches and
22 warnings described in that subsection as the Admin-
23 istrator considers necessary—

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

1 (B) to provide actionable geographic infor-
2 mation to the recipient of a watch or warning
3 for a flash flood.

4 (2) REQUIREMENTS REGARDING RECOMMENDA-
5 TIONS.—In conducting the assessment required by
6 subsection (a)(1)(A), the Administrator shall ensure
7 that any recommendation under subsection (a)(2)(B)
8 that the Administrator considers a major change—

9 (A) is validated by social and behavioral
10 science using a generalizable sample;

11 (B) accounts for the needs of various de-
12 mographics, vulnerable populations, and geo-
13 graphic regions;

14 (C) responds to the needs of Federal,
15 State, local, and Tribal government partners
16 and media partners; and

17 (D) accounts for necessary changes to fed-
18 erally operated watch and warning propagation
19 and dissemination infrastructure and protocols.

20 (c) DEFINITIONS.—In this section:

21 (1) WATCH; WARNING.—

22 (A) IN GENERAL.—Except as provided in
23 subparagraph (B), the terms “watch” and
24 “warning”, with respect to a hazardous flash
25 flood event, mean products issued by the Na-

1 tional Oceanic and Atmospheric Administration,
2 intended for use by the general public—

- 3 (i) to alert the general public to the
4 potential for or presence of the event; and
5 (ii) to inform action to prevent loss of
6 life and property.

7 (B) EXCLUSION.—The terms “watch” and
8 “warning” do not include technical or special-
9 ized meteorological and hydrological forecasts,
10 outlooks, or model guidance products.

11 (2) WEATHER ENTERPRISE.—The term
12 “weather enterprise” has the meaning given that
13 term in section 2 of the Weather Research and
14 Forecasting Innovation Act of 2017 (15 U.S.C.
15 8501).

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

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

- 21 (1) flow rate, including discharge;
22 (2) conductivity;
23 (3) oxygen concentration;
24 (4) nutrient load;
25 (5) water temperature; and

1 (6) sediment load.

2 (b) DATA NEEDS ASSESSMENT.—The Administrator
3 shall assess the need for additional data to assess and pre-
4 dict the effect of the flooding and freshwater discharge
5 described in subsection (a).

6 (c) INVENTORY OF DATA NEEDS.—Based on the as-
7 sessments required by subsections (a) and (b), the Admin-
8 istrator shall create an inventory of data needs with re-
9 spect to the flooding and freshwater discharge described
10 in subsections (a) and (b).

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

16 **SEC. 8. TORNADO WARNING IMPROVEMENT.**

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

20 (1) by redesignating subsections (c) and (d) as
21 subsections (d) and (e), respectively; and

22 (2) by inserting after subsection (b) the fol-
23 lowing:

24 “(c) INNOVATIVE OBSERVATIONS.—The Adminis-
25 trator shall ensure that the program periodically examines

1 the value of incorporating innovative observations, such as
2 acoustic or infrasonic measurements, observations from
3 phased array radars, and observations from mesonets,
4 with respect to the improvement of tornado forecasts, pre-
5 dictions, and warnings.”.

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

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

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

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

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

15 “(4) evaluating and incorporating, as appro-
16 priate, innovative observations, including acoustic or
17 infrasonic measurements.”.

18 **SEC. 10. WEATHER AND WATER RESEARCH AND DEVELOP-**
19 **MENT PLANNING.**

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

1 **SEC. 11. FORECAST COMMUNICATION COORDINATORS.**

2 Section 1762(f)(1) of the Food Security Act of 1985
3 (15 U.S.C. 8521(f)(1)) is amended, in the second sen-
4 tence, by striking “may” and inserting “shall”.

5 **SEC. 12. IMPROVING PRECIPITATION FREQUENCY ESTI-**
6 **MATES.**

7 (a) IN GENERAL.—The Administrator shall—

8 (1) not later than 5 years after the date of en-
9 actment of this title and not less than every 5 years
10 thereafter, update precipitation frequency estimates
11 for the United States, such that each update in-
12 cludes at least one precipitation frequency atlas that
13 incorporates assumptions of non-stationarity;

14 (2) develop products targeted at users of this
15 data in support of the mission of the National Oce-
16 anic and Atmospheric Administration;

17 (3) make publicly available, in a searchable,
18 interoperable format, all precipitation frequency esti-
19 mate studies developed by the National Oceanic and
20 Atmospheric Administration that the Administrator
21 has the legal right to redistribute and that are
22 deemed to be at an appropriate stage of development
23 on an internet website of the National Oceanic and
24 Atmospheric Administration; and

25 (4) ensure all precipitation frequency estimate
26 data, products, and supporting documentation and

1 metadata are preserved, curated, and served by the
2 National Oceanic and Atmospheric Administration,
3 as appropriate.

4 (b) AUTHORIZATION OF APPROPRIATIONS.—There
5 are authorized to be appropriated to the National Oceanic
6 and Atmospheric Administration to carry out this section
7 \$3,500,000 for each of fiscal years 2022 through 2030.

8 **SEC. 13. INTERAGENCY COORDINATING COMMITTEE ON**
9 **WATER MANAGEMENT.**

10 (a) ESTABLISHMENT.—There is established a com-
11 mittee, to be known as the “Interagency Coordinating
12 Committee on Water Management” (in this section re-
13 ferred to as the “Committee”).

14 (b) MEMBERSHIP.—The Committee shall be com-
15 posed of the following members:

16 (1) The Administrator.

17 (2) The Assistant Secretary for Water and
18 Science of the Department of the Interior.

19 (3) The head of each of the following:

20 (A) The Federal Emergency Management
21 Agency.

22 (B) The Army Corps of Engineers.

23 (C) The National Science Foundation.

24 (D) The Office of Science and Technology
25 Policy.

1 (E) The Council on Environmental Qual-
2 ity.

3 (F) The Department of Energy.

4 (G) The Department of Agriculture.

5 (H) Any other Federal agency, as the co-
6 chairs consider appropriate.

7 (c) CO-CHAIRS.—The Committee shall be co-chaired
8 by the Secretary of the Interior and the Administrator of
9 the Environmental Protection Agency.

10 (d) MEETINGS.—The Committee shall meet not less
11 frequently than once each year at the call of the co-chairs.

12 (e) GENERAL PURPOSE AND DUTIES.—The Com-
13 mittee shall ensure that agencies across the Federal Gov-
14 ernment that engage in water-related matters, including
15 water storage and supplies, water quality and restoration
16 activities, water infrastructure, transportation on United
17 States rivers and inland waterways, and water forecasting,
18 work together where such agencies have joint or overlap-
19 ping responsibilities to—

20 (1) improve interagency coordination by Fed-
21 eral agencies on water resource management and
22 water-related infrastructure issues;

23 (2) coordinate existing water-related Federal
24 task forces, working groups, and other formal cross-
25 agency initiatives, as appropriate;

1 (3) designate and consolidate repositories re-
2 sponsible for archiving and managing water-related
3 matters;

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

7 (5) conduct integrated planning for Federal in-
8 vestments in water-related infrastructure; and

9 (6) support workforce development and efforts
10 to recruit, train, and retain professionals to operate
11 and maintain essential water facilities in the United
12 States.

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

18 **SEC. 14. HYDROLOGIC RESEARCH FELLOWSHIP PROGRAM.**

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

20 (1) **DECISION SUPPORT SERVICES.**—The term
21 “decision support services” means information, in-
22 cluding data and refined products, that supports
23 water resources-related decision-making processes.

24 (2) **INSTITUTION OF HIGHER EDUCATION.**—The
25 term “institution of higher education” has the

1 meaning given that term in section 101 of the High-
2 er Education Act of 1965 (20 U.S.C. 1001).

3 (b) HYDROLOGIC RESEARCH FELLOWSHIP PRO-
4 GRAM.—

5 (1) ESTABLISHMENT.—The Administrator shall
6 establish a hydrologic research fellowship program
7 (in this section referred to as the “program”) for
8 qualified individuals.

9 (2) QUALIFIED INDIVIDUAL.—For purposes of
10 this section, a qualified individual is an individual
11 who is—

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

13 (B) enrolled in a research-based graduate
14 program, at an institution of higher education,
15 in a field that advances the research priorities
16 developed by the Administrator under para-
17 graph (7), such as—

18 (i) hydrology;

19 (ii) earth sciences;

20 (iii) atmospheric sciences;

21 (iv) computer sciences;

22 (v) engineering;

23 (vi) environmental sciences;

24 (vii) geosciences;

25 (viii) urban planning; or

1 (ix) related social sciences.

2 (3) AWARD GUIDELINES.—Fellowships under
3 the program shall be awarded pursuant to guidelines
4 established by the Administrator.

5 (4) SELECTION PREFERENCE.—In selecting
6 qualified individuals for participation in the pro-
7 gram, the Administrator, acting through the Direc-
8 tor, shall give preference to applicants from Histori-
9 cally Black Colleges and Universities and Minority-
10 Serving Institutions.

11 (5) PLACEMENT.—The program shall support
12 the placement of qualified individuals in positions
13 within the executive branch of the Federal Govern-
14 ment where such individuals can address and ad-
15 vance the research priorities developed by the Ad-
16 ministrator under paragraph (7).

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

19 (7) FELLOWSHIP RESEARCH PRIORITIES.—The
20 Administrator in consultation with representatives
21 from the United States Geological Survey, the Fed-
22 eral Emergency Management Agency, and the Army
23 Corps of Engineers, as appropriate, shall develop
24 and publish priorities for the conduct of research by
25 fellows, which may include the following:

1 (A) Advance the collaborative development
2 of a flexible community-based water resources
3 modeling system.

4 (B) Apply artificial intelligence and ma-
5 chine learning capabilities to advance existing
6 hydrologic modeling capabilities.

7 (C) Support the evolution and integration
8 of hydrologic modeling within an Earth Systems
9 Modeling Framework.

10 (D) Improve visualizations of hydrologic
11 model outputs.

12 (E) Advance the state of coupled fresh-
13 water and saltwater modeling and forecasting
14 capabilities.

15 (F) Advance understanding and process
16 representation of water quality parameters.

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

19 (H) Support the integration of social
20 science to advance decision support services.

21 (I) Develop methods to study groundwater
22 sustainability and estimate the efficiency of re-
23 charge management.

24 (c) DIRECT HIRING.—

(1) AUTHORITY.—During fiscal year 2021 and any fiscal year thereafter, the head of any Federal agency may appoint, without regard to the provisions of subchapter I of chapter 33 of title 5, United States Code, other than sections 3303 and 3328 of that title, to a position with the Federal agency a recipient of a fellowship under the program who—

(A) earned a degree from a program described in subsection (b)(2)(B);

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

(C) meets qualification standards established by the Office of Personnel Management.

(2) EXERCISE OF AUTHORITY.—The direct hire authority provided by this subsection shall be exercised with respect to an individual described in paragraph (1) not later than 2 years after the date on which the individual completed the fellowship under the program.

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

(a) DEFINITIONS.—In this section:

1 (1) EXTREME WEATHER.—The term “extreme
2 weather” includes observed or anticipated severe and
3 unseasonable atmospheric conditions, including
4 drought, heavy precipitation, hurricanes, tornadoes
5 and other windstorms (including derechos), large
6 hail, extreme heat, extreme cold, flooding, sustained
7 temperatures or precipitation that deviate substan-
8 tially from historical averages, and any other weath-
9 er event that the Administrator determines qualifies
10 as extreme weather.

11 (2) LONG-TERM.—The term “long-term” shall
12 have such meaning as the Administrator, in con-
13 sultation with the Director of the National Institute
14 of Standards and Technology, considers appropriate
15 for purposes of this section.

16 (3) OTHER ENVIRONMENTAL TRENDS.—The
17 term “other environmental trends” means wildfires,
18 coastal flooding, inland flooding, land subsidence,
19 rising sea levels, and any other challenges relating to
20 changes in environmental systems over time that the
21 Administrator determines qualify as environmental
22 challenges other than extreme weather.

23 (b) IDENTIFICATION AND SUPPORT OF CONSISTENT,
24 FEDERAL SET OF FORWARD-LOOKING, LONG-TERM ME-
25 TEOROLOGICAL INFORMATION.—The Administrator shall

1 identify, and support research that enables, a consistent,
2 Federal set of forward-looking, long-term meteorological
3 information that models future extreme weather events,
4 other environmental trends, projections, and up-to-date
5 observations, including mesoscale information as deter-
6 mined appropriate by the Administrator.

7 **SEC. 16. GAP ANALYSIS ON AVAILABILITY OF SNOW-RE-**
8 **LATED DATA TO ASSESS AND PREDICT**
9 **FLOOD AND FLOOD IMPACTS.**

10 (a) IN GENERAL.—The Administrator, in consulta-
11 tion with the Department of Agriculture, the Department
12 of the Interior, and the Army Corps of Engineers, shall
13 conduct an analysis of gaps in the availability of snow-
14 related data to assess and predict floods and flood im-
15 pacts, including data on the following:

- 16 (1) Snow water equivalent.
- 17 (2) Snow depth.
- 18 (3) Snowpack temperature.
- 19 (4) Snow and mixed-phase precipitation.
- 20 (5) Snow melt.
- 21 (6) Rain-snow line.
- 22 (7) Soil moisture.

23 (b) REPORT.—Not later than 180 days after the date
24 of the enactment of this Act, the Administrator shall sub-
25 mit to the Committee on Commerce, Science, and Trans-

1 portation of the Senate and the Committee on Science,
2 Space, and Technology of the House of Representatives
3 a report on—

4 (1) the findings of the gap analysis required by
5 subsection (a); and

6 (2) opportunities for additional collaboration
7 among Federal agencies to collect snow-related data
8 to better assess and predict floods and flood im-
9 pacts.

10 **SEC. 17. AVAILABILITY TO THE PUBLIC OF FLOOD-RE-**
11 **LATED DATA.**

12 (a) IN GENERAL.—The Administrator shall make
13 flood-related data available to the public on the website
14 of the National Oceanic and Atmospheric Administration.

15 (b) COST.—The Administrator may make the data
16 under subsection (a) freely accessible or available at a cost
17 that does not exceed the cost of preparing the data.

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