

Calendar No. 556

116TH CONGRESS
2D SESSION

S. 4462

[Report No. 116–269]

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

IN THE SENATE OF THE UNITED STATES

AUGUST 6, 2020

Mr. WICKER (for himself and Mr. PETERS) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

SEPTEMBER 24, 2020

Reported by Mr. WICKER, with an amendment

[Strike out all after the enacting clause and insert the part printed in *italic*]

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,*

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

2 (a) **SHORT TITLE.**—This Act may be cited as the
 3 “Flood Level Observation, Operations, and Decision Sup-
 4 port Act” or the “FLOODS Act”.

5 (b) **TABLE OF CONTENTS.**—The table of contents for
 6 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 Na-
tional Weather Service.
- Sec. 6. Improving National Oceanic and Atmospheric Administration commu-
nication 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 Coordinating Committee on Water Management.

7 **SEC. 2. DEFINITIONS.**

8 In this Act:

9 (1) **STATE.**—The term “State” means each
 10 State of the United States; the District of Columbia;
 11 the Commonwealth of Puerto Rico; American
 12 Samoa; Guam; the Commonwealth of the Northern
 13 Mariana Islands; the Virgin Islands of the United
 14 States; and any other territory or possession of the
 15 United States.

16 (2) **UNDER SECRETARY.**—The term “Under
 17 Secretary” means the Under Secretary of Commerce
 18 for Oceans and Atmosphere.

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

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

8 (b) **SYSTEM FUNCTIONS.**—The Under Secretary,
 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-

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

3 ~~(F)~~ communicates flood forecasts, flood
4 conditions, and flood impacts to public and pri-
5 vate entities engaged in flood planning, pre-
6 paredness, and response, including—

7 (i) decision makers at the Federal,
8 State, local, and Tribal levels of govern-
9 ment;

10 (ii) the private sector; and

11 (iii) the public;

12 ~~(2)~~ provide timely data, information, and prod-
13 ucts that reflect differences in flood conditions
14 among localities, regions, watersheds, and States;

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

19 ~~(4)~~ use existing forecasting and assessment pro-
20 grams and partnerships;

21 ~~(5)~~ make improvements in seasonal precipita-
22 tion and temperature, subseasonal precipitation and
23 temperature, and flood water prediction; and

(6) continue ongoing research and monitoring activities relating to floods, including research activities relating to—

(A) the prediction, length, severity, and impacts of floods and improvement of the accuracy, timing, and specificity of flash flood warnings;

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

(C) how water travels over and through surfaces.

(c) PARTNERSHIPS.—The Under Secretary, through the National Integrated Flood Information System, may—

(1) engage with the private sector to improve flood monitoring, forecasts, land and topography data, and communication, if the Under Secretary determines that such engagement is appropriate, cost effective, and beneficial to the public and decision makers described in subsection (b)(1)(F)(i);

(2) facilitate the development of 1 or more academic cooperative partnerships to assist in carrying out the functions of the National Integrated Flood Information System described in subsection (b); and

(3) use and support monitoring by citizen scientists, including by developing best practices to fa-

1 facilitate maximum data integration, as the Under
 2 Secretary considers appropriate.

3 (d) CONSULTATION.—In developing and maintaining
 4 the National Integrated Flood Information System, the
 5 Under Secretary shall consult with relevant Federal,
 6 State, local, and Tribal government agencies, research in-
 7 stitutions, and the private sector.

8 (e) COOPERATION FROM OTHER FEDERAL AGEN-
 9 CIES.—Each Federal agency shall cooperate as appro-
 10 priate with the Under Secretary in carrying out this sec-
 11 tion.

12 **SEC. 4. OBSERVATIONS AND MODELING FOR TOTAL WATER**
 13 **PREDICTION.**

14 (a) PARTNERSHIPS.—

15 (1) IN GENERAL.—The Under Secretary shall
 16 establish partnerships with 1 or more institutions of
 17 higher education (as defined in section 101 of the
 18 Higher Education Act of 1965 (20 U.S.C. 1001)) to
 19 evaluate observations that would improve total water
 20 prediction.

21 (2) PRIORITY OBSERVATIONS.—In establishing
 22 partnerships under paragraph (1), the Under Sec-
 23 retary shall prioritize partnerships to evaluate obser-
 24 vations from unmanned aerial systems.

1 ~~(2) PERFORMANCE BY OTHER EMPLOYEES.—~~

2 Performance of the responsibilities outlined in this
3 section is not limited to the service coordination hy-
4 drologist position.

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

9 ~~(c) RESPONSIBILITIES.—~~

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

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

1 (B) liaise with users of products and serv-
2 ices of the National Weather Service, such as
3 the public, academia, media outlets, users in the
4 hydropower, transportation, recreation, and ag-
5 ricultural communities, and forestry, land, fish-
6 eries, and water management interests, to
7 evaluate the adequacy and usefulness of the
8 products and services of the National Weather
9 Service;

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

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

22 (E) ensure the maintenance and accuracy
23 of flooding call lists, appropriate office flooding
24 policy or procedures, and other flooding infor-

1 mation or dissemination methodologies or strat-
2 egies; and

3 (F) work closely with Federal, State, local,
4 and Tribal emergency management agencies;
5 and other agencies relating to disaster manage-
6 ment, to ensure a planned, coordinated, and ef-
7 fective preparedness and response effort.

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

12 (d) ADDITIONAL RESPONSIBILITIES.—

13 (1) IN GENERAL.—Subject to paragraph (2), a
14 service coordination hydrologist designated under
15 subsection (a) may, with respect to hydrology—

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

20 (B) identify priority community prepared-
21 ness objectives;

22 (C) develop plans to meet the objectives
23 identified under subparagraph (B); and

24 (D) conduct flooding event preparedness
25 planning and citizen education efforts with and

1 through various State, local, and Tribal govern-
2 ment agencies and other disaster management-
3 related organizations.

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

8 (c) PLACEMENT WITH STATE AND LOCAL EMER-
9 GENCY MANAGERS.—

10 (1) IN GENERAL.—In carrying out this section,
11 the Director may place a service coordination hy-
12 drologist designated under subsection (a) with a
13 State or local emergency manager, if the Director
14 determines that such placement is necessary or con-
15 venient to carry out this section.

16 (2) TREATMENT.—If the Director determines
17 that the placement of a service coordination hydrolo-
18 gist with a State or local emergency manager under
19 paragraph (1) is near a River Forecast Center of the
20 National Weather Service, such placement shall be
21 treated as designation of the service coordination hy-
22 drologist at such River Forecast Center for purposes
23 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 Under
9 Secretary 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 Under Secretary 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) communicate risk to the general
25 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 Under Secretary may

9 have 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 Under Sec-
- 14 retary 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-~~

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

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

~~(4) CONSULTATION.~~—In conducting the assess-
ment required by paragraph (1)(A), the Under Sec-
retary shall consult with—

~~(A) such line offices of the National Oee-
anic and Atmospheric Administration as the
Under Secretary considers relevant, including—~~

~~(i) the National Ocean Service;~~

~~(ii) the National Weather Service; and~~

~~(iii) the Office of Oceanic and Atmos-
pheric Research;~~

~~(B) individuals in the academic sector, in-
cluding individuals in the field of social and be-
havioral sciences;~~

~~(C) other weather services;~~

~~(D) media outlets and other entities that
distribute the watches and warnings described
in paragraph (1)(A)(i);~~

~~(E) emergency planners and responders,
including State, local, and Tribal emergency
management agencies;~~

1 ~~(F)~~ other government users of the watches
 2 and warnings described in paragraph ~~(1)(A)(i)~~,
 3 including the Federal Highway Administration;
 4 and

5 ~~(G)~~ such other Federal agencies as the
 6 Under Secretary determines rely on watches
 7 and warnings regarding flash floods for oper-
 8 ational decisions.

9 ~~(5) NATIONAL ACADEMY OF SCIENCES.—~~The
 10 Under Secretary shall engage with the National
 11 Academy of Sciences, as the Under Secretary con-
 12 siders necessary and practicable, including by con-
 13 tracting with the National Research Council to re-
 14 view the scientific and technical soundness of the as-
 15 sessment required by paragraph ~~(1)(A)~~, including
 16 the recommendations under paragraph ~~(2)(B)~~.

17 ~~(6) METHODOLOGIES.—~~In conducting the as-
 18 sessment required by paragraph ~~(1)(A)~~, the Under
 19 Secretary shall use such methodologies as the Under
 20 Secretary considers are generally accepted by the
 21 weather enterprise, including social and behavioral
 22 sciences.

23 ~~(b) IMPROVEMENTS TO FLASH FLOOD WATCHES~~
 24 AND WARNINGS.—

1 (1) IN GENERAL.—Based on the assessment re-
 2 quired by subsection (a)(1)(A), the Under Secretary
 3 shall make such improvements to the watches and
 4 warnings described in that subsection as the Under
 5 Secretary considers necessary—

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

8 (B) to provide actionable geographic infor-
 9 mation to the recipient of a watch or warning
 10 for a flash flood.

11 (2) REQUIREMENTS REGARDING RECOMMENDA-
 12 TIONS.—In conducting the assessment required by
 13 subsection (a)(1)(A), the Under Secretary shall en-
 14 sure that any recommendation under subsection
 15 (a)(2)(B) that the Under Secretary considers a
 16 major change—

17 (A) is validated by social and behavioral
 18 science using a generalizable sample;

19 (B) accounts for the needs of various de-
 20 mographics, vulnerable populations, and geo-
 21 graphic regions;

22 (C) responds to the needs of Federal,
 23 State, local, and Tribal government partners
 24 and media partners; and

1 ~~(D)~~ accounts for necessary changes to fed-
 2 erally operated watch and warning propagation
 3 and dissemination infrastructure and protocols.

4 ~~(c)~~ DEFINITIONS.—In this section:

5 ~~(1)~~ WATCH; WARNING.—

6 ~~(A)~~ IN GENERAL.—Except as provided in
 7 subparagraph ~~(B)~~, the terms “watch” and
 8 “warning”, with respect to a hazardous flash
 9 flood event, mean products issued by the Na-
 10 tional Oceanic and Atmospheric Administration;
 11 intended for use by the general public—

12 ~~(i)~~ to alert the general public to the
 13 potential for or presence of the event; and

14 ~~(ii)~~ to inform action to prevent loss of
 15 life and property.

16 ~~(B)~~ EXCLUSION.—The terms “watch” and
 17 “warning” do not include technical or special-
 18 ized meteorological and hydrological forecasts;
 19 outlooks, or model guidance products.

20 ~~(2)~~ WEATHER ENTERPRISE.—The term
 21 “weather enterprise” has the meaning given that
 22 term in section 2 of the Weather Research and
 23 Forecasting Innovation Act of 2017 (15 U.S.C.
 24 8501).

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

2 (a) DATA AVAILABILITY ASSESSMENT.—The Under
3 Secretary shall assess the availability of short- and long-
4 term data on large-scale freshwater flooding into oceans,
5 bays, and estuaries, including data on—

- 6 (1) flow rate, including discharge;
- 7 (2) conductivity;
- 8 (3) oxygen concentration;
- 9 (4) nutrient load;
- 10 (5) water temperature; and
- 11 (6) sediment load.

12 (b) DATA NEEDS ASSESSMENT.—The Under Sec-
13 retary shall assess the need for additional data to assess
14 and predict the effect of the flooding and freshwater dis-
15 charge described in subsection (a).

16 (c) INVENTORY OF DATA NEEDS.—Based on the as-
17 sessments required by subsections (a) and (b), the Under
18 Secretary shall create an inventory of data needs with re-
19 spect to the flooding and freshwater discharge described
20 in subsections (a) and (b).

21 (d) PLANNING.—In planning for the collection of ad-
22 ditional data necessary for ecosystem-based modeling of
23 the effect of the flooding and freshwater discharge de-
24 scribed in subsections (a) and (b), the Under Secretary
25 shall use the inventory created under subsection (c).

1 **SEC. 8. TORNADO WARNING IMPROVEMENT.**

2 Section ~~103~~ of the Weather Research and Fore-
 3 casting Innovation Act of 2017 (~~15 U.S.C. 8513~~) is
 4 amended—

5 (1) by redesignating subsections (c) and (d) as
 6 subsections (d) and (e), respectively; and

7 (2) by inserting after subsection (b) the fol-
 8 lowing:

9 “(c) **INNOVATIVE OBSERVATIONS.**—The Under Sec-
 10 retary shall ensure that the program periodically examines
 11 the value of incorporating innovative observations, such as
 12 acoustic or infrasonic measurements, observations from
 13 phased array radars, and observations from mesonets,
 14 with respect to the improvement of tornado forecasts, pre-
 15 dictions, and warnings.”.

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

17 Section ~~104(b)~~ of the Weather Research and Fore-
 18 casting Innovation Act of 2017 (~~15 U.S.C. 8514(b)~~) is
 19 amended—

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

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

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

1 “(4) evaluating and incorporating, as appro-
 2 priate, innovative observations, including acoustic or
 3 infrasonic measurements.”.

4 **SEC. 10. WEATHER AND WATER RESEARCH AND DEVELOP-**
 5 **MENT PLANNING.**

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

10 **SEC. 11. FORECAST COMMUNICATION COORDINATORS.**

11 Section 1762(f)(1) of the Food Security Act of 1985
 12 (15 U.S.C. 8521(f)(1)) is amended, in the second sen-
 13 tence, by striking “may” and inserting “shall”.

14 **SEC. 12. ESTIMATES OF PRECIPITATION FREQUENCY IN**
 15 **THE UNITED STATES.**

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

17 (1) **FREELY ASSOCIATED STATES.**—The term
 18 “Freely Associated States” means the Republic of
 19 Palau, the Republic of the Marshall Islands, and the
 20 Federated States of Micronesia, which have each en-
 21 tered into a Compact of Free Association with the
 22 United States.

23 (2) **UNITED STATES.**—The term “United
 24 States” means the 50 States of the United States,
 25 the District of Columbia, the Commonwealth of

1 Puerto Rico, the United States Virgin Islands,
 2 Guam, American Samoa, the Commonwealth of the
 3 Northern Mariana Islands, and the Freely Associ-
 4 ated States.

5 (b) IN GENERAL.—The Administrator of the Na-
 6 tional Oceanic and Atmospheric Administration shall es-
 7 tablish a program, to be known as the “NOAA Precipita-
 8 tion Frequency Atlas of the United States”, to estimate
 9 and communicate the frequency of precipitation in the
 10 United States.

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

13 (1) shall better inform the public and provide
 14 information on—

15 (A) temporal and spatial distribution of
 16 heavy precipitation;

17 (B) analyses of seasonality in precipitation;
 18 and

19 (C) trends in annual maximum series data;
 20 and

21 (2) may serve as the official source of the Fed-
 22 eral Government on estimates of precipitation fre-
 23 quency and associated information with respect to
 24 the United States.

25 (d) REQUIREMENTS.—

1 (1) ~~COVERAGE.~~—The NOAA Precipitation Fre-
 2 quency Atlas of the United States shall include such
 3 estimates of the frequency of precipitation in the
 4 United States as the Administrator determines ap-
 5 propriate.

6 (2) ~~FREQUENCY.~~—Such estimates—

7 (A) shall be conducted not less frequently
 8 than once every 10 years; and

9 (B) may be conducted more frequently if
 10 determined appropriate by the Administrator.

11 (3) ~~PUBLICATION.~~—Such estimates and meth-
 12 odologies used to conduct such estimates shall be—

13 (A) subject to an appropriate, scientific
 14 process, as determined by the Administrator;
 15 and

16 (B) published on a publicly accessible
 17 website of the National Oceanic and Atmos-
 18 pheric Administration.

19 (e) ~~PARTNERSHIPS.~~—The Administrator may partner
 20 with other Federal agencies, members of the private sec-
 21 tor, academic cooperative partnerships, or nongovernment
 22 associations to assist in carrying out the functions de-
 23 scribed in subsection (c).

24 (f) ~~CONSULTATION.~~—In carrying out this section, the
 25 Administrator may consult with relevant Federal, State,

1 local, Tribal, and Territorial government agencies, re-
 2 search institutions, and the private sector, as the Adminis-
 3 trator determines necessary.

4 (g) COORDINATION.—In carrying out this section, the
 5 Administrator may coordinate with other Federal agen-
 6 eies.

7 (h) AUTHORIZATION OF APPROPRIATIONS.—There
 8 are authorized to be appropriated to carry out this section,
 9 from amounts otherwise authorized to be appropriated to
 10 the Administrator to carry out this Act, \$3,500,000 for
 11 each of fiscal years 2021 through 2030.

12 **SEC. 13. INTERAGENCY COORDINATING COMMITTEE ON**
 13 **WATER MANAGEMENT.**

14 (a) ESTABLISHMENT.—There is established a com-
 15 mittee, to be known as the “Interagency Coordinating
 16 Committee on Water Management” (in this section re-
 17 ferred to as the “Committee”).

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

20 (1) The Under Secretary.

21 (2) The Assistant Secretary for Water and
 22 Science of the Department of the Interior.

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

24 (A) The Federal Emergency Management
 25 Agency.

1 (B) The Army Corps of Engineers.

2 (C) The National Science Foundation.

3 (D) The Office of Science and Technology
4 Policy.

5 (E) The Council on Environmental Qual-
6 ity.

7 (F) The Department of Energy.

8 (G) The Department of Agriculture.

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

11 (e) CO-CHAIRS.—The Committee shall be co-chaired
12 by the Secretary of the Interior and the Administrator of
13 the Environmental Protection Agency.

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

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

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

4 (2) coordinate and consolidate existing water-
5 related Federal task forces, working groups, and
6 other formal cross-agency initiatives, as appropriate;

7 (3) designate and consolidate repositories re-
8 sponsible for archiving and managing water-related
9 matters;

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

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

15 (6) support workforce development and efforts
16 to recruit, train, and retain professionals to operate
17 and maintain essential water facilities in the United
18 States.

19 (f) ~~CROSS-AGENCY PRIORITY RESEARCH NEEDS.—~~
20 Not later than 1 year after the date of the enactment of
21 this Act, the Committee shall develop and submit to Con-
22 gress a list of research needs that includes needs for cross-
23 agency research and coordination.

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

2 (a) *SHORT TITLE.*—*This Act may be cited as the*
 3 *“Flood Level Observation, Operations, and Decision Sup-*
 4 *port Act” or the “FLOODS Act”.*

5 (b) *TABLE OF CONTENTS.*—*The table of contents for*
 6 *this Act is as follows:*

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Sec. 11. Forecast communication coordinators.

Sec. 12. Estimates of precipitation frequency in the United States.

Sec. 13. Interagency Coordinating Committee on Water Management.

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.

7 **SEC. 2. DEFINITIONS.**

8 *In this Act:*

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

1 (2) *UNDER SECRETARY.*—*The term “Under Sec-*
 2 *retary” means the Under Secretary of Commerce for*
 3 *Oceans and Atmosphere.*

4 **SEC. 3. NATIONAL INTEGRATED FLOOD INFORMATION SYS-**
 5 **TEM.**

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

11 (b) *SYSTEM FUNCTIONS.*—*The Under Secretary,*
 12 *through the National Integrated Flood Information System,*
 13 *shall—*

14 (1) *provide an effective flood early warning sys-*
 15 *tem that—*

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

21 (B) *makes usable, reliable, and timely fore-*
 22 *casts of floods;*

23 (C) *assesses the severity of flood conditions*
 24 *and effects;*

1 (D) issues flood watches and warnings when
2 necessary;

3 (E) provides information described in sub-
4 paragraph (A), forecasts described in subpara-
5 graph (B), and assessments described in sub-
6 paragraph (C) at the national, regional, and
7 local levels, as appropriate; and

8 (F) communicates flood forecasts, flood con-
9 ditions, and flood impacts to public and private
10 entities engaged in flood planning, preparedness,
11 and response, including—

12 (i) decision makers at the Federal,
13 State, local, and Tribal levels of govern-
14 ment;

15 (ii) the private sector; and

16 (iii) the public;

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

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

24 (4) use existing forecasting and assessment pro-
25 grams and partnerships;

1 (5) *make improvements in seasonal precipitation*
 2 *and temperature, subseasonal precipitation and tem-*
 3 *perature, and flood water prediction; and*

4 (6) *continue ongoing research and monitoring*
 5 *activities relating to floods, including research activi-*
 6 *ties relating to—*

7 (A) *the prediction, length, severity, and im-*
 8 *pacts of floods and improvement of the accuracy,*
 9 *timing, and specificity of flash flood warnings;*

10 (B) *the role of extreme weather events and*
 11 *climate variability in floods; and*

12 (C) *how water travels over and through sur-*
 13 *faces.*

14 (c) *PARTNERSHIPS.—The Under Secretary, through*
 15 *the National Integrated Flood Information System, may—*

16 (1) *engage with the private sector to improve*
 17 *flood monitoring, forecasts, land and topography*
 18 *data, and communication, if the Under Secretary de-*
 19 *termines that such engagement is appropriate, cost ef-*
 20 *fective, and beneficial to the public and decision mak-*
 21 *ers described in subsection (b)(1)(F)(i);*

22 (2) *facilitate the development of 1 or more aca-*
 23 *ademic cooperative partnerships to assist in carrying*
 24 *out the functions of the National Integrated Flood In-*
 25 *formation System described in subsection (b);*

(d) CONSULTATION.—In developing and maintaining the National Integrated Flood Information System, the Under Secretary shall consult with relevant Federal, State, local, and Tribal government agencies, research institutions, and the private sector.

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

23 (a) *PARTNERSHIPS*.—

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1 *higher education (as defined in section 101 of the*
2 *Higher Education Act of 1965 (20 U.S.C. 1001)) to*
3 *evaluate observations that would improve total water*
4 *prediction.*

5 (2) *PRIORITY OBSERVATIONS.—In establishing*
6 *partnerships under paragraph (1), the Under Sec-*
7 *retary shall prioritize partnerships to evaluate obser-*
8 *vations from unmanned aerial systems.*

9 (b) *MAINTAINED OBSERVATIONS.—If the Under Sec-*
10 *retary determines that incorporating additional observa-*
11 *tions improves total water prediction, the Under Secretary*
12 *shall, to the extent practicable, continue incorporating those*
13 *observations.*

14 (c) *MODELING IMPROVEMENTS.—The Under Secretary*
15 *shall advance geographic coverage, resolution, skill, and effi-*
16 *ciency of coastal oceanographic modeling, including efforts*
17 *that improve the coupling of and interoperability between*
18 *hydrological models and coastal ocean models.*

19 (d) *GEOSPATIAL DATA.—The Under Secretary shall*
20 *advance the development of models to vertically transform*
21 *geospatial data into a common system for use as the Federal*
22 *standard for surveys and mapping.*

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.*—*Per-*
 12 *formance of the responsibilities outlined in this sec-*
 13 *tion is not limited to the service coordination hydrolo-*
 14 *gist position.*

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

19 (c) *RESPONSIBILITIES.*—

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

1 *under subsection (a) shall, with respect to hydrol-*
2 *ogy—*

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 effectively*
9 *to improve outcomes from flood events;*

10 *(B) liaise with users of products and serv-*
11 *ices of the National Weather Service, such as the*
12 *public, academia, media outlets, users in the hy-*
13 *dropower, transportation, recreation, and agri-*
14 *cultural communities, and forestry, land, fish-*
15 *eries, and water management interests, to evalu-*
16 *ate the adequacy and usefulness of the products*
17 *and services of the National Weather Service;*

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

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

5 (E) ensure the maintenance and accuracy of
 6 flooding call lists, appropriate office flooding
 7 policy or procedures, and other flooding informa-
 8 tion or dissemination methodologies or strategies;
 9 and

10 (F) work closely with Federal, State, local,
 11 and Tribal emergency and floodplain manage-
 12 ment agencies, and other agencies relating to dis-
 13 aster management, to ensure a planned, coordi-
 14 nated, and effective preparedness and response
 15 effort.

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

20 (d) *ADDITIONAL RESPONSIBILITIES.*—

21 (1) *IN GENERAL.*—Subject to paragraph (2), a
 22 service coordination hydrologist designated under sub-
 23 section (a) may, with respect to hydrology—

24 (A) work with a State agency to develop
 25 plans for promoting more effective use of prod-

1 ucts and services of the National Weather Service
 2 throughout the State;

3 (B) identify priority community prepared-
 4 ness objectives;

5 (C) develop plans to meet the objectives
 6 identified under subparagraph (B); and

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

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

16 (e) *PLACEMENT WITH STATE AND LOCAL EMERGENCY*
 17 *AND FLOODPLAIN MANAGERS.*—

18 (1) *IN GENERAL.*—*In carrying out this section,*
 19 *the Director may place a service coordination hy-*
 20 *drologist designated under subsection (a) with a State*
 21 *or local emergency or floodplain manager, if the Di-*
 22 *rector determines that such placement is necessary or*
 23 *convenient to carry out this section.*

24 (2) *TREATMENT.*—*If the Director determines*
 25 *that the placement of a service coordination hydrolo-*

1 *gist with a State or local emergency or floodplain*
 2 *manager under paragraph (1) is near a River Fore-*
 3 *cast Center of the National Weather Service, such*
 4 *placement shall be treated as designation of the serv-*
 5 *ice coordination hydrologist at such River Forecast*
 6 *Center for purposes of subsection (a).*

7 **SEC. 6. IMPROVING NATIONAL OCEANIC AND ATMOS-**
 8 **PHERIC ADMINISTRATION COMMUNICATION**
 9 **OF FUTURE FLOOD RISKS AND HAZARDOUS**
 10 **FLASH FLOOD EVENTS.**

11 *(a) ASSESSMENT OF FLASH FLOOD WATCHES AND*
 12 *WARNINGS.—*

13 *(1) IN GENERAL.—Not later than 2 years after*
 14 *the date of the enactment of this Act, the Under Sec-*
 15 *retary shall—*

16 *(A) conduct an assessment of—*

17 *(i) the flash flood watches and warn-*
 18 *ings of the National Weather Service; and*

19 *(ii) the information delivery to support*
 20 *preparation and responses to floods; and*

21 *(B) submit to Congress a report on the find-*
 22 *ings of the Under Secretary with respect to the*
 23 *assessment required by subparagraph (A).*

24 *(2) ELEMENTS.—The assessment required by*
 25 *paragraph (1)(A) shall include the following:*

1 (A) *An evaluation of whether the watches,*
 2 *warnings, and information described in para-*
 3 *graph (1)(A)—*

4 (i) *communicate risk to the general*
 5 *public;*

6 (ii) *inform action to prevent loss of life*
 7 *and property;*

8 (iii) *inform action to support flood*
 9 *preparation and response; and*

10 (iv) *deliver information in a manner*
 11 *designed to lead to appropriate action.*

12 (B) *Subject to subsection (b)(2), such rec-*
 13 *ommendations as the Under Secretary may have*
 14 *for—*

15 (i) *legislative and administrative ac-*
 16 *tion to improve the watches and warnings*
 17 *described in paragraph (1)(A)(i); and*

18 (ii) *such research as the Under Sec-*
 19 *retary considers necessary to address the*
 20 *focus areas described in paragraph (3).*

21 (3) *FOCUS AREAS.—The assessment required by*
 22 *paragraph (1)(A) shall focus on the following areas:*

23 (A) *Ways to communicate the risks posed by*
 24 *hazardous flash flood events to the public that*

1 are most likely to result in informed decision
2 making regarding the mitigation of those risks.

3 (B) Ways to provide actionable geographic
4 information to the recipient of a watch or warn-
5 ing for a flash flood, including partnering with
6 emergency response agencies, as appropriate.

7 (C) Evaluation of information delivery to
8 support the preparation for and response to
9 floods.

10 (4) CONSULTATION.—In conducting the assess-
11 ment required by paragraph (1)(A), the Under Sec-
12 retary shall consult with—

13 (A) such line offices of the National Oceanic
14 and Atmospheric Administration as the Under
15 Secretary considers relevant, including—

16 (i) the National Ocean Service;
17 (ii) the National Weather Service; and
18 (iii) the Office of Oceanic and Atmos-
19 pheric Research;

20 (B) individuals in the academic sector, in-
21 cluding individuals in the field of social and be-
22 havioral sciences;

23 (C) other weather services;

1 (D) media outlets and other entities that
 2 distribute the watches and warnings described in
 3 paragraph (1)(A)(i);

4 (E) floodplain managers and emergency
 5 planners and responders, including State, local,
 6 and Tribal emergency management agencies;

7 (F) other government users of the watches
 8 and warnings described in paragraph (1)(A)(i),
 9 including the Federal Highway Administration;
 10 and

11 (G) such other Federal agencies as the
 12 Under Secretary determines rely on watches and
 13 warnings regarding flash floods for operational
 14 decisions.

15 (5) NATIONAL ACADEMY OF SCIENCES.—The
 16 Under Secretary shall engage with the National Acad-
 17 emy of Sciences, as the Under Secretary considers
 18 necessary and practicable, including by contracting
 19 with the National Research Council to review the sci-
 20 entific and technical soundness of the assessment re-
 21 quired by paragraph (1)(A), including the rec-
 22 ommendations under paragraph (2)(B).

23 (6) METHODOLOGIES.—In conducting the assess-
 24 ment required by paragraph (1)(A), the Under Sec-
 25 retary shall use such methodologies as the Under Sec-

1 *retary considers are generally accepted by the weather*
 2 *enterprise, including social and behavioral sciences.*

3 *(b) IMPROVEMENTS TO FLASH FLOOD WATCHES AND*
 4 *WARNINGS.—*

5 *(1) IN GENERAL.—Based on the assessment re-*
 6 *quired by subsection (a)(1)(A), the Under Secretary*
 7 *shall make such improvements to the watches and*
 8 *warnings described in that subsection as the Under*
 9 *Secretary considers necessary—*

10 *(A) to improve the communication of the*
 11 *risks posed by hazardous flash flood events; and*

12 *(B) to provide actionable geographic infor-*
 13 *mation to the recipient of a watch or warning*
 14 *for a flash flood.*

15 *(2) REQUIREMENTS REGARDING RECOMMENDA-*
 16 *TIONS.—In conducting the assessment required by*
 17 *subsection (a)(1)(A), the Under Secretary shall ensure*
 18 *that any recommendation under subsection (a)(2)(B)*
 19 *that the Under Secretary considers a major change—*

20 *(A) is validated by social and behavioral*
 21 *science using a generalizable sample;*

22 *(B) accounts for the needs of various demo-*
 23 *graphics, vulnerable populations, and geographic*
 24 *regions;*

1 (C) responds to the needs of Federal, State,
 2 local, and Tribal government partners and
 3 media partners; and

4 (D) accounts for necessary changes to feder-
 5 ally operated watch and warning propagation
 6 and dissemination infrastructure and protocols.

7 (c) *DEFINITIONS.—In this section:*

8 (1) *WATCH; WARNING.—*

9 (A) *IN GENERAL.—Except as provided in*
 10 *subparagraph (B), the terms “watch” and*
 11 *“warning”, with respect to a hazardous flash*
 12 *flood event, mean products issued by the Na-*
 13 *tional Oceanic and Atmospheric Administration,*
 14 *intended for use by the general public—*

15 (i) *to alert the general public to the po-*
 16 *tential for or presence of the event; and*

17 (ii) *to inform action to prevent loss of*
 18 *life and property.*

19 (B) *EXCLUSION.—The terms “watch” and*
 20 *“warning” do not include technical or special-*
 21 *ized meteorological and hydrological forecasts,*
 22 *outlooks, or model guidance products.*

23 (2) *WEATHER ENTERPRISE.—The term “weather*
 24 *enterprise” has the meaning given that term in sec-*

tion 2 of the Weather Research and Forecasting Innovation Act of 2017 (15 U.S.C. 8501).

SEC. 7. FRESHWATER MONITORING ALONG THE COAST.

(a) *DATA AVAILABILITY ASSESSMENT.*—The Under Secretary shall assess the availability of short- and long-term data on large-scale freshwater flooding into oceans, bays, and estuaries, including data on—

(1) flow rate, including discharge;

(2) conductivity;

(3) oxygen concentration;

(4) nutrient load;

(5) water temperature; and

(6) sediment load.

(b) *DATA NEEDS ASSESSMENT.*—The Under Secretary shall assess the need for additional data to assess and predict the effect of the flooding and freshwater discharge described in subsection (a).

(c) *INVENTORY OF DATA NEEDS.*—Based on the assessments required by subsections (a) and (b), the Under Secretary shall create an inventory of data needs with respect to the flooding and freshwater discharge described in subsections (a) and (b).

(d) *PLANNING.*—In planning for the collection of additional data necessary for ecosystem-based modeling of the effect of the flooding and freshwater discharge described in

1 subsections (a) and (b), the Under Secretary shall use the
 2 inventory created under subsection (c).

3 **SEC. 8. TORNADO WARNING IMPROVEMENT.**

4 Section 103 of the Weather Research and Forecasting
 5 Innovation Act of 2017 (15 U.S.C. 8513) is amended—

6 (1) by redesignating subsections (c) and (d) as
 7 subsections (d) and (e), respectively; and

8 (2) by inserting after subsection (b) the fol-
 9 lowing:

10 “(c) *INNOVATIVE OBSERVATIONS.*—The Under Sec-
 11 retary shall ensure that the program periodically examines
 12 the value of incorporating innovative observations, such as
 13 acoustic or infrasonic measurements, observations from
 14 phased array radars, and observations from mesonets, with
 15 respect to the improvement of tornado forecasts, predictions,
 16 and warnings.”.

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

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

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

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

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

1 “(4) evaluating and incorporating, as appro-
 2 priate, innovative observations, including acoustic or
 3 infrasonic measurements.”.

4 **SEC. 10. WEATHER AND WATER RESEARCH AND DEVELOP-**
 5 **MENT PLANNING.**

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

10 **SEC. 11. FORECAST COMMUNICATION COORDINATORS.**

11 Section 1762(f)(1) of the Food Security Act of 1985
 12 (15 U.S.C. 8521(f)(1)) is amended, in the second sentence,
 13 by striking “may” and inserting “shall”.

14 **SEC. 12. ESTIMATES OF PRECIPITATION FREQUENCY IN**
 15 **THE UNITED STATES.**

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

17 (1) *FREELY ASSOCIATED STATES.*—The term
 18 “Freely Associated States” means the Republic of
 19 Palau, the Republic of the Marshall Islands, and the
 20 Federated States of Micronesia, which have each en-
 21 tered into a Compact of Free Association with the
 22 United States.

23 (2) *UNITED STATES.*—The term “United States”
 24 means the 50 States of the United States, the District
 25 of Columbia, the Commonwealth of Puerto Rico, the

1 *United States Virgin Islands, Guam, American*
 2 *Samoa, the Commonwealth of the Northern Mariana*
 3 *Islands, and the Freely Associated States.*

4 **(b) IN GENERAL.**—*The Administrator of the National*
 5 *Oceanic and Atmospheric Administration shall establish a*
 6 *program, to be known as the “NOAA Precipitation Fre-*
 7 *quency Atlas of the United States”, to compile, estimate,*
 8 *analyze, and communicate the frequency of precipitation in*
 9 *the United States.*

10 **(c) FUNCTIONS.**—*The NOAA Precipitation Frequency*
 11 *Atlas of the United States—*

12 *(1) shall better inform the public and provide in-*
 13 *formation on—*

14 *(A) temporal and spatial distribution of*
 15 *heavy precipitation;*

16 *(B) analyses of seasonality in precipitation;*
 17 *and*

18 *(C) trends in annual maximum series data;*
 19 *and*

20 *(2) may serve as the official source of the Federal*
 21 *Government on estimates of precipitation frequency*
 22 *and associated information with respect to the United*
 23 *States.*

24 **(d) REQUIREMENTS.**—

1 (1) *COVERAGE.*—*The NOAA Precipitation Fre-*
 2 *quency Atlas of the United States shall include such*
 3 *estimates of the frequency of precipitation in the*
 4 *United States as the Administrator determines appro-*
 5 *priate.*

6 (2) *FREQUENCY.*—*Such estimates—*

7 (A) *shall be conducted not less frequently*
 8 *than once every 10 years; and*

9 (B) *may be conducted more frequently if de-*
 10 *termined appropriate by the Administrator.*

11 (3) *PUBLICATION.*—*Such estimates and meth-*
 12 *odologies used to conduct such estimates shall be—*

13 (A) *subject to an appropriate, scientific*
 14 *process, as determined by the Administrator; and*

15 (B) *published on a publicly accessible*
 16 *website of the National Oceanic and Atmospheric*
 17 *Administration.*

18 (e) *PARTNERSHIPS.*—*The Administrator may partner*
 19 *with other Federal agencies, members of the private sector,*
 20 *academic cooperative partnerships, or nongovernment asso-*
 21 *ciations to assist in carrying out the functions described*
 22 *in subsection (c).*

23 (f) *CONSULTATION.*—*In carrying out this section, the*
 24 *Administrator may consult with relevant Federal, State,*
 25 *local, Tribal, and Territorial government agencies, research*

1 *institutions, and the private sector, as the Administrator*
 2 *determines necessary.*

3 *(g) COORDINATION.—In carrying out this section, the*
 4 *Administrator may coordinate with other Federal agencies.*

5 *(h) AUTHORIZATION OF APPROPRIATIONS.—There are*
 6 *authorized to be appropriated to carry out this section, from*
 7 *amounts otherwise authorized to be appropriated to the Ad-*
 8 *ministrator to carry out this Act, \$3,500,000 for each of*
 9 *fiscal years 2021 through 2030.*

10 **SEC. 13. INTERAGENCY COORDINATING COMMITTEE ON**
 11 **WATER MANAGEMENT.**

12 *(a) ESTABLISHMENT.—There is established a com-*
 13 *mittee, to be known as the “Interagency Coordinating Com-*
 14 *mittee on Water Management” (in this section referred to*
 15 *as the “Committee”).*

16 *(b) MEMBERSHIP.—The Committee shall be composed*
 17 *of the following members:*

18 *(1) The Under Secretary.*

19 *(2) The Assistant Secretary for Water and*
 20 *Science of the Department of the Interior.*

21 *(3) The head of each of the following:*

22 *(A) The Federal Emergency Management*
 23 *Agency.*

24 *(B) The Army Corps of Engineers.*

25 *(C) The National Science Foundation.*

1 (D) *The Office of Science and Technology*
 2 *Policy.*

3 (E) *The Council on Environmental Quality.*

4 (F) *The Department of Energy.*

5 (G) *The Department of Agriculture.*

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

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

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

13 (e) *GENERAL PURPOSE AND DUTIES.—The Committee*
 14 *shall ensure that agencies across the Federal Government*
 15 *that engage in water-related matters, including water stor-*
 16 *age and supplies, water quality and restoration activities,*
 17 *water infrastructure, transportation on United States riv-*
 18 *ers and inland waterways, and water forecasting, work to-*
 19 *gether where such agencies have joint or overlapping respon-*
 20 *sibilities to—*

21 (1) *improve interagency coordination by Federal*
 22 *agencies on water resource management and water-re-*
 23 *lated infrastructure issues;*

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

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

21 SEC. 14. NATIONAL WEATHER SERVICE HYDROLOGIC RE-
22 SEARCH FELLOWSHIP PROGRAM.

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

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

3 (2) *INSTITUTION OF HIGHER EDUCATION.*—The
4 term “institution of higher education” has the mean-
5 ing given that term in section 101 of the Higher Edu-
6 cation Act of 1965 (20 U.S.C. 1001)).

7 (b) *HYDROLOGIC RESEARCH FELLOWSHIP PRO-*
8 *GRAM.*—

9 (1) *ESTABLISHMENT.*—The Under Secretary,
10 acting through the Director of the National Weather
11 Service (in this section referred to as the “Director”)
12 shall establish a hydrologic research fellowship pro-
13 gram (in this section referred to as the “program”)
14 for qualified individuals.

15 (2) *QUALIFIED INDIVIDUAL.*—For purposes of
16 this section, a qualified individual is an individual
17 who is—

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

19 (B) enrolled in a research-based graduate
20 program, at an institution of higher education,
21 in a field that advances the research priorities
22 developed by the Under Secretary under para-
23 graph (7), such as—

24 (i) hydrology;

25 (ii) earth sciences;

- 1 (iii) *atmospheric sciences;*
- 2 (iv) *computer sciences;*
- 3 (v) *engineering;*
- 4 (vi) *environmental sciences;*
- 5 (vii) *geosciences;*
- 6 (viii) *urban planning; or*
- 7 (ix) *related social sciences.*

8 (3) *AWARD GUIDELINES.—Fellowships under the*
 9 *program shall be awarded pursuant to guidelines es-*
 10 *tablished by the Under Secretary.*

11 (4) *SELECTION PREFERENCE.—In selecting*
 12 *qualified individuals for participation in the pro-*
 13 *gram, the Under Secretary, acting through the Direc-*
 14 *tor, shall give preference to applicants from histori-*
 15 *cally Black colleges and universities and minority-*
 16 *serving institutions.*

17 (5) *PLACEMENT.—The program shall support the*
 18 *placement of qualified individuals in positions within*
 19 *the executive branch of the Federal Government where*
 20 *such individuals can address and advance the re-*
 21 *search priorities developed by the Under Secretary*
 22 *under paragraph (7).*

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

1 (7) *FELLOWSHIP RESEARCH PRIORITIES.*—*The*
 2 *Under Secretary, acting through the Director, and in*
 3 *consultation with representatives from the United*
 4 *States Geological Survey, the Federal Emergency*
 5 *Management Agency, and the Army Corps of Engi-*
 6 *neers, as appropriate, shall develop and publish pri-*
 7 *orities for the conduct of research by fellows, which*
 8 *may include the following:*

9 (A) *Advance the collaborative development*
 10 *of a flexible community-based water resources*
 11 *modeling system.*

12 (B) *Apply artificial intelligence and ma-*
 13 *chine learning capabilities to advance existing*
 14 *hydrologic modeling capabilities.*

15 (C) *Support the evolution and integration*
 16 *of hydrologic modeling within an Earth Systems*
 17 *Modeling Framework.*

18 (D) *Improve visualizations of hydrologic*
 19 *model outputs.*

20 (E) *Advance the state of coupled freshwater*
 21 *and salt water modeling and forecasting capa-*
 22 *bilities.*

23 (F) *Advance understanding and process*
 24 *representation of water quality parameters.*

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

3 (H) Support the integration of social
4 science to advance decision support services.

5 (I) Develop methods to study groundwater
6 sustainability and estimate the efficiency of re-
7 charge management.

8 (c) *DIRECT HIRING.*—

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

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

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

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

23 (2) *EXERCISE OF AUTHORITY.*—The direct hire
24 authority provided by this subsection shall be exer-
25 cised with respect to an individual described in para-

1 graph (1) not later than 2 years after the date on
 2 which the individual completed the fellowship under
 3 the program.

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

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

8 (1) *EXTREME WEATHER.*—*The term “extreme*
 9 *weather” includes observed or anticipated severe and*
 10 *unseasonable atmospheric conditions, including*
 11 *drought, heavy precipitation, hurricanes, tornadoes*
 12 *and other windstorms (including derechos), extreme*
 13 *heat, extreme cold, flooding, sustained temperatures or*
 14 *precipitation that deviate substantially from histor-*
 15 *ical averages, and any other weather event that the*
 16 *Under Secretary determines qualifies as extreme*
 17 *weather.*

18 (2) *LONG-TERM.*—*The term “long-term” shall*
 19 *have such meaning as the Director of the National In-*
 20 *stitute of Standards and Technology, in consultation*
 21 *with the Under Secretary, considers appropriate for*
 22 *purposes of this section.*

23 (3) *OTHER ENVIRONMENTAL TRENDS.*—*The term*
 24 *“other environmental trends” means wildfires, coastal*
 25 *flooding, inland flooding, land subsidence, rising sea*

1 *levels, and any other challenges relating to changes in*
 2 *environmental systems over time that the Under Sec-*
 3 *retary determines qualify as environmental challenges*
 4 *other than extreme weather.*

5 *(b) IDENTIFICATION AND SUPPORT OF CONSISTENT,*
 6 *FEDERAL SET OF FORWARD-LOOKING, LONG-TERM METE-*
 7 *OROLOGICAL INFORMATION.—The Under Secretary shall*
 8 *identify, and support research that enables, a consistent,*
 9 *Federal set of forward-looking, long-term meteorological in-*
 10 *formation that models future extreme weather events, other*
 11 *environmental trends, projections, and up-to-date observa-*
 12 *tions, including mesoscale information as determined ap-*
 13 *propriate by the Under Secretary.*

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

17 *(a) IN GENERAL.—The Under Secretary, in consulta-*
 18 *tion with the Department of Agriculture, the Department*
 19 *of the Interior, and the Army Corps of Engineers, shall con-*
 20 *duct an analysis of gaps in the availability of snow-related*
 21 *data to assess and predict floods and flood impacts, includ-*
 22 *ing data on the following:*

- 23 *(1) Snow water equivalent.*
 24 *(2) Snow depth.*
 25 *(3) Snowpack temperature.*

1 (4) *Snow precipitation.*

2 (5) *Snow melt.*

3 (6) *Rain-snow line.*

4 (b) *REPORT.—Not later than 180 days after the date*
 5 *of the enactment of this Act, the Under Secretary shall sub-*
 6 *mit to the Committee on Commerce, Science, and Transpor-*
 7 *tation of the Senate and the Committee on Science, Space,*
 8 *and Technology of the House of Representatives a report*
 9 *on—*

10 (1) *the findings of the gap analysis required by*
 11 *subsection (a); and*

12 (2) *opportunities for additional collaboration*
 13 *among Federal agencies to collect snow-related data to*
 14 *better assess and predict floods and flood impacts.*

15 **SEC. 17. AVAILABILITY TO THE PUBLIC OF FLOOD-RELATED**
 16 **DATA.**

17 (a) *IN GENERAL.—The Under Secretary shall make*
 18 *flood-related data available to the public on the website of*
 19 *the National Oceanic and Atmospheric Administration.*

20 (b) *COST.—The Under Secretary may make the data*
 21 *under subsection (a) freely accessible or available at a cost*
 22 *that does not exceed the cost of preparing the data.*

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A BILL

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

SEPTEMBER 24, 2020

Reported with an amendment