

AMENDMENT NO. _____

Calendar No. _____

Purpose: In the nature of a substitute.

IN THE SENATE OF THE UNITED STATES—116th Cong., 2d Sess.**S. 4462**

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

Referred to the Committee on _____ and
ordered to be printed

Ordered to lie on the table and to be printed

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

Viz:

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

2 lowing:

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

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

5 “Flood Level Observation, Operations, and Decision Sup-
6 port Act” or the “FLOODS Act”.

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

8 this Act is as follows:

Sec. 1. Short title; table of contents.

Sec. 2. Definitions.

Sec. 3. National Integrated Flood Information System.

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

Sec. 5. Service coordination hydrologists at River Forecast Centers of the Na-
tional Weather Service.

- Sec. 6. Improving National Oceanic and Atmospheric Administration communication of future flood risks and hazardous flash flood events.
- Sec. 7. Freshwater monitoring along the coast.
- Sec. 8. Tornado warning improvement.
- Sec. 9. Hurricane forecast improvement program.
- Sec. 10. Weather and water research and development planning.
- Sec. 11. Forecast communication coordinators.
- Sec. 12. Estimates of precipitation frequency in the United States.
- Sec. 13. Interagency Coordinating Committee on Water Management.
- Sec. 14. National Weather Service hydrologic research fellowship program.

1 **SEC. 2. DEFINITIONS.**

2 In this Act:

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

10 (2) UNDER SECRETARY.—The term “Under
11 Secretary” means the Under Secretary of Commerce
12 for Oceans and Atmosphere.

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

15 (a) IN GENERAL.—The Under Secretary shall estab-
16 lish a system, to be known as the “National Integrated
17 Flood Information System”, to better inform and provide
18 for more timely decision making to reduce flood-related
19 effects and costs.

1 (b) SYSTEM FUNCTIONS.—The Under Secretary,
2 through the National Integrated Flood Information Sys-
3 tem, shall—

4 (1) provide an effective flood early warning sys-
5 tem that—

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

11 (B) makes usable, reliable, and timely fore-
12 casts of floods;

13 (C) assesses the severity of flood conditions
14 and effects;

15 (D) issues flood watches and warnings
16 when necessary;

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

22 (F) communicates flood forecasts, flood
23 conditions, and flood impacts to public and pri-
24 vate entities engaged in flood planning, pre-
25 paredness, and response, including—

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

4 (ii) the private sector; and

5 (iii) the public;

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

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

13 (4) use existing forecasting and assessment pro-
14 grams and partnerships;

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

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

21 (A) the prediction, length, severity, and
22 impacts of floods and improvement of the accu-
23 racy, timing, and specificity of flash flood warn-
24 ings;

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

3 (C) how water travels over and through
4 surfaces.

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

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

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

17 (3) use and support monitoring by citizen sci-
18 entists, including by developing best practices to fa-
19 cilitate maximum data integration, as the Under
20 Secretary considers appropriate.

21 (d) CONSULTATION.—In developing and maintaining
22 the National Integrated Flood Information System, the
23 Under Secretary shall consult with relevant Federal,
24 State, local, and Tribal government agencies, research in-
25 stitutions, and the private sector.

1 (e) COOPERATION FROM OTHER FEDERAL AGEN-
2 CIES.—Each Federal agency shall cooperate as appro-
3 priate with the Under Secretary in carrying out this sec-
4 tion.

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

7 (a) PARTNERSHIPS.—

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

14 (2) PRIORITY OBSERVATIONS.—In establishing
15 partnerships under paragraph (1), the Under Sec-
16 retary shall prioritize partnerships to evaluate obser-
17 vations from unmanned aerial systems.

18 (b) MAINTAINED OBSERVATIONS.—If the Under Sec-
19 retary determines that incorporating additional observa-
20 tions improves total water prediction, the Under Secretary
21 shall, to the extent practicable, continue incorporating
22 those observations.

23 (c) MODELING IMPROVEMENTS.—The Under Sec-
24 retary shall advance geographic coverage, resolution, skill,
25 and efficiency of coastal oceanographic modeling, includ-

1 ing efforts that improve the coupling of and interoper-
2 ability between hydrological models and coastal ocean
3 models.

4 (d) GEOSPATIAL DATA.—The Under Secretary shall
5 advance 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.

8 **SEC. 5. SERVICE COORDINATION HYDROLOGISTS AT RIVER**
9 **FORECAST CENTERS OF THE NATIONAL**
10 **WEATHER SERVICE.**

11 (a) DESIGNATION OF SERVICE COORDINATION HY-
12 DROLOGISTS.—

13 (1) IN GENERAL.—The Director of the National
14 Weather Service (in this section referred to as the
15 “Director”) shall designate at least 1 service coordi-
16 nation hydrologist at each River Forecast Center of
17 the National Weather Service.

18 (2) PERFORMANCE BY OTHER EMPLOYEES.—
19 Performance of the responsibilities outlined in this
20 section is not limited to the service coordination hy-
21 drologist position.

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

1 (c) RESPONSIBILITIES.—

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

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

17 (B) liaise with users of products and serv-
18 ices of the National Weather Service, such as
19 the public, academia, media outlets, users in the
20 hydropower, transportation, recreation, and ag-
21 ricultural communities, and forestry, land, fish-
22 eries, and water management interests, to
23 evaluate the adequacy and usefulness of the
24 products and services of the National Weather
25 Service;

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

9 (D) engage in interagency partnerships
10 with Federal, State, local, and Tribal govern-
11 ment agencies to explore the use of forecast-in-
12 formed reservoir operations to reduce flood risk;

13 (E) ensure the maintenance and accuracy
14 of flooding call lists, appropriate office flooding
15 policy or procedures, and other flooding infor-
16 mation or dissemination methodologies or strat-
17 egies; and

18 (F) work closely with Federal, State, local,
19 and Tribal emergency and floodplain manage-
20 ment agencies, and other agencies relating to
21 disaster management, to ensure a planned, co-
22 ordinated, and effective preparedness and re-
23 sponse effort.

24 (2) OTHER STAFF.—The Director may assign a
25 responsibility set forth in paragraph (1) to such

1 other staff as the Director considers appropriate to
2 carry out such responsibility.

3 (d) ADDITIONAL RESPONSIBILITIES.—

4 (1) IN GENERAL.—Subject to paragraph (2), a
5 service coordination hydrologist designated under
6 subsection (a) may, with respect to hydrology—

7 (A) work with a State agency to develop
8 plans for promoting more effective use of prod-
9 ucts and services of the National Weather Serv-
10 ice throughout the State;

11 (B) identify priority community prepared-
12 ness objectives;

13 (C) develop plans to meet the objectives
14 identified under subparagraph (B); and

15 (D) conduct flooding event preparedness
16 planning and citizen education efforts with and
17 through various State, local, and Tribal govern-
18 ment agencies and other disaster management-
19 related organizations.

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

24 (e) PLACEMENT WITH STATE AND LOCAL EMER-
25 GENCY AND FLOODPLAIN MANAGERS.—

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

3 (ii) the information delivery to sup-
4 port preparation and responses to floods;
5 and

6 (B) submit to Congress a report on the
7 findings of the Under Secretary with respect to
8 the assessment required by subparagraph (A).

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

11 (A) An evaluation of whether the watches,
12 warnings, and information described in para-
13 graph (1)(A)—

14 (i) communicate risk to the general
15 public;

16 (ii) inform action to prevent loss of
17 life and property;

18 (iii) inform action to support flood
19 preparation and response; and

20 (iv) deliver information in a manner
21 designed to lead to appropriate action.

22 (B) Subject to subsection (b)(2), such rec-
23 ommendations as the Under Secretary may
24 have for—

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

4 (ii) such research as the Under Sec-
5 retary considers necessary to address the
6 focus areas described in paragraph (3).

7 (3) FOCUS AREAS.—The assessment required
8 by paragraph (1)(A) shall focus on the following
9 areas:

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

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

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

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

1 (A) such line offices of the National Ocea-
2 nic and Atmospheric Administration as the
3 Under Secretary considers relevant, including—

4 (i) the National Ocean Service;

5 (ii) the National Weather Service; and

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

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

11 (C) other weather services;

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

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

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

22 (G) such other Federal agencies as the
23 Under Secretary determines rely on watches
24 and warnings regarding flash floods for oper-
25 ational decisions.

1 (5) NATIONAL ACADEMY OF SCIENCES.—The
2 Under Secretary shall engage with the National
3 Academy of Sciences, as the Under Secretary con-
4 siders necessary and practicable, including by con-
5 tracting with the National Research Council to re-
6 view the scientific and technical soundness of the as-
7 sessment required by paragraph (1)(A), including
8 the recommendations under paragraph (2)(B).

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

15 (b) IMPROVEMENTS TO FLASH FLOOD WATCHES
16 AND WARNINGS.—

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

22 (A) to improve the communication of the
23 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 Under Secretary shall en-
7 sure that any recommendation under subsection
8 (a)(2)(B) that the Under Secretary considers a
9 major change—

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

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

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

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

21 (c) DEFINITIONS.—In this section:

22 (1) WATCH; WARNING.—

23 (A) IN GENERAL.—Except as provided in
24 subparagraph (B), the terms “watch” and
25 “warning”, with respect to a hazardous flash

1 flood event, mean products issued by the Na-
2 tional Oceanic and Atmospheric Administration,
3 intended for use by the general public—

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

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

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

12 (2) WEATHER ENTERPRISE.—The term
13 “weather enterprise” has the meaning given that
14 term in section 2 of the Weather Research and
15 Forecasting Innovation Act of 2017 (15 U.S.C.
16 8501).

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

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

22 (1) flow rate, including discharge;

23 (2) conductivity;

24 (3) oxygen concentration;

25 (4) nutrient load;

1 (5) water temperature; and

2 (6) sediment load.

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

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

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

17 **SEC. 8. TORNADO WARNING IMPROVEMENT.**

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

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

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

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. ESTIMATES OF PRECIPITATION FREQUENCY IN**
6 **THE UNITED STATES.**

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

8 (1) **FREELY ASSOCIATED STATES.**—The term
9 “Freely Associated States” means the Republic of
10 Palau, the Republic of the Marshall Islands, and the
11 Federated States of Micronesia, which have each en-
12 tered into a Compact of Free Association with the
13 United States.

14 (2) **UNITED STATES.**—The term “United
15 States” means the 50 States of the United States,
16 the District of Columbia, the Commonwealth of
17 Puerto Rico, the United States Virgin Islands,
18 Guam, American Samoa, the Commonwealth of the
19 Northern Mariana Islands, and the Freely Associ-
20 ated States.

21 (b) **IN GENERAL.**—The Administrator of the Na-
22 tional Oceanic and Atmospheric Administration shall es-
23 tablish a program, to be known as the “NOAA Precipita-
24 tion Frequency Atlas of the United States”, to compile,
25 estimate, analyze, and communicate the frequency of pre-
26 cipitation in the United States.

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

3 (1) shall better inform the public and provide
4 information on—

5 (A) temporal and spatial distribution of
6 heavy precipitation;

7 (B) analyses of seasonality in precipitation;
8 and

9 (C) trends in annual maximum series data;
10 and

11 (2) may serve as the official source of the Fed-
12 eral Government on estimates of precipitation fre-
13 quency and associated information with respect to
14 the United States.

15 (d) REQUIREMENTS.—

16 (1) COVERAGE.—The NOAA Precipitation Fre-
17 quency Atlas of the United States shall include such
18 estimates of the frequency of precipitation in the
19 United States as the Administrator determines ap-
20 propriate.

21 (2) FREQUENCY.—Such estimates—

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

24 (B) may be conducted more frequently if
25 determined appropriate by the Administrator.

1 (3) PUBLICATION.—Such estimates and meth-
2 odologies used to conduct such estimates shall be—

3 (A) subject to an appropriate, scientific
4 process, as determined by the Administrator;
5 and

6 (B) published on a publicly accessible
7 website of the National Oceanic and Atmos-
8 pheric Administration.

9 (e) PARTNERSHIPS.—The Administrator may partner
10 with other Federal agencies, members of the private sec-
11 tor, academic cooperative partnerships, or nongovernment
12 associations to assist in carrying out the functions de-
13 scribed in subsection (c).

14 (f) CONSULTATION.—In carrying out this section, the
15 Administrator may consult with relevant Federal, State,
16 local, Tribal, and Territorial government agencies, re-
17 search institutions, and the private sector, as the Adminis-
18 trator determines necessary.

19 (g) COORDINATION.—In carrying out this section, the
20 Administrator may coordinate with other Federal agen-
21 cies.

22 (h) AUTHORIZATION OF APPROPRIATIONS.—There
23 are authorized to be appropriated to carry out this section,
24 from amounts otherwise authorized to be appropriated to

1 the Administrator to carry out this Act, \$3,500,000 for
2 each of fiscal years 2021 through 2030.

3 **SEC. 13. INTERAGENCY COORDINATING COMMITTEE ON**
4 **WATER MANAGEMENT.**

5 (a) **ESTABLISHMENT.**—There is established a com-
6 mittee, to be known as the “Interagency Coordinating
7 Committee on Water Management” (in this section re-
8 ferred to as the “Committee”).

9 (b) **MEMBERSHIP.**—The Committee shall be com-
10 posed of the following members:

11 (1) The Under Secretary.

12 (2) The Assistant Secretary for Water and
13 Science of the Department of the Interior.

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

15 (A) The Federal Emergency Management
16 Agency.

17 (B) The Army Corps of Engineers.

18 (C) The National Science Foundation.

19 (D) The Office of Science and Technology
20 Policy.

21 (E) The Council on Environmental Qual-
22 ity.

23 (F) The Department of Energy.

24 (G) The Department of Agriculture.

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

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

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

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

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

19 (2) coordinate existing water-related Federal
20 task forces, working groups, and other formal cross-
21 agency initiatives, as appropriate;

22 (3) designate and consolidate repositories re-
23 sponsible for archiving and managing water-related
24 matters;

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

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

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

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

15 **SEC. 14. NATIONAL WEATHER SERVICE HYDROLOGIC RE-**
16 **SEARCH FELLOWSHIP PROGRAM.**

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

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

22 (2) **INSTITUTION OF HIGHER EDUCATION.**—The
23 term “institution of higher education” has the
24 meaning given that term in section 101 of the High-
25 er Education Act of 1965 (20 U.S.C. 1001)).

1 (b) HYDROLOGIC RESEARCH FELLOWSHIP PRO-
2 GRAM.—

3 (1) ESTABLISHMENT.—The Under Secretary,
4 acting through the Director of the National Weather
5 Service (in this section referred to as the “Direc-
6 tor”) shall establish a hydrologic research fellowship
7 program (in this section referred to as the “pro-
8 gram”) for 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 Under Secretary 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 Under Secretary.

5 (4) SELECTION PREFERENCE.—In selecting
6 qualified individuals for participation in the pro-
7 gram, the Under Secretary, acting through the Di-
8 rector, shall give preference to applicants from his-
9 torically Black colleges and universities and minor-
10 ity-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 Under
16 Secretary 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 Under Secretary, acting through the Director, and
21 in consultation with representatives from the United
22 States Geological Survey, the Federal Emergency
23 Management Agency, and the Army Corps of Engi-
24 neers, as appropriate, shall develop and publish pri-

1 orities for the conduct of research by fellows, which
2 may include the following:

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

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

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

12 (D) Improve visualizations of hydrologic
13 model outputs.

14 (E) Advance the state of coupled fresh-
15 water and salt water modeling and forecasting
16 capabilities.

17 (F) Advance understanding and process
18 representation of water quality parameters.

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

21 (H) Support the integration of social
22 science to advance decision support services.

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

1 (c) DIRECT HIRING.—

2 (1) AUTHORITY.—During fiscal year 2021 and
3 any fiscal year thereafter, the head of any Federal
4 agency may appoint, without regard to the provi-
5 sions of subchapter I of chapter 33 of title 5, United
6 States Code, other than sections 3303 and 3328 of
7 that title, to a position with the Federal agency a re-
8 cipient of a fellowship under the program who—

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

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

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

16 (2) EXERCISE OF AUTHORITY.—The direct hire
17 authority provided by this subsection shall be exer-
18 cised with respect to an individual described in para-
19 graph (1) not later than 2 years after the date on
20 which the individual completed the fellowship under
21 the program.