

116<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION

# S. 4462

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## AN ACT

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

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

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

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

11          (b) SYSTEM FUNCTIONS.—The Under Secretary,  
12          through the National Integrated Flood Information Sys-  
13          tem, 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  
2 when 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  
9 conditions, and flood impacts to public and pri-  
10 vate entities engaged in flood planning, pre-  
11 paredness, 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  
19 among 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 precipita-  
2           tion and temperature, subseasonal precipitation and  
3           temperature, 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  
8                   impacts of floods and improvement of the accu-  
9                   racy, timing, and specificity of flash flood warn-  
10                  ings;

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

13                  (C) how water travels over and through  
14                  surfaces.

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

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

23                   (2) facilitate the development of 1 or more aca-  
24                   demic cooperative partnerships to assist in carrying

1 out the functions of the National Integrated Flood  
2 Information System described in subsection (b);

3 (3) use and support monitoring by citizen sci-  
4 entists, including by developing best practices to fa-  
5 cilitate maximum data integration, as the Under  
6 Secretary considers appropriate; and

7 (4) engage with, and leverage the resources of,  
8 entities within the National Oceanic and Atmos-  
9 pheric Administration in existence as of the date of  
10 the enactment of this Act, such as the National In-  
11 tegrated Drought Information System, the Regional  
12 Climate Center, and the National Mesonet Program,  
13 to improve coordination of water monitoring, fore-  
14 casting, and management.

15 (d) CONSULTATION.—In developing and maintaining  
16 the National Integrated Flood Information System, the  
17 Under Secretary shall consult with relevant Federal,  
18 State, local, and Tribal government agencies, research in-  
19 stitutions, and the private sector.

20 (e) COOPERATION FROM OTHER FEDERAL AGEN-  
21 CIES.—Each Federal agency shall cooperate as appro-  
22 priate with the Under Secretary in carrying out this sec-  
23 tion.

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

3 (a) **PARTNERSHIPS.**—

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

10 (2) **PRIORITY OBSERVATIONS.**—In establishing  
11 partnerships under paragraph (1), the Under Sec-  
12 retary shall prioritize partnerships to evaluate obser-  
13 vations from unmanned aerial systems.

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

19 (c) **MODELING IMPROVEMENTS.**—The Under Sec-  
20 retary shall advance geographic coverage, resolution, skill,  
21 and efficiency of coastal oceanographic modeling, includ-  
22 ing efforts that improve the coupling of and interoper-  
23 ability between hydrological models and coastal ocean  
24 models.

25 (d) **GEOSPATIAL DATA.**—The Under Secretary shall  
26 advance the development of models to vertically transform

1 geospatial data into a common system for use as the Fed-  
2 eral standard for surveys and mapping.

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

6 (a) DESIGNATION OF SERVICE COORDINATION HY-  
7 DROLOGISTS.—

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

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

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

21 (c) RESPONSIBILITIES.—

22 (1) IN GENERAL.—Subject to paragraph (2),  
23 consistent with the analysis described in section 409  
24 of the Weather Research and Forecasting Innovation  
25 Act of 2017 (Public Law 115–25; 131 Stat. 112),



1 and in order to increase impact-based decision sup-  
2 port services, each service coordination hydrologist  
3 designated under subsection (a) shall, with respect  
4 to hydrology—

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

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

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

1 develop, modify, or tailor products and services  
2 of the National Weather Service to improve the  
3 usefulness of such products and services;

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

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

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

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

23 (d) ADDITIONAL RESPONSIBILITIES.—

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

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

8           (B) identify priority community prepared-  
 9 ness objectives;

10           (C) develop plans to meet the objectives  
 11 identified under subparagraph (B); and

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

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

21           (e) PLACEMENT WITH STATE AND LOCAL EMER-  
 22 GENCY AND FLOODPLAIN MANAGERS.—

23           (1) IN GENERAL.—In carrying out this section,  
 24 the Director may place a service coordination hy-  
 25 drologist designated under subsection (a) with a

1 State or local emergency or floodplain manager, if  
 2 the Director determines that such placement is nec-  
 3 essary or convenient to carry out this section.

4 (2) TREATMENT.—If the Director determines  
 5 that the placement of a service coordination hydrolo-  
 6 gist with a State or local emergency or floodplain  
 7 manager under paragraph (1) is near a River Fore-  
 8 cast Center of the National Weather Service, such  
 9 placement shall be treated as designation of the  
 10 service coordination hydrologist at such River Fore-  
 11 cast Center for purposes of subsection (a).

12 **SEC. 6. IMPROVING NATIONAL OCEANIC AND ATMOS-**  
 13 **PHERIC ADMINISTRATION COMMUNICATION**  
 14 **OF FUTURE FLOOD RISKS AND HAZARDOUS**  
 15 **FLASH FLOOD EVENTS.**

16 (a) ASSESSMENT OF FLASH FLOOD WATCHES AND  
 17 WARNINGS.—

18 (1) IN GENERAL.—Not later than 2 years after  
 19 the date of the enactment of this Act, the Under  
 20 Secretary shall—

21 (A) conduct an assessment of—

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

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

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

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

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

12                   (i) communicate risk to the general  
13                   public;

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

16                   (iii) inform action to support flood  
17                   preparation and response; and

18                   (iv) deliver information in a manner  
19                   designed to lead to appropriate action.

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

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

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

4                   (3) FOCUS AREAS.—The assessment required  
5                   by paragraph (1)(A) shall focus on the following  
6                   areas:

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

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

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

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

22                         (A) such line offices of the National Oce-  
23                         anic and Atmospheric Administration as the  
24                         Under Secretary considers relevant, including—

25                                 (i) the National Ocean Service;

1 (ii) the National Weather Service; and

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

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

7 (C) other weather services;

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

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

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

18 (G) such other Federal agencies as the  
19 Under Secretary determines rely on watches  
20 and warnings regarding flash floods for oper-  
21 ational decisions.

22 (5) NATIONAL ACADEMY OF SCIENCES.—The  
23 Under Secretary shall engage with the National  
24 Academy of Sciences, as the Under Secretary con-  
25 siders necessary and practicable, including by con-

1       tracting with the National Research Council to re-  
2       view the scientific and technical soundness of the as-  
3       sessment required by paragraph (1)(A), including  
4       the recommendations under paragraph (2)(B).

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

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

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

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

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

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



1 sure that any recommendation under subsection  
 2 (a)(2)(B) that the Under Secretary considers a  
 3 major change—

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

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

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

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

15 (c) DEFINITIONS.—In this section:

16 (1) WATCH; WARNING.—

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

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

1 (ii) to inform action to prevent loss of  
2 life and property.

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

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

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

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

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

23 (b) DATA NEEDS ASSESSMENT.—The Under Sec-  
24 retary shall assess the need for additional data to assess

1 and predict the effect of the flooding and freshwater dis-  
2 charge described in subsection (a).

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

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

13 **SEC. 8. TORNADO WARNING IMPROVEMENT.**

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

17 (1) by redesignating subsections (c) and (d) as  
18 subsections (d) and (e), respectively; and

19 (2) by inserting after subsection (b) the fol-  
20 lowing:

21 “(c) INNOVATIVE OBSERVATIONS.—The Under Sec-  
22 retary shall ensure that the program periodically examines  
23 the value of incorporating innovative observations, such as  
24 acoustic or infrasonic measurements, observations from  
25 phased array radars, and observations from mesonets,

1 with respect to the improvement of tornado forecasts, pre-  
2 dictions, and warnings.”.

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

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

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

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

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

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

15 **SEC. 10. WEATHER AND WATER RESEARCH AND DEVELOP-**  
16 **MENT PLANNING.**

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

21 **SEC. 11. FORECAST COMMUNICATION COORDINATORS.**

22 Section 1762(f)(1) of the Food Security Act of 1985  
23 (15 U.S.C. 8521(f)(1)) is amended, in the second sen-  
24 tence, by striking “may” and inserting “shall”.

1 **SEC. 12. ESTIMATES OF PRECIPITATION FREQUENCY IN**  
2 **THE UNITED STATES.**

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

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

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

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

23 (c) **FUNCTIONS.**—The NOAA Precipitation Fre-  
24 quency Atlas of the United States—

25 (1) shall better inform the public and provide  
26 information on—

1 (A) temporal and spatial distribution of  
2 heavy precipitation;

3 (B) analyses of seasonality in precipitation;  
4 and

5 (C) trends in annual maximum series data;  
6 and

7 (2) may serve as the official source of the Fed-  
8 eral Government on estimates of precipitation fre-  
9 quency and associated information with respect to  
10 the United States.

11 (d) REQUIREMENTS.—

12 (1) COVERAGE.—The NOAA Precipitation Fre-  
13 quency Atlas of the United States shall include such  
14 estimates of the frequency of precipitation in the  
15 United States as the Administrator determines ap-  
16 propriate.

17 (2) FREQUENCY.—Such estimates—

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

20 (B) may be conducted more frequently if  
21 determined appropriate by the Administrator.

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

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

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

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

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

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

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

1 **SEC. 13. INTERAGENCY COORDINATING COMMITTEE ON**  
2 **WATER MANAGEMENT.**

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

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

9 (1) The Under Secretary.

10 (2) The Assistant Secretary for Water and  
11 Science of the Department of the Interior.

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

13 (A) The Federal Emergency Management  
14 Agency.

15 (B) The Army Corps of Engineers.

16 (C) The National Science Foundation.

17 (D) The Office of Science and Technology  
18 Policy.

19 (E) The Council on Environmental Qual-  
20 ity.

21 (F) The Department of Energy.

22 (G) The Department of Agriculture.

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



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

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

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

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

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

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

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

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

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

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

12          **SEC. 14. NATIONAL WEATHER SERVICE HYDROLOGIC RE-**  
13          **SEARCH FELLOWSHIP PROGRAM.**

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

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

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

23          (b) **HYDROLOGIC RESEARCH FELLOWSHIP PRO-**  
24          **GRAM.**—

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

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

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

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

16                           (i) hydrology;

17                           (ii) earth sciences;

18                           (iii) atmospheric sciences;

19                           (iv) computer sciences;

20                           (v) engineering;

21                           (vi) environmental sciences;

22                           (vii) geosciences;

23                           (viii) urban planning; or

24                           (ix) related social sciences.

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

4           (4) SELECTION PREFERENCE.—In selecting  
5 qualified individuals for participation in the pro-  
6 gram, the Under Secretary, acting through the Di-  
7 rector, shall give preference to applicants from his-  
8 torically Black colleges and universities and minor-  
9 ity-serving institutions.

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

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

18          (7) FELLOWSHIP RESEARCH PRIORITIES.—The  
19 Under Secretary, acting through the Director, and  
20 in consultation with representatives from the United  
21 States Geological Survey, the Federal Emergency  
22 Management Agency, and the Army Corps of Engi-  
23 neers, as appropriate, shall develop and publish pri-  
24 orities for the conduct of research by fellows, which  
25 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 salt water 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           (1) AUTHORITY.—During fiscal year 2021 and  
 2 any fiscal year thereafter, the head of any Federal  
 3 agency may appoint, without regard to the provi-  
 4 sions of subchapter I of chapter 33 of title 5, United  
 5 States Code, other than sections 3303 and 3328 of  
 6 that title, to a position with the Federal agency a re-  
 7 cipient of a fellowship under the program who—

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

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

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

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

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

24           (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), extreme  
6 heat, extreme cold, flooding, sustained temperatures  
7 or precipitation that deviate substantially from his-  
8 torical averages, and any other weather event that  
9 the Under Secretary determines qualifies as extreme  
10 weather.

11           (2) LONG-TERM.—The term “long-term” shall  
12 have such meaning as the Director of the National  
13 Institute of Standards and Technology, in consulta-  
14 tion with the Under Secretary, 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 Under Secretary determines qualify as environ-  
22 mental 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 Under Secretary

1 shall identify, and support research that enables, a con-  
2 sistent, Federal set of forward-looking, long-term meteorolo-  
3 gical information that models future extreme weather  
4 events, other environmental trends, projections, and up-  
5 to-date observations, including mesoscale information as  
6 determined appropriate by the Under Secretary.

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 Under Secretary, 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 precipitation.
- 20 (5) Snow melt.
- 21 (6) Rain-snow line.

22 (b) REPORT.—Not later than 180 days after the date  
23 of the enactment of this Act, the Under Secretary shall  
24 submit to the Committee on Commerce, Science, and  
25 Transportation of the Senate and the Committee on



1 Science, Space, and Technology of the House of Rep-  
2 resentatives a report on—

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

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

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

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

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

Passed the Senate November 16, 2020.

Attest:

*Secretary.*

116<sup>TH</sup> CONGRESS  
2<sup>D</sup> SESSION  
**S. 4462**

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## **AN ACT**

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