

117TH CONGRESS
1ST SESSION

S. 558

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 Committee on Water Management and Infrastructure.
- Sec. 14. National Weather Service hydrologic research fellowship program.
- Sec. 15. Identification and support of consistent, Federal set of forward-looking, long-term meteorological information.
- Sec. 16. Gap analysis on availability of snow-related data to assess and predict flood and flood impacts.
- Sec. 17. Availability to the public of flood-related data.

7 **SEC. 2. DEFINITIONS.**

8 In this Act:

9 (1) **ADMINISTRATOR.**—The term “Adminis-
 10 trator” means the Administrator of the National
 11 Oceanic and Atmospheric Administration.

12 (2) **STATE.**—The term “State” means each
 13 State of the United States, the District of Columbia,
 14 the Commonwealth of Puerto Rico, American
 15 Samoa, Guam, the Commonwealth of the Northern
 16 Mariana Islands, the Virgin Islands of the United

1 States, and any other territory or possession of the
2 United States.

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

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

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

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

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

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

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

24 (D) provides information described in sub-
25 paragraph (A), forecasts described in subpara-

1 graph (B), and assessments described in sub-
2 paragraph (C) at the national, regional, and
3 local levels, as appropriate; and

4 (E) communicates flood forecasts, flood
5 conditions, and flood impacts to appropriate en-
6 tities engaged in flood planning, preparedness,
7 and response and post-event flood extent, in-
8 cluding—

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

12 (ii) the public;

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

8 (a) PARTNERSHIPS.—

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

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

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

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

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

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

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

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

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

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

22 (c) RESPONSIBILITIES.—

23 (1) IN GENERAL.—Subject to paragraph (2),
 24 consistent with the analysis described in section 409
 25 of the Weather Research and Forecasting Innovation

1 Act of 2017 (Public Law 115–25; 131 Stat. 112),
2 and in order to increase impact-based decision sup-
3 port services, each service coordination hydrologist
4 designated under subsection (a) shall, with respect
5 to hydrology—

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

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

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

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

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

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

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

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 (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.

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

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

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

10 (A) conduct an assessment of—

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

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

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

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

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

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 Administrator may have
9 for—

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

13 (ii) such research as the Adminis-
14 trator considers necessary to address the
15 focus areas described in paragraph (3).

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

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

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

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

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

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

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

12 (B) other weather services;

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

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

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

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

1 warnings regarding flash floods for operational
2 decisions.

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

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

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

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

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

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

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

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

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

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

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

20 (c) DEFINITIONS.—In this section:

21 (1) WATCH; WARNING.—

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

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

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

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

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

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

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

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

21 (1) flow rate, including discharge;

22 (2) conductivity;

23 (3) oxygen concentration;

24 (4) nutrient load;

25 (5) water temperature; and

1 (6) sediment load.

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

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

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

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

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

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

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

24 “(c) INNOVATIVE OBSERVATIONS.—The Under Sec-
25 retary shall ensure that the program periodically examines

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

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

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

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

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

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

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

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

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

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

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

5 **SEC. 12. 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 shall establish
22 a program, to be known as the “NOAA Precipitation Fre-
23 quency Atlas of the United States”, to compile, estimate,
24 analyze, and communicate the frequency of precipitation
25 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 2022 through 2030.

3 **SEC. 13. INTERAGENCY COMMITTEE ON WATER MANAGE-**
4 **MENT AND INFRASTRUCTURE.**

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

9 (b) **MEMBERSHIP.**—The Water Policy Committee
10 shall be composed of the following members:

11 (1) The Administrator.

12 (2) The Secretary of the Interior.

13 (3) The Administrator of the Environmental
14 Protection Agency.

15 (4) The Secretary of Agriculture.

16 (5) The Secretary of Commerce.

17 (6) The Secretary of Energy.

18 (7) The Secretary of the Army.

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

21 (c) **CO-CHAIRS.**—The Water Policy Committee shall
22 be co-chaired by the Secretary of the Interior and the Ad-
23 ministrator of the Environmental Protection Agency.

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

4 (e) GENERAL PURPOSE AND DUTIES.—The Water
5 Policy Committee shall ensure that agencies and depart-
6 ments across the Federal Government that engage in
7 water-related matters, including water storage and sup-
8 plies, water quality and restoration activities, water infra-
9 structure, transportation on United States rivers and in-
10 land waterways, and water forecasting, work together
11 where such agencies and departments have joint or over-
12 lapping responsibilities to—

13 (1) improve interagency coordination among
14 Federal agencies and departments on water resource
15 management and water infrastructure issues;

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

19 (3) prioritize managing the water resources of
20 the United States and promoting resilience of the
21 water-related infrastructure of the United States, in-
22 cluding—

23 (A) increasing water storage, water supply
24 reliability, and drought resiliency;

1 (B) improving water quality, source water
2 protection, and nutrient management;

3 (C) promoting restoration activities;

4 (D) improving water systems, including
5 with respect to drinking water, desalination,
6 water reuse, wastewater, and flood control; and

7 (E) improving water data management, re-
8 search, modeling, and forecasting;

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

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

15 (6) support workforce development and efforts
16 to recruit, train, and retain professionals to operate
17 and maintain essential drinking water, wastewater,
18 flood control, hydropower, water delivery, and water
19 storage facilities in the United States.

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

1 **SEC. 14. NATIONAL WEATHER SERVICE HYDROLOGIC RE-**
2 **SEARCH FELLOWSHIP PROGRAM.**

3 (a) DEFINITIONS.—In this section:

4 (1) ASSISTANT ADMINISTRATOR.—The term
5 “Assistant Administrator” means the Assistant Ad-
6 ministrator for Weather Services of the National
7 Oceanic and Atmospheric Administration.

8 (2) DECISION SUPPORT SERVICES.—The term
9 “decision support services” means information, in-
10 cluding data and refined products, that supports
11 water resources-related decision-making processes.

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

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

19 (A) The National Ocean Service.

20 (B) The National Environmental Satellite,
21 Data, and Information Service.

22 (C) The National Marine Fisheries Service.

23 (D) The Office of Oceanic and Atmos-
24 pheric Research.

25 (E) The Office of Marine and Aviation Op-
26 erations.

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

3 (1) ESTABLISHMENT.—The Administrator shall
4 establish a hydrologic research fellowship program
5 (in this section referred to as the “program”) for
6 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 Assistant Administrator under
15 paragraph (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 Assistant Administrator.

4 (4) SELECTION PREFERENCE.—In selecting
5 qualified individuals for participation in the pro-
6 gram, the Assistant Administrator shall give pref-
7 erence to applicants from historically Black colleges
8 and universities and minority-serving institutions.

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

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

17 (7) FELLOWSHIP RESEARCH PRIORITIES.—The
18 Assistant Administrator, in consultation with rep-
19 resentatives from the NOAA line offices, the United
20 States Geological Survey, the Federal Emergency
21 Management Agency, and the Army Corps of Engi-
22 neers, as appropriate, shall develop and publish pri-
23 orities for the conduct of research by fellows, which
24 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 2022 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), large
6 hail, extreme heat, extreme cold, flooding, sustained
7 temperatures or precipitation that deviate substan-
8 tially from historical averages, and any other weath-
9 er event that the Administrator determines qualifies
10 as extreme weather.

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

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

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

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

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

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

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

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

1 Space, and Technology of the House of Representatives
2 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 Administrator 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 Administrator 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 September 30, 2021.

Attest:

Secretary.

117TH CONGRESS
1ST SESSION
S. 558

AN ACT

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