

118TH CONGRESS  
2D SESSION

# S. 5601

To improve the National Oceanic and Atmospheric Administration’s weather research, support improvements in weather forecasting and prediction, expand commercial opportunities for the provision of weather data, and for other purposes.

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## IN THE SENATE OF THE UNITED STATES

DECEMBER 18 (legislative day, DECEMBER 16), 2024

Ms. CANTWELL (for herself and Mr. CRUZ) introduced the following bill; which was read twice and referred to the Committee on Commerce, Science, and Transportation

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## A BILL

To improve the National Oceanic and Atmospheric Administration’s weather research, support improvements in weather forecasting and prediction, expand commercial opportunities for the provision of weather data, and for other purposes.

1       *Be it enacted by the Senate and House of Representa-*  
2       *tives of the United States of America in Congress assembled,*

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

4       (a) SHORT TITLE.—This Act may be cited as the  
5       “Weather Research and Forecasting Innovation Reauthor-  
6       ization Act of 2024” or the “Weather Act Reauthorization  
7       Act of 2024”.

- 1 (b) TABLE OF CONTENTS.—The table of contents for  
 2 this Act is as follows:

Sec. 1. Short title; table of contents.  
 Sec. 2. Definitions.

#### TITLE I—REAUTHORIZATION OF THE WEATHER RESEARCH AND FORECASTING INNOVATION ACT OF 2017

Sec. 101. Public safety priority.  
 Sec. 102. United States weather research and forecasting.  
 Sec. 103. Verification of the Origins of Rotation in Tornadoes Experiment -  
                   United States of America (VORTEX-USA).  
 Sec. 104. Hurricane forecast improvement program.  
 Sec. 105. Tsunami Warning and Education Act reauthorization.  
 Sec. 106. Observing system planning.  
 Sec. 107. Observing system simulation experiments.  
 Sec. 108. Computing resources prioritization.  
 Sec. 109. Earth prediction innovation center.  
 Sec. 110. Satellite architecture planning.  
 Sec. 111. Improving uncrewed activities.  
 Sec. 112. Interagency Council for Advancing Meteorological Services.  
 Sec. 113. Ocean observations.  
 Sec. 114. Consolidation of reports.  
 Sec. 115. Precipitation forecast improvement program.

#### TITLE II—ENHANCING FEDERAL WEATHER FORECASTING AND INNOVATION

Sec. 201. Weather innovation for the next generation.  
 Sec. 202. Radar next program.  
 Sec. 203. Data voids in highly vulnerable areas of the United States.  
 Sec. 204. Atmospheric rivers forecast improvement program.  
 Sec. 205. Coastal flooding and storm surge forecast improvement program.  
 Sec. 206. Aviation weather and data innovation.  
 Sec. 207. NESDIS partnership program, transition program, and operational  
                   planning.  
 Sec. 208. Advanced weather interactive processing system.  
 Sec. 209. Reanalysis and reforecasting.  
 Sec. 210. National Weather Service workforce.  
 Sec. 211. Artificial intelligence for weather forecasting.  
 Sec. 212. Composition of the atmosphere and atmospheric observations.  
 Sec. 213. Project to improve forecasts of coastal marine fog.

#### TITLE III—COMMERCIAL WEATHER AND ENVIRONMENTAL OBSERVATIONS

Sec. 301. Commercial Data Program.  
 Sec. 302. Commercial Data Pilot Program.  
 Sec. 303. Contracting authority and avoidance of duplication.  
 Sec. 304. Data assimilation, management, and sharing practices.  
 Sec. 305. Clerical amendment.

#### TITLE IV—COMMUNICATING WEATHER TO THE PUBLIC

Sec. 401. Definitions.

- Sec. 402. Hazardous weather or water event risk communication.
- Sec. 403. Hazard communication research and engagement.
- Sec. 404. National Weather Service communications improvement.
- Sec. 405. NOAA Weather Radio modernization.
- Sec. 406. Post-storm surveys and assessments.
- Sec. 407. Government Accountability Office report on alert dissemination for hazardous weather or water events.
- Sec. 408. Data collection management and protection.

#### TITLE V—IMPROVING WEATHER INFORMATION FOR AGRICULTURE AND WATER MANAGEMENT

- Sec. 501. Weather and climate information in agriculture and water management.
- Sec. 502. National integrated drought information system.
- Sec. 503. National Mesonet Program.
- Sec. 504. National Coordinated Soil Moisture Monitoring Network.
- Sec. 505. National Water Center.
- Sec. 506. Satellite transfers briefing.

#### TITLE VI—HARMFUL ALGAL BLOOM AND HYPOXIA RESEARCH AND CONTROL AMENDMENTS ACT OF 2024

- Sec. 601. Short title.
- Sec. 602. Amendments to the Harmful Algal Blooms and Hypoxia Research and Control Act of 1998.
- Sec. 603. Other harmful algal bloom matters.

#### TITLE VII—PREVENTING HEALTH EMERGENCIES AND TEMPERATURE-RELATED ILLNESS AND DEATHS ACT OF 2024

- Sec. 701. Short title.
- Sec. 702. Definitions.
- Sec. 703. National Integrated Heat Health Information System Interagency Committee.
- Sec. 704. National Integrated Heat Health Information System.
- Sec. 705. Authorization of appropriations.

#### TITLE VIII—NATIONAL LANDSLIDE PREPAREDNESS ACT REAUTHORIZATION ACT OF 2024

- Sec. 801. Short title.
- Sec. 802. Certain definitions under Flood Level Observation, Operations, and Decision Support Act.
- Sec. 803. Reauthorization of National Landslide Preparedness Act.

#### TITLE IX—ILLEGAL RED SNAPPER ENFORCEMENT ACT

- Sec. 901. Short title.
- Sec. 902. Methodology for identifying the country of origin of red snapper imported into the United States.

#### TITLE X—ACCELERATING NETWORKING, CYBERINFRASTRUCTURE, AND HARDWARE FOR OCEANIC RE- SEARCH ACT

- Sec. 1001. Short title.
- Sec. 1002. Definitions.

Sec. 1003. Plan to improve cybersecurity and telecommunications of U.S. Academic Research Fleet.

#### TITLE XI—OTHER AUTHORITIES

Sec. 1101. Meteorological observations in the Arctic region.

Sec. 1102. Unfunded priorities list, reports, and plans.

Sec. 1103. Miscellaneous authorities.

### 1 **SEC. 2. DEFINITIONS.**

2 (a) IN GENERAL.—In this Act, the terms “seasonal”,  
 3 “State”, “subseasonal”, “Under Secretary”, “weather en-  
 4 terprise”, “weather data”, and “weather industry” have  
 5 the meanings given such terms in section 2 of the Weather  
 6 Research and Forecasting Innovation Act of 2017 (15  
 7 U.S.C. 8501).

8 (b) WEATHER DATA DEFINED.—Section 2 of the  
 9 Weather Research and Forecasting Innovation Act of  
 10 2017 (15 U.S.C. 8501) is amended—

11 (1) by redesignating paragraph (5) as para-  
 12 graph (6); and

13 (2) by inserting after paragraph (4) the fol-  
 14 lowing new paragraph:

15 “(5) WEATHER DATA.—The term ‘weather  
 16 data’ means information used to track and predict  
 17 weather conditions and patterns, including forecasts,  
 18 observations, and derivative products from such in-  
 19 formation.”.

1 **TITLE I—REAUTHORIZATION OF**  
2 **THE WEATHER RESEARCH**  
3 **AND FORECASTING INNOVA-**  
4 **TION ACT OF 2017**

5 **SEC. 101. PUBLIC SAFETY PRIORITY.**

6 Section 101 of the Weather Research and Fore-  
7 casting Innovation Act of 2017 (15 U.S.C. 8511) is  
8 amended to read as follows:

9 **“SEC. 101. PUBLIC SAFETY PRIORITY.**

10 “(a) IN GENERAL.—The Under Secretary shall—

11 “(1) ensure the National Oceanic and Atmos-  
12 pheric Administration focuses on providing accurate  
13 and timely weather forecasts that protect lives and  
14 property and enhance the national economy;

15 “(2) through the Director of the National  
16 Weather Service, coordinate and implement observa-  
17 tional infrastructure, weather forecasting, commu-  
18 nications, and impact-based decision support serv-  
19 ices; and

20 “(3) work to improve operation weather fore-  
21 casts, products, and services through nimble, flexi-  
22 ble, and mobile methods.

23 “(b) RESEARCH.—In conducting research, the Under  
24 Secretary shall prioritize improving weather data, mod-  
25 eling, computing, forecasting, and warnings for the protec-

tion of life and property and for the enhancement of the  
national economy.”.

**SEC. 102. UNITED STATES WEATHER RESEARCH AND FORE-  
CASTING.**

Section 110 of the Weather Research and Fore-  
casting Innovation Act of 2017 (15 U.S.C. 8519) is  
amended to read as follows:

**“SEC. 110. AUTHORIZATION OF APPROPRIATIONS.**

“(a) AUTHORIZATION OF APPROPRIATIONS.—There  
are authorized to be appropriated to the Office of Oceanic  
and Atmospheric Research to carry out this title the fol-  
lowing:

“(1) \$163,794,000 for fiscal year 2025, of  
which—

“(A) \$91,058,000 is authorized for weath-  
er laboratories and cooperative institutes;

“(B) \$39,491,000 is authorized for the  
United States Weather Research Program;

“(C) \$21,125,000 is authorized for tornado,  
severe storm, and next generation radar re-  
search; and

“(D) \$12,120,000 is authorized for the  
joint technology transfer initiative described in  
section 102(b)(4) of this title.

1           “(2) \$165,432,000 for fiscal year 2026, of  
2       which—

3           “(A) \$91,968,000 is authorized for weath-  
4       er laboratories and cooperative institutes;

5           “(B) \$39,886,000 is authorized for the  
6       United States Weather Research Program;

7           “(C) \$21,336,000 is authorized for tor-  
8       nado, severe storm, and next generation radar  
9       research; and

10          “(D) \$12,241,000 is authorized for the  
11       joint technology transfer initiative described in  
12       section 102(b)(4) of this title.

13          “(3) \$167,086,000 for fiscal year 2027, of  
14       which—

15          “(A) \$92,888,000 is authorized for weath-  
16       er laboratories and cooperative institutes;

17          “(B) \$40,285,000 is authorized for the  
18       United States Weather Research Program;

19          “(C) \$21,550,000 is authorized for tor-  
20       nado, severe storm, and next generation radar  
21       research; and

22          “(D) \$12,364,000 is authorized for the  
23       joint technology transfer initiative described in  
24       section 102(b)(4) of this title.

1           “(4) \$168,757,000 for fiscal year 2028, of  
2       which—

3           “(A) \$93,817,000 is authorized for weath-  
4       er laboratories and cooperative institutes;

5           “(B) \$40,688,000 is authorized for the  
6       United States Weather Research Program;

7           “(C) \$21,765,000 is authorized for tor-  
8       nado, severe storm, and next generation radar  
9       research; and

10          “(D) \$12,487,000 is authorized for the  
11       joint technology transfer initiative described in  
12       section 102(b)(4) of this title.

13          “(5) \$170,444,000 for fiscal year 2029, of  
14       which—

15          “(A) \$94,755,000 is authorized for weath-  
16       er laboratories and cooperative institutes;

17          “(B) \$41,094,000 is authorized for the  
18       United States Weather Research Program;

19          “(C) \$21,983,000 is authorized for tor-  
20       nado, severe storm, and next generation radar  
21       research; and

22          “(D) \$12,612,000 is authorized for the  
23       joint technology transfer initiative described in  
24       section 102(b)(4) of this title.



1       “(b) LIMITATION.—No additional funds are author-  
 2 ized to carry out this title or the amendments made by  
 3 this title.”.

4   **SEC. 103. VERIFICATION OF THE ORIGINS OF ROTATION IN**  
 5                   **TORNADOES EXPERIMENT - UNITED STATES**  
 6                   **OF AMERICA (VORTEX-USA).**

7       (a) IN GENERAL.—Section 103 of the Weather Re-  
 8 search and Forecasting Innovation Act of 2017 (15 U.S.C.  
 9 8513) is amended to read as follows:

10   **“SEC. 103. VERIFICATION OF THE ORIGINS OF ROTATION IN**  
 11                   **TORNADOES EXPERIMENT - UNITED STATES**  
 12                   **OF AMERICA (VORTEX-USA).**

13       “(a) IN GENERAL.—The Under Secretary, in collabo-  
 14 ration with the United States weather industry and aca-  
 15 demic partners, shall maintain a program for rapidly im-  
 16 proving tornado forecasts, predictions, and warnings, in-  
 17 cluding forecaster training in radar interpretation and in-  
 18 formation integration from new sources.

19       “(b) GOAL.—The goal of the program under sub-  
 20 section (a) shall be to develop and extend accurate tornado  
 21 forecasts, predictions, and warnings in order to reduce the  
 22 loss of life or property related to tornadoes, with a focus  
 23 on the following:

24               “(1) Improving the effectiveness and timeliness  
 25       of tornado forecasts, predictions, and warnings.

1           “(2) Optimizing lead time and providing action-  
2           able information beyond one hour in advance.

3           “(3) Transitioning from warn-on-detection to  
4           warn-on-forecast.

5           “(c) INNOVATIVE OBSERVATIONS.—The Under Sec-  
6           retary shall ensure the program under subsection (a) peri-  
7           odically examines, tests, and evaluates the value of incor-  
8           porating innovative observations, such as novel sensor  
9           technologies, observation tools or networks, crewed or  
10          uncrewed systems, and hosted instruments on commercial  
11          aircrafts, vessels, and satellites, with respect to the im-  
12          provement of tornado forecasts, predictions, and warnings.

13          “(d) ACTIVITIES.—The Under Secretary shall award  
14          grants for research, including relating to the following:

15               “(1) Implementing key goals and achieving pro-  
16               gram milestones to the maximum extent practicable  
17               as outlined by the National Oceanic and Atmos-  
18               pheric Administration’s 2019 report, ‘Tornado  
19               Warning Improvement and Extension Program  
20               Plan’.

21               “(2) In coordination with the National Science  
22               and Technology Council’s Social and Behavioral  
23               Sciences Subcommittee, improving the social, behav-  
24               ioral, risk, communication, and economic sciences re-  
25               garding vulnerabilities, risk communication, and de-

1 livery of information critical for reducing the loss of  
 2 life or property related to tornadoes.

3 “(3) Improving the physical sciences, computer  
 4 modeling, and tools related to tornado formation, the  
 5 impacts of tornadoes on the built and natural envi-  
 6 ronment, and the interaction of tornadoes and hurri-  
 7 canes.

8 “(e) PRIORITY INSTITUTIONS.—

9 “(1) IN GENERAL.—In awarding grants under  
 10 subsection (d), the Under Secretary may prioritize  
 11 awarding grants to minority-serving institutions.

12 “(2) DEFINITION OF MINORITY-SERVING INSTI-  
 13 TUTION.—In this subsection, the term ‘minority-  
 14 serving institution’ means—

15 “(A) a part B institution (as defined in  
 16 section 322 of the Higher Education Act of  
 17 1965 (20 U.S.C. 1061));

18 “(B) a Hispanic-serving institution (as de-  
 19 fined in section 502(a) of that Act (20 U.S.C.  
 20 1101a(a)));

21 “(C) a Tribal College or University (as de-  
 22 fined in section 316(b) of that Act (20 U.S.C.  
 23 1059c(b)));

1 “(D) an Alaska Native-serving institution  
2 (as defined in section 317(b) of that Act (20  
3 U.S.C. 1059d(b)));

4 “(E) a Native Hawaiian-serving institution  
5 (as defined in section 317(b) of that Act (20  
6 U.S.C. 1059d(b)));

7 “(F) a Predominantly Black Institution  
8 (as defined in section 318(b) of that Act (20  
9 U.S.C. 1059e(b)));

10 “(G) an Asian American and Native Amer-  
11 ican Pacific Islander-serving institution (as de-  
12 fined in section 320(b) of that Act (20 U.S.C.  
13 1059g(b))); or

14 “(H) a Native American-serving, nontribal  
15 institution (as defined in section 319(b) of that  
16 Act (20 U.S.C. 1059f(b))).

17 “(f) WARNINGS.—In carrying out subsection (a), the  
18 Under Secretary, in coordination with the program estab-  
19 lished under section 403(a) of the Weather Act Reauthor-  
20 ization Act of 2024, shall—

21 “(1) conduct and transition to operations the  
22 research necessary to develop and deploy prob-  
23 abilistic weather forecast guidance technology for  
24 tornadoes and related weather phenomena;

1           “(2) incorporate into tornado modeling and  
2           forecasting, as appropriate, social, behavioral, risk,  
3           communication, and economic sciences;

4           “(3) enhance workforce training on radar inter-  
5           pretation and use of tornado warning systems; and

6           “(4) expand computational resources, including  
7           cloud computing, to support higher-resolution mod-  
8           eling to advance the capability for warn-on-forecast.

9           “(g) TORNADO RATING SYSTEM.—The Under Sec-  
10          retary, in collaboration with local communities and emer-  
11          gency managers, shall—

12           “(1) evaluate the system used as of the date of  
13          the enactment of this section to rate the severity of  
14          tornadoes;

15           “(2) determine whether updates to such system  
16          are required to ensure such ratings accurately reflect  
17          the severity of tornadoes; and

18           “(3) if determined necessary, update such sys-  
19          tem.

20           “(h) ANNUAL BUDGET.—The Under Secretary shall,  
21          not less frequently than annually, submit to Congress a  
22          proposed budget corresponding with carrying out this sec-  
23          tion.

24           “(i) AUTHORIZATION OF APPROPRIATIONS.—There is  
25          authorized to be appropriated to the Under Secretary to

1 carry out this section \$11,000,000 for each of fiscal years  
 2 2025 through 2030, of which not less than \$2,000,000  
 3 each fiscal year shall be used for prioritized grants award-  
 4 ed under subsection (e).”.

5 (b) CLERICAL AMENDMENT.—The table of contents  
 6 in section 1(b) of the Weather Research and Forecasting  
 7 Innovation Act of 2017 is amended by amending the item  
 8 relating to section 103 to read as follows:

“Sec. 103. Verification of the Origins of Rotation in Tornadoes Experiment -  
 United States of America (VORTEX-USA).”.

9 **SEC. 104. HURRICANE FORECAST IMPROVEMENT PRO-**  
 10 **GRAM.**

11 Section 104 of the Weather Research and Fore-  
 12 casting Innovation Act of 2017 (15 U.S.C. 8514) is  
 13 amended to read as follows:

14 **“SEC. 104. HURRICANE FORECAST IMPROVEMENT PRO-**  
 15 **GRAM.**

16 “(a) IN GENERAL.—The Under Secretary, in collabo-  
 17 ration with the United States weather industry and aca-  
 18 demic partners, shall maintain a program to improve hur-  
 19 ricane forecasting, predictions, and warnings.

20 “(b) GOAL.—The goal of the program under sub-  
 21 section (a) shall be to develop and extend accurate hurri-  
 22 cane forecasts, predictions, and warnings in order to re-  
 23 duce the loss of life or property related to hurricanes, with  
 24 a focus on the following:

1           “(1) Improving the understanding, prediction,  
2           and communication of rapid intensity change and  
3           projected path of hurricanes, including probabilistic  
4           methods for hurricane hazard mapping.

5           “(2) Improving the forecast and impact-based  
6           communication of inland flooding, compound flood-  
7           ing, and storm surges from hurricanes, in coordina-  
8           tion with the program established under section 205  
9           of the Weather Act Reauthorization Act of 2024.

10           “(3) Incorporating social, behavioral, risk, com-  
11           munication, and economic sciences to clearly inform  
12           response to prevent the loss of life or property.

13           “(4) Evaluating and incorporating, as appro-  
14           priate, innovative observations, including acoustic or  
15           infrasonic measurements, novel sensor technologies,  
16           observation tools or networks, crewed or uncrewed  
17           systems, and hosted instruments on commercial air-  
18           crafts, vessels, and satellites.

19           “(c) ACTIVITIES.—In carrying out subsection (a), the  
20           Under Secretary shall award grants for research, includ-  
21           ing relating to the following:

22           “(1) Implementing key strategies and following  
23           priorities and objectives outlined by the National  
24           Oceanic and Atmospheric Administration’s 2019 re-  
25           port ‘Hurricane Forecast Improvement Program’.

1           “(2) In coordination with the National Science  
2           and Technology Council’s Social and Behavioral  
3           Sciences Subcommittee and other relevant inter-  
4           agency committees, improving the social, behavioral,  
5           risk, communications, and economic sciences related  
6           to vulnerabilities, risk communication, and delivery  
7           of information critical for reducing the loss of life or  
8           property related to hurricanes.

9           “(3) Improving the physical sciences, oper-  
10          ational modeling, and tools related to hurricane for-  
11          mation, the impacts of wind and water-based hurri-  
12          cane hazards on the built and natural environment,  
13          and the interaction of hurricanes and tornadoes.

14          “(d) WARNINGS.—In carrying out subsection (a), the  
15          Under Secretary, in coordination with the program estab-  
16          lished under section 403(a) of the Weather Act Reauthor-  
17          ization Act of 2024, shall—

18                 “(1) conduct and transition to operations the  
19                 research necessary to develop and deploy prob-  
20                 abilistic weather forecast guidance technology relat-  
21                 ing to hurricanes and related weather phenomena;

22                 “(2) incorporate into hurricane modeling and  
23                 forecasting, as appropriate, social, behavioral, risk,  
24                 communication, and economic sciences research; and



1           “(3) expand computational resources, including  
2           cloud computing, to support and improve higher-res-  
3           olution operational modeling of hurricanes and re-  
4           lated weather phenomena.

5           “(e) ANNUAL REPORT.—Not later than June 1 of  
6           each year until 2029, the Under Secretary, in consultation  
7           with the Secretary of Defense, shall submit to the Com-  
8           mittee on Commerce, Science, and Transportation of the  
9           Senate and the Committee on Science, Space, and Tech-  
10          nology of the House of Representatives a report that in-  
11          cludes the following:

12           “(1) The number and causes of missed mission  
13           requirements for the National Hurricane Operations  
14           Plan and the National Winter Season Operations  
15           Plan, including those related to equipment malfunc-  
16           tion, aircraft availability, aircraft maintenance, flight  
17           hour limits, and availability of pilots or other air and  
18           maintenance crew members.

19           “(2) Requirements related to the plans de-  
20           scribed in paragraph (1) that were requested by  
21           forecasters but not tasked, and the reasons why  
22           those were not tasked.

23           “(3) A workforce management plan addressing  
24           any shortfalls in human capital resources that are

1 necessary for hurricane observational data collection  
 2 aboard aircraft or uncrewed systems.

3 “(4) A summary of—

4 “(A) hurricane technology that is under re-  
 5 search and development to improve confidence  
 6 in hurricane track and intensity predictions;

7 “(B) hurricane technology that is at the  
 8 prototype demonstration stage or beyond; and

9 “(C) plans for transitioning the hurricane  
 10 technology described in subparagraph (B) into  
 11 operations.”.

12 **SEC. 105. TSUNAMI WARNING AND EDUCATION ACT REAU-**  
 13 **THORIZATION.**

14 (a) **TITLE HEADING.**—The Tsunami Warning and  
 15 Education Act (enacted as title VIII of the Magnuson-Ste-  
 16 vens Fishery Conservation and Management Reauthoriza-  
 17 tion Act of 2006 (Public Law 109–479)) is amended in  
 18 the title heading, by inserting “**RESEARCH,**” after  
 19 “**WARNING,**”.

20 (b) **PURPOSES.**—Section 803 of the Tsunami Warn-  
 21 ing and Education Act (33 U.S.C. 3202) is amended—

22 (1) in paragraph (2), by inserting “timeliness  
 23 and” before “accuracy”;

24 (2) in paragraph (7), by striking “and” after  
 25 the semicolon;

1           (3) in paragraph (8), by striking the period and  
2           inserting “; and”; and

3           (4) by adding at the end the following new  
4           paragraph:

5           “(9) to ensure data and metadata are managed,  
6           archived, and made available for operations, re-  
7           search, education, and mitigation activities in ac-  
8           cordance with section 305 of the Weather Research  
9           and Forecasting Innovation Act of 2017.”.

10          (c) TSUNAMI FORECASTING AND WARNING PRO-  
11          GRAM.—Section 804 of the Tsunami Warning and Edu-  
12          cation Act (33 U.S.C. 3203) is amended—

13                 (1) in subsection (b)—

14                         (A) in paragraph (4), by inserting “, using  
15                         industry and scientific best practices,” after  
16                         “operational condition”;

17                         (B) in paragraph (5)—

18                                 (i) in subparagraph (C), by striking  
19                                 “global seismic network” and inserting  
20                                 “Global Seismic Network”;

21                                 (ii) by redesignating subparagraphs  
22                                 (D), (E), (F), and (G), as subparagraphs  
23                                 (E), (F), (G), and (H), respectively; and

24                                 (iii) by inserting after subparagraph  
25                                 (C) the following new subparagraph:

1 “(D) the global navigation satellite system  
2 (GNSS) network;”;

3 (C) by amending paragraph (6) to read as  
4 follows:

5 “(6) ensure data quality and management sys-  
6 tems, support data and metadata access and  
7 archiving, and support the requirements of the pro-  
8 gram pursuant to the Foundations for Evidence-  
9 Based Policymaking Act of 2018 (Public Law 115–  
10 435) and chapter 31 of title 44, United States  
11 Code;”;

12 (D) in paragraph (7)—

13 (i) by amending the matter preceding  
14 subparagraph (A) to read as follows: “in-  
15 clude a cooperative effort among the Ad-  
16 ministration, the United States Geological  
17 Survey (USGS), the National Aeronautics  
18 and Space Administration (NASA), and  
19 the National Science Foundation (NSF)  
20 under which the Director of USGS, the Di-  
21 rector of the NSF, and the Administrator  
22 of NASA shall—”;

23 (ii) in subparagraph (A), by striking  
24 “and” at the end; and

1 (iii) by adding at the end the fol-  
 2 lowing new subparagraphs:

3 “(C) provide reliable and real-time support  
 4 for the GNSS network data streams from NSF,  
 5 NASA, and USGS maintained networks, and  
 6 supplement instrumentation coverage for rapid  
 7 earthquake assessment;

8 “(D) assess the data and information re-  
 9 lating to warning systems of collaborating agen-  
 10 cies for potential utilization in NOAA’s warning  
 11 system, taking into consideration advancement  
 12 in research and technology;

13 “(E) incorporate, as practicable, tsunami  
 14 notifications and warnings in the USGS Earth-  
 15 quake Early Warning System; and

16 “(F) incorporate, as practicable, prelimi-  
 17 nary analysis or data from the National Earth-  
 18 quake Information Center regarding the source  
 19 and magnitude of an offshore earthquake with-  
 20 in five minutes of detection;”;

21 (E) in paragraph (8)—

22 (i) by inserting “ and decision support  
 23 aides” after “graphical warning prod-  
 24 ucts,”; and

1 (ii) by inserting “-prone” after “tsu-  
2 nami”;

3 (F) in paragraph (9), by striking “and”  
4 after the semicolon;

5 (G) in paragraph (10), by striking the pe-  
6 riod and inserting “; and”; and

7 (H) by adding at the end the following new  
8 paragraph:

9 “(11) update tsunami inundation maps, models,  
10 or other geographic products, in order to best sup-  
11 port, as appropriate, relevant agencies with tsunami  
12 mitigation and recovery activities.”;

13 (2) in subsection (c)—

14 (A) by striking paragraph (1) and redesign-  
15 ating paragraphs (2) and (3) as paragraphs  
16 (1) and (2), respectively; and

17 (B) in paragraph (1), as so redesignated—

18 (i) by striking “the Atlantic Ocean,  
19 including the Caribbean Sea and Gulf of  
20 Mexico, that are determined—” and insert-  
21 ing “the Pacific, Arctic, and Atlantic  
22 Oceans, including the Caribbean Sea and  
23 Gulf of Mexico, that are determined to  
24 pose significant risks of tsunami for States

1 and United States territories along the  
2 coastal areas of such regions; and”;

3 (ii) by striking subparagraphs (A) and  
4 (B);

5 (3) by redesignating subsections (d), (e), (f),  
6 and (g) as subsections (e), (f), (g), and (h), respec-  
7 tively;

8 (4) by inserting after subsection (c) the fol-  
9 lowing new subsection:

10 “(d) TSUNAMI WARNING ALERT LEVEL EVALUA-  
11 TION.—The Administrator, in collaboration with social sci-  
12 entists, emergency personnel, and high-risk communities,  
13 shall—

14 “(1) evaluate tsunami alert levels terminology,  
15 timing, and effectiveness;

16 “(2) determine if such alerts produce the de-  
17 sired response and understanding from possible tsu-  
18 nami-prone communities; and

19 “(3) if necessary, update the alert level system  
20 for increased effectiveness.”;

21 (5) in subsection (e), as so redesignated—

22 (A) in paragraph (1)—

23 (i) in the matter preceding subpara-  
24 graph (A), by inserting “responsible for  
25 Alaska, the continental United States, Ha-

1 waii, United States territories, and inter-  
2 national entities the Administrator deter-  
3 mines appropriate” before the period;

4 (ii) in subparagraph (A), by striking  
5 “which is primarily responsible for Alaska  
6 and the continental United States”; and

7 (iii) in subparagraph (B), by striking  
8 “, which is primarily responsible for Ha-  
9 waii, the Caribbean, and other areas of the  
10 Pacific not covered by the National Cen-  
11 ter”;

12 (B) in paragraph (2)—

13 (i) in subparagraph (A), by inserting  
14 “current,” after “sea level,”;

15 (ii) in subparagraph (B), by striking  
16 “and volcanic eruptions” and inserting  
17 “volcanic eruptions, or other sources”;

18 (iii) in subparagraph (C), by striking  
19 “buoy data and tidal” and inserting “and  
20 coastal”;

21 (iv) in subparagraph (E), by striking  
22 “Integrated Ocean Observing System of  
23 the Administration” and inserting “United  
24 States and global ocean and coastal observ-  
25 ing system”;



1 (v) in subparagraph (H), by inserting  
2 “monitoring needs,” after “response,”; and

3 (vi) by amending subparagraph (I) to  
4 read as follows:

5 “(I) Providing a Tsunami Warning Coordi-  
6 nator to coordinate with partners and stake-  
7 holders products and services of the centers  
8 supported or maintained under paragraph (1).”;

9 (C) by amending paragraph (3) to read as  
10 follows:

11 “(3) FAIL-SAFE WARNING CAPABILITY.—The  
12 Administrator shall support and maintain fail-safe  
13 warning capability for the tsunami warning centers  
14 supported or maintained under paragraph (1), and  
15 such centers shall conduct at least one service back  
16 up drill biannually.”;

17 (D) in paragraph (4)—

18 (i) by amending the matter preceding  
19 subparagraph (A) to read as follows: “The  
20 Administrator shall coordinate with the  
21 weather forecast offices of the National  
22 Weather Service, the centers supported or  
23 maintained under paragraph (1), and such  
24 national and regional program offices of  
25 the Administration as the Administrator or

the coordinating committee, as established in section 805(b), consider appropriate to ensure that regional and local weather forecast offices—”;

(ii) in subparagraph (B), by striking “and” after the semicolon;

(iii) in subparagraph (C), by striking the period and inserting “; and”; and

(iv) by adding at the end the following new subparagraph:

“(D) conduct education and outreach efforts to help prepare coastal communities for tsunami hazards.”;

(E) in paragraph (5)—

(i) in the section heading, by striking “UNIFORM” and inserting “STANDARDIZED”;

(ii) in subparagraph (A), by striking “uniform” and inserting “standardized”;

(iii) in subparagraph (C)(ii), by striking “uniform” and inserting “standardized”;

(iv) in subparagraph (D), by striking “and” after the semicolon;

1 (v) in subparagraph (E), by striking  
 2 the period and inserting “; and”; and

3 (vi) by adding at the end the following  
 4 new subparagraph:

5 “(F) align the analytic techniques and  
 6 methodologies of the existing tsunami warning  
 7 centers supported or maintained under para-  
 8 graph (1) to ensure seamless continuity of oper-  
 9 ations and mitigate risk of operational failure  
 10 by prioritizing investments that include—

11 “(i) replacing end of life equipment;

12 “(ii) ensuring product consistency;

13 “(iii) enabling consistent operational  
 14 process for backup capabilities;

15 “(iv) mitigating existing operational  
 16 security risks; and

17 “(v) meeting information security re-  
 18 quirements specified in chapter 35 of title  
 19 44, United States Code.”; and

20 (F) by adding at the end the following new  
 21 paragraph:

22 “(7) REPORTING.—Not later than 180 days  
 23 after the date of the enactment of this paragraph  
 24 and annually thereafter until such time as all rel-  
 25 evant requirements have been satisfied, the Adminis-

1       trator shall provide to the Committee on Science,  
2       Space, and Technology of the House of Representa-  
3       tives and the Committee on Commerce, Science, and  
4       Transportation of the Senate an update briefing on  
5       the progress of the following:

6               “(A) Standardizing products and proce-  
7               dures under paragraph (5), including tsunami  
8               assessments, forecast guidance, and related  
9               products.

10              “(B) Migrating the message generation  
11              systems of the centers supported or maintained  
12              under paragraph (1) to the Advanced Weather  
13              Information Processing Systems, or successor  
14              systems.

15              “(C) The structural reorganization effort,  
16              if necessary, to align such centers’ organiza-  
17              tional charts.

18              “(D) The expected timeline for the full  
19              completion of standardizing such centers’ prod-  
20              ucts and procedures.”;

21       (6) in subsection (f), as so redesignated—

22               (A) in paragraph (1)—

23                   (i) in the matter preceding subpara-  
24                   graph (A), by inserting “detect, measure,  
25                   and” after “used to”;

1 (ii) in subparagraph (B), by striking  
2 “and” after the semicolon;

3 (iii) in subparagraph (C), by striking  
4 “and the Advanced National Seismic Sys-  
5 tem” and inserting “the Advanced Na-  
6 tional Seismic System, and the global navi-  
7 gation satellite system (GNSS); and”; and

8 (iv) by adding at the end the following  
9 new subparagraph:

10 “(D) ensure research is coordinated with  
11 tsunami warning operations;”; and

12 (B) in paragraph (3), by inserting “accord-  
13 ing to industry best practices” before the pe-  
14 riod; and

15 (7) in subsection (h)(2)(A), as so redesignated,  
16 by striking “accuracy of the tsunami model used”  
17 and inserting “timeliness and accuracy of the fore-  
18 cast used to issue the warning”.

19 (d) NATIONAL TSUNAMI HAZARD MITIGATION PRO-  
20 GRAM.—Section 805(c) of the Tsunami Warning and Edu-  
21 cation Act (33 U.S.C. 3204(c)) is amended—

22 (1) in paragraph (5)—

23 (A) by redesignating subparagraphs (B),  
24 (C), (D), (E), (F), and (G) as subparagraphs  
25 (C), (D), (E), (F), (G), and (H), respectively;

1 (B) by inserting after subparagraph (A)  
 2 the following new subparagraph:

3 “(B) Coastal digital elevation models  
 4 (DEMs) to support the development of inunda-  
 5 tion maps.”; and

6 (C) by adding at the end the following new  
 7 subparagraphs:

8 “(I) Evaluation of the variation of inunda-  
 9 tion impact resulting from tsunami-driven sedi-  
 10 ment transport.

11 “(J) Evaluation of tsunami debris impact  
 12 on critical infrastructure (as such term is de-  
 13 fined in section 1016(e) of Public Law 107–56  
 14 (42 U.S.C. 5195c(e))) and lifelines.

15 “(K) High-resolution and high-quality dig-  
 16 ital elevation models needed for at-risk coast-  
 17 lines, ports, and harbors, particularly for re-  
 18 gions not covered by existing inundation  
 19 maps.”; and

20 (2) in paragraph (7)(C), by inserting “and be-  
 21 havioral” after “social”;

22 (e) TSUNAMI RESEARCH PROGRAM.—Section 806 of  
 23 the Tsunami Warning and Education Act (33 U.S.C.  
 24 3205) is amended—

25 (1) in subsection (a)—

1 (A) by striking “section 805(d)” and in-  
 2 serting “section 805(b)”;

3 (B) by inserting “and management” after  
 4 “data collection”;  
 5 (2) in subsection (b)—

6 (A) in paragraph (1), by inserting “deploy-  
 7 ment and” after “may include”;

8 (B) in paragraph (3), by striking “social  
 9 science research” and inserting “social and be-  
 10 havioral science research, including data collec-  
 11 tion,”;

12 (C) in paragraph (4), by striking “and”  
 13 after the semicolon;

14 (D) by redesignating paragraph (5) as  
 15 paragraph (7); and

16 (E) by inserting after paragraph (4) the  
 17 following new paragraphs:

18 “(5) develop decision support tools;

19 “(6) leverage and prioritize research opportuni-  
 20 ties; and”;

21 (3) by adding at the end the following new sub-  
 22 section:

23 “(c) RESEARCH AND DEVELOPMENT PLAN.—Not  
 24 later than 12 months after the date of the enactment of  
 25 this subsection and not less frequently than every 36

1 months thereafter, the Administrator, in consultation with  
2 the Interagency Council for Advancing Meteorological  
3 Services, shall develop a research and development and re-  
4 search to operations plan to improve tsunami detection  
5 and forecasting capabilities that—

6 “(1) identifies and prioritizes research and de-  
7 velopment priorities to satisfy section 804;

8 “(2) identifies key research needs for better de-  
9 tecting tsunamis that may occur in open ocean and  
10 along the coastlines of the United States and its ter-  
11 ritories, improve forecasting of tsunamis that are  
12 not seismically driven, and other opportunities deter-  
13 mined appropriate;

14 “(3) develops plans for transitioning research to  
15 operations; and

16 “(4) identifies collaboration opportunities that  
17 may further and align tsunami research, develop-  
18 ment, warnings, and operations between the centers  
19 supported or maintained under section 804, the Na-  
20 tional Tsunami Hazard Mitigation Program, the Na-  
21 tional Oceanic and Atmospheric Administration Cen-  
22 ter for Tsunami Research, the National Science  
23 Foundation, the United States Geological Survey,  
24 the Federal Emergency Management Agency, insti-



1       tutions of higher education, private entities, stake-  
 2       holders, and others determined appropriate.”;

3       (f) ASSESSMENT OF TSUNAMI WATCHES AND WARN-  
 4       INGS.—

5               (1) IN GENERAL.—The Tsunami Warning and  
 6       Education Act (enacted as title VIII of the Magnu-  
 7       son-Stevens Fishery Conservation and Management  
 8       Reauthorization Act of 2006 (Public Law 109–479))  
 9       is amended by inserting after section 804 (33 U.S.C.  
 10      3203) the following:

11   **“SEC. 804A. ASSESSMENT OF TSUNAMI WATCHES AND**  
 12       **WARNINGS.**

13       “(a) ASSESSMENT OF TSUNAMI WATCHES AND  
 14       WARNINGS.—

15               “(1) IN GENERAL.—Not later than 2 years  
 16       after the date of the enactment of this Act, the  
 17       Under Secretary shall—

18                       “(A) conduct an assessment of—

19                               “(i) the tsunami watches and warn-  
 20                               ings of the National Weather Service; and

21                               “(ii) the information delivery to sup-  
 22                               port preparation and responses to  
 23                               tsunamis; and

1 “(B) submit to Congress a report on the  
2 findings of the Under Secretary with respect to  
3 the assessment required by subparagraph (A).

4 “(2) ELEMENTS.—The assessment required by  
5 paragraph (1)(A) shall include the following:

6 “(A) An evaluation of whether the watch-  
7 es, warnings, and information described in  
8 paragraph (1)(A) effectively—

9 “(i) communicate risk to the general  
10 public;

11 “(ii) inform action to prevent loss of  
12 life and property;

13 “(iii) inform action to support tsu-  
14 nami preparation and response; and

15 “(iv) deliver information in a manner  
16 designed to lead to appropriate action.

17 “(B) Subject to subsection (b)(2), such  
18 recommendations as the Under Secretary may  
19 have for—

20 “(i) legislative and administrative ac-  
21 tion to improve the watches and warnings  
22 described in paragraph (1)(A)(i); and

23 “(ii) such research as the Under Sec-  
24 retary considers necessary to address the  
25 focus areas described in paragraph (3).

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

4           “(A) Ways to communicate the risks posed  
5       by hazardous tsunami events to the public that  
6       are most likely to result in informed decision  
7       making regarding the mitigation of those risks.

8           “(B) Ways to provide actionable geo-  
9       graphic information to the recipient of a watch  
10      or warning for tsunami, including partnering  
11      with emergency response agencies, as appro-  
12      priate.

13          “(C) Evaluation of information delivery to  
14      support the preparation for and response to  
15      tsunamis

16          “(4) CONSULTATION.—In conducting the as-  
17      sessment required by paragraph (1)(A), the Under  
18      Secretary shall consult with—

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

22          “(B) other weather services;

23          “(C) media outlets and other entities that  
24      distribute the watches and warnings described  
25      in paragraph (1)(A)(i);

1           “(D) emergency planners and responders,  
2           including State, local, and Tribal emergency  
3           management agencies;

4           “(E) other government users of the watch-  
5           es and warnings described in paragraph  
6           (1)(A)(i), including the Federal Highway Ad-  
7           ministration; and

8           “(F) such other Federal agencies as the  
9           Under Secretary determines rely on watches  
10          and warnings regarding tsunamis for oper-  
11          ational decisions.

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

18          “(b) IMPROVEMENTS TO TSUNAMI WATCHES AND  
19          WARNINGS.—

20               “(1) IN GENERAL.—Based on the assessment  
21          required by subsection (a)(1)(A), the Under Sec-  
22          retary shall make such improvements to the watches  
23          and warnings described in that subsection as the  
24          Under Secretary considers necessary—

1 “(A) to improve the communication of the  
2 risks posed by tsunami events; and

3 “(B) to provide actionable geographic in-  
4 formation to the recipient of a watch or warn-  
5 ing for a tsunami.

6 “(2) REQUIREMENTS REGARDING REC-  
7 OMMENDATIONS.—In conducting the assessment re-  
8 quired by subsection (a)(1)(A), the Under Secretary  
9 shall ensure that any recommendation under sub-  
10 section (a)(2)(B) that the Under Secretary considers  
11 a major change—

12 “(A) is validated by social and behavioral  
13 science using a generalizable sample;

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

17 “(C) responds to the needs of Federal,  
18 State, local, and Tribal government partners  
19 and media partners; and

20 “(D) accounts for necessary changes to  
21 Federally operated watch and warning propaga-  
22 tion and dissemination infrastructure and pro-  
23 tocols.”.

24 (2) CLERICAL AMENDMENT.—The table of con-  
25 tents for the Tsunami Warning and Education Act

1 (enacted as title VIII of the Magnuson-Stevens Fish-  
 2 ery Conservation and Management Reauthorization  
 3 Act of 2006 (Public Law 109–479)) is amended by  
 4 inserting after the item relating to section 804 the  
 5 following:

“Sec. 804A. Assessment of tsunami watches and warnings.”.

6 (g) GLOBAL TSUNAMI WARNING AND MITIGATION  
 7 NETWORK.—Section 807(d) of the Tsunami Warning and  
 8 Education Act (33 U.S.C. 3206(d)) is amended by insert-  
 9 ing “and management” after “data sharing”;

10 (h) TSUNAMI SCIENCE AND TECHNOLOGY ADVISORY  
 11 PANEL.—Section 808 of the Tsunami Warning and Edu-  
 12 cation Act (33 U.S.C. 3206a) is amended—

13 (1) in subsection (b)(1), by inserting “and be-  
 14 havioral” after “social”; and

15 (2) by adding at the end the following:

16 “(e) SUNSET.—The Panel shall terminate not later  
 17 than six years after the date of the enactment of the  
 18 Weather Act Reauthorization Act of 2024.”.

19 (i) AUTHORIZATION OF APPROPRIATIONS.—Section  
 20 809 of the Tsunami Warning and Education Act (33  
 21 U.S.C. 3207) is amended to read as follows:

22 **“SEC. 809. AUTHORIZATION OF APPROPRIATIONS.**

23 “There are authorized to be appropriated to the Ad-  
 24 ministrator to carry out this title \$30,000,000 for each  
 25 of fiscal years 2024 through 2028, of which—

1           “(1) not less than 27 percent of the amount ap-  
 2           propriated for each fiscal year shall be for activities  
 3           conducted at the State level under the national tsu-  
 4           nami hazard mitigation program under section 805;  
 5           and

6           “(2) not less than 8 percent of the amount ap-  
 7           propriated shall be for the tsunami research pro-  
 8           gram under section 806.”.

9   **SEC. 106. OBSERVING SYSTEM PLANNING.**

10       Section 106 of the Weather Research and Fore-  
 11       casting Innovation Act of 2017 (15 U.S.C. 8516) is  
 12       amended—

13           (1) in paragraph (3)—

14               (A) by inserting “Federal” before “observ-  
 15               ing capabilities”; and

16               (B) by striking “and” after the semicolon;

17           (2) in paragraph (4)—

18               (A) by inserting “, including private sector  
 19               partnerships or commercial acquisition,” after  
 20               “options”; and

21               (B) by striking the period and inserting a  
 22               semicolon; and

23           (3) by adding at the end the following new  
 24       paragraphs:

1           “(5) compare costs and schedule, including  
 2           cost-benefit analysis, of Federal and private sector  
 3           supplemental options to fill the observation data re-  
 4           quirements under paragraph (1) and gaps identified  
 5           pursuant to paragraph (3); and

6           “(6) not later than one year after the date of  
 7           the enactment of the Weather Act Reauthorization  
 8           Act of 2024, submit to Congress a report that pro-  
 9           vides an analysis of the technical, schedule, cost, and  
 10          cost benefit analyses to place an operational polar-  
 11          orbiting environmental satellite capability in the  
 12          early morning orbit to support the weather enter-  
 13          prise and the Administration’s mission.”.

14 **SEC. 107. OBSERVING SYSTEM SIMULATION EXPERIMENTS.**

15          Section 107 of the Weather Research and Fore-  
 16          casting Innovation Act of 2017 (15 U.S.C. 8517) is  
 17          amended—

18               (1) in subsection (b)(3), by striking “providing  
 19               data” and inserting “comparison to current or ex-  
 20               perimental commercial system capabilities that pro-  
 21               vide data”;

22               (2) in subsection (c)(1), by striking “, including  
 23               polar-orbiting and geostationary satellite systems,”;

24               (3) by striking subsection (d); and



1           (4) by redesignating subsection (e) as sub-  
2           section (d).

3   **SEC. 108. COMPUTING RESOURCES PRIORITIZATION.**

4           (a) COMPUTING RESEARCH INITIATIVE.—Section  
5   108 of the Weather Research and Forecasting Innovation  
6   Act of 2017 (15 U.S.C. 8518) is amended by striking sub-  
7   section (a)(3)(C) and all that follows through subsection  
8   (b)(7) and inserting the following:

9           “(b) ARTIFICIAL INTELLIGENCE INVESTMENTS.—  
10   The Under Secretary shall leverage artificial intelligence  
11   and machine learning technologies to facilitate, optimize,  
12   and further leverage advanced computing to accomplish  
13   critical missions of the National Oceanic and Atmospheric  
14   Administration.

15          “(c) CENTERS OF EXCELLENCE.—The Under Sec-  
16   retary may expand, and where applicable establish, centers  
17   of excellence to aid the adoption of next-generation artifi-  
18   cial intelligence and machine learning enabled advanced  
19   computing capabilities. Each such center may carry out  
20   activities that include the following:

21               “(1) Leveraging robust public-private partner-  
22               ship models to provide access to training, experience,  
23               and long-term development of workforce and infra-  
24               structure.

1           “(2) Developing and optimizing tools, libraries,  
2           algorithms, data structures, and other supporting  
3           software necessary for specific applications on high  
4           performance computing systems.

5           “(3) Applying modern artificial intelligence,  
6           deep machine-learning, and advanced data analysis  
7           technologies to address current and future mission  
8           challenges.

9           “(4) To the maximum extent practicable, ex-  
10          ploring quantum computing and related application  
11          partnerships with public, private, and academic enti-  
12          ties to improve the accuracy and resolution of weath-  
13          er predictions.

14          “(d) MULTI-YEAR CONTRACTS.—The Under Sec-  
15          retary may enter into multi-year contracts in accordance  
16          with section 3903 of title 41, United States Code, and  
17          shall ensure compliance with all contract clauses provided  
18          in such section to support operations, research, and devel-  
19          opment related to high performance and cloud computing  
20          infrastructure or systems with an unfunded contingent li-  
21          ability in the event of cancellation.

22          “(e) REPORT.—Not later than two years after the  
23          date of the enactment of the Weather Act Reauthorization  
24          Act of 2024, the Under Secretary, in collaboration with  
25          the Secretary of Energy shall submit to the Committee

1 on Science, Space, and Technology of the House of Rep-  
2 resentatives and the Committee on Commerce, Science,  
3 and Transportation and the Committee on Energy and  
4 Natural Resources of the Senate a report evaluating the  
5 following:

6           “(1) A best estimate of the overall value of  
7       high-resolution probabilistic forecast guidance for  
8       hazardous weather or water events (as such term is  
9       defined in section 401 of the Weather Act Reauthor-  
10      ization Act of 2024) using a next-generation weather  
11      forecast and warning framework.

12           “(2) The needs for cloud computing, quantum  
13      computing, or high-performance computing, visual-  
14      ization, and dissemination collaboration between the  
15      Department of Energy and the National Oceanic  
16      and Atmospheric Administration.

17           “(3) A timeline and guidance for implementa-  
18      tion of the following:

19                   “(A) High-resolution numerical weather  
20                   prediction models.

21                   “(B) Methods for meeting the cloud com-  
22                   puting, quantum computing, or high-perform-  
23                   ance computing, visualization, and dissemina-  
24                   tion needs identified under paragraph (2).”.

1 (b) STRATEGIC PLAN ON HIGH-PERFORMANCE COM-  
2 PUTING AND DATA MANAGEMENT NEEDS.—

3 (1) IN GENERAL.—The Under Secretary shall  
4 make publicly available not later than one year after  
5 the date of the enactment of this Act, and update  
6 every 5 years thereafter until 2035, a 10-year stra-  
7 tegic plan that outlines the high-performance com-  
8 puting and data management requirements and  
9 needs of the National Oceanic and Atmospheric Ad-  
10 ministration and actions and strategies to address  
11 those requirements and needs.

12 (2) PLAN ELEMENTS.—At a minimum, the  
13 strategic plan required by paragraph (1) shall in-  
14 clude the following:

15 (A) A 10-year prospective outlook of com-  
16 puting resources and upgrades needed to meet  
17 the mission needs of the National Oceanic and  
18 Atmospheric Administration for fisheries man-  
19 agement, oceanographic forecasting, and eco-  
20 logical forecasting missions.

21 (B) A discussion of—

22 (i) computing and processing re-  
23 sources of the Administration and a 10-  
24 year projected need for such resources,

1 disaggregated by line office of the Admin-  
2 istration;

3 (ii) facilities, commercial contracts,  
4 and partnerships (with other Federal agen-  
5 cies or other institutions or entities) of the  
6 Administration that are providing com-  
7 puting and data management support or  
8 capacity as of such date;

9 (iii) the use by the Administration of  
10 cloud computing and other emerging tech-  
11 nologies, such as artificial intelligence and  
12 machine learning;

13 (iv) additional technologies that have  
14 the potential to increase effectiveness and  
15 efficiency for data storage and processing  
16 power, including challenges to access and  
17 use of those technologies;

18 (v) the distribution of computing re-  
19 sources among the operations and research  
20 functions of the Administration;

21 (vi) products and services of the Ad-  
22 ministration that have not become avail-  
23 able to the public because of a lack of com-  
24 puting resources;

(vii) current and future workforce development needs, such as information technology and software engineering, of the Administration; and

(viii) the high-performance computing requirements of the Administration, with a special focus on requirements that are common across line offices of the Administration.

(C) Timelines, and performance measures for assessing progress toward attaining goals for—

(i) computing infrastructure and architecture of the Administration (including facilities, hardware, and software); and

(ii) use by the Administration of technologies that will increase effectiveness and efficiency for data storage and processing power, including challenges to access and use of such technologies.

(D) A 10-year life cycle analysis of the management of facilities, hardware, and engineering involved in the strategic plan that includes—

1 (i) program formulation for project  
2 conception, implementation, and closure;  
3 and

4 (ii) technical infrastructure, products,  
5 processes, data, and personnel resources  
6 required to achieve defined cost, schedule,  
7 and performance objectives.

8 (E) If appropriate, a description of actions  
9 taken to implement the previous plan.

10 (3) PUBLIC INVOLVEMENT.—In developing the  
11 strategic plan required by paragraph (1), the Under  
12 Secretary shall invite comments and other feedback  
13 from the public to inform the strategic plan.

14 (4) ANNUAL BRIEFINGS.—

15 (A) IN GENERAL.—Not later than one year  
16 after the date of the enactment of this Act, and  
17 annually thereafter until 2029, the Under Sec-  
18 retary shall brief Congress on the progress  
19 made toward the objectives of the strategic plan  
20 required by paragraph (1).

21 (B) ELEMENTS.—Each briefing required  
22 by subparagraph (A) shall include the following:

23 (i) An evaluation of the progress  
24 made in implementing the strategic plan.

1                   (ii) Such updates to the strategic plan  
 2                   as the Under Secretary considers appro-  
 3                   priate.

4 **SEC. 109. EARTH PREDICTION INNOVATION CENTER.**

5       Paragraph (5) of section 102(b) of the Weather Re-  
 6       search and Forecasting Innovation Act of 2017 (15 U.S.C.  
 7       8512(b)) is amended—

8               (1) in subparagraph (D), by striking “and”  
 9       after the semicolon; and

10              (2) by striking subparagraph (E) and inserting  
 11       the following new subparagraphs:

12                   “(E) developing community weather re-  
 13       search modeling systems that—

14                           “(i) are accessible by the public in ac-  
 15       cordance with section 10601 of the James  
 16       M. Inhofe National Defense Authorization  
 17       Act for Fiscal Year 2023 (15 U.S.C.  
 18       8512a) and available for archive and long-  
 19       term study;

20                           “(ii) meet basic end-user requirements  
 21       for running on public computers and net-  
 22       works located outside of secure National  
 23       Oceanic and Atmospheric Administration  
 24       information and technology systems;



1 “(iii) use, whenever appropriate and  
2 cost-effective, innovative strategies and  
3 methods, including cloud-based computing  
4 capabilities, for hosting and management  
5 of part or all of the system described in  
6 this subparagraph;

7 “(iv) use modeling systems that allow  
8 for interoperability with new model compo-  
9 nents, modules, and next-generation soft-  
10 ware and coding languages;

11 “(v) allow for open testing and inte-  
12 gration of promising operational model im-  
13 provements from the broader community;

14 “(vi) access as close to a real-time  
15 basis as possible operational data and  
16 metadata, including commercially pur-  
17 chased data for use in the model testing  
18 conducted by the Earth Prediction Innova-  
19 tion Center pursuant to redistribution re-  
20 strictions, licensing agreements, and appli-  
21 cable existing laws and regulations; and

22 “(vii) provide supported and portable  
23 versions of the unified forecast system, in-  
24 cluding applications for fire weather, sub-  
25 seasonal to seasonal forecasting, hurricane,

space weather, ocean, cryosphere, air quality, and coastal models, that can reproduce current operational global and regional model prediction; and

“(F) establishing a National Oceanic and Atmospheric Administration Data Lake, to be maintained by the Administration, a commercial partner, or non-profit entity, that consolidates and maintains a publicly available and continuously updated collection of data and metadata used in numerical weather prediction for use in the Earth Prediction Innovation Center’s model testing, pursuant to redistribution restrictions, licensing agreements, and applicable existing laws and regulations.”.

**SEC. 110. SATELLITE ARCHITECTURE PLANNING.**

Section 301 of the Weather Research and Forecasting Innovation Act of 2017 (15 U.S.C. 8531) is amended—

(1) in subsection (a), by striking paragraph (1) and redesignating paragraphs (2), (3), and (4) as paragraphs (1), (2), and (3), respectively;

(2) by amending subsection (b) to read as follows:

1       “(b) NATIONAL OCEANIC AND ATMOSPHERIC ADMIN-  
2   ISTRATION SATELLITE SYSTEMS AND DATA.—

3               “(1) IN GENERAL.—The Under Secretary shall  
4       maintain a fleet of National Oceanic and Atmos-  
5       pheric Administration space-based observation plat-  
6       forms that provide critical operations-focused data  
7       and information to support the mission of the Ad-  
8       ministration to monitor the global environment in  
9       order to protect lives and property from extreme  
10      weather and other natural phenomena.

11              “(2) COLLABORATION.—The Under Secretary  
12      shall implement recommendations from the National  
13      Oceanic and Atmospheric Administration Observing  
14      Systems Council to ensure an appropriate mix of  
15      government, academic, commercial sector, and inter-  
16      national partnerships in the provision of data and  
17      information, including a broadened effort on data  
18      acquisition through the Commercial Data Program  
19      under section 302 when cost effective and beneficial  
20      to the Administration.

21              “(3) PRIORITY.—The Under Secretary shall en-  
22      sure that platforms maintained under paragraph (1)  
23      prioritize the development of products and services  
24      that are tailored to meet the National Oceanic and  
25      Atmospheric Administration’s mission.

1 “(4) NATIONAL CENTERS FOR ENVIRONMENTAL  
 2 INFORMATION.—The Under Secretary shall maintain  
 3 the National Centers for Environmental Information  
 4 to provide a long-term archive and access to the na-  
 5 tional and global data and metadata of the National  
 6 Oceanic and Atmospheric Administration.”; and

7 (3) in subsection (f)(1), by striking “2023” and  
 8 inserting “2030”.

9 **SEC. 111. IMPROVING UNCREWED ACTIVITIES.**

10 (a) RESEARCH AND DEVELOPMENT.—Section  
 11 102(b)(3) of the Weather Research and Forecasting Inno-  
 12 vation Act of 2017 (15 U.S.C. 8512(b)(3)) is amended—

13 (1) in subparagraph (B), by striking “aerial”  
 14 and inserting “crewed and uncrewed aerial and sur-  
 15 face”; and

16 (2) in subparagraph (G), by striking “, includ-  
 17 ing commercial observing systems” and inserting “,  
 18 including stationary and mobile commercial observ-  
 19 ing systems, such as uncrewed aircraft and marine  
 20 systems, to provide observations of the atmosphere  
 21 and ocean, and other observations, in cooperation  
 22 with the Office of Marine and Aviation Operations”.

23 (b) USE OF UNCREWED AERIAL SYSTEMS.—Section  
 24 102 of the Weather Research and Forecasting Innovation  
 25 Act of 2017 (15 U.S.C. 8512) is further amended by—

1           (1) redesignating subsections (c) and (d) as  
2 subsections (d) and (e), respectively; and

3           (2) by inserting after subsection (b) the fol-  
4 lowing:

5       “(c) USE OF UNCREWED AERIAL SYSTEMS.—

6           “(1) IN GENERAL.—In carrying out the pro-  
7 gram under this section, the Assistant Administrator  
8 for Oceanic and Atmospheric Research and the As-  
9 sistant Administrator for the Office of Marine and  
10 Aviation Operations, whenever practical, shall use  
11 uncrewed aerial systems to assess damage and assist  
12 recovery after an extreme weather or water event.

13          “(2) USE OF SYSTEMS.—In carrying out the  
14 program under this section, the Assistant Adminis-  
15 trator for Oceanic and Atmospheric Research and  
16 the Assistant Administrator for the Office of Marine  
17 and Aviation Operations, may acquire uncrewed aer-  
18 ial systems and training resources for the regional  
19 offices and partners of the National Oceanic and At-  
20 mospheric Administration for the use and deploy-  
21 ment of those systems in storm assessments and re-  
22 sponse.”.

1 **SEC. 112. INTERAGENCY COUNCIL FOR ADVANCING METE-**  
 2 **OROLOGICAL SERVICES.**

3 (a) IN GENERAL.—Section 402 of the Weather Re-  
 4 search and Forecasting Innovation Act of 2017 (15 U.S.C.  
 5 8542) is amended—

6 (1) in subsection (a)—

7 (A) by striking “Advancing Weather Serv-  
 8 ices” and inserting “Advancing Meteorological  
 9 Services (in this section referred to as the  
 10 ‘Interagency Council’)”; and

11 (B) by striking “Committee” each place it  
 12 appears and inserting “Council”;

13 (2) by amending subsections (b) and (c) to read  
 14 as follows:

15 “(b) CO-CHAIRS.—The Director of the Office of  
 16 Science and Technology Policy and the Under Secretary  
 17 shall serve as co-chairs of the Interagency Council. The  
 18 Under Secretary shall serve as the Federal Coordinator  
 19 for Meteorology.

20 “(c) FURTHER COORDINATION.—The Director of the  
 21 Office of Science and Technology Policy shall take such  
 22 steps as are necessary to coordinate the activities of the  
 23 Federal Government with stakeholders in the United  
 24 States weather industry, academic partners, State govern-  
 25 ments, and emergency managers, including by imple-  
 26 menting mechanisms to encourage and enable the partici-

1 pation of non-Federal employees in the functions of the  
2 Interagency Council.”; and

3 (3) by adding at the end the following new sub-  
4 sections:

5 “(d) FUNCTIONS.—The Interagency Council shall be  
6 the formal mechanism by which all relevant Federal de-  
7 partments and agencies coordinate implementation of pol-  
8 icy and practices to ensure United States global leadership  
9 in meteorological services. In doing so, the Interagency  
10 Council shall review programs and support relevant weath-  
11 er research and forecast innovation activities, as well as  
12 other related implementation activities, related to Federal  
13 meteorological services, including by carrying out the fol-  
14 lowing:

15 “(1) Identifying and helping prioritize meteoro-  
16 logical research and service delivery needs, including  
17 relating to observations, operational systems, com-  
18 munications, and infrastructure.

19 “(2) Providing recommendations to streamline  
20 or consolidate activities and develop greater effi-  
21 ciencies in cross-agency activities.

22 “(3) Leveraging Earth system science research  
23 outcomes of the National Oceanic and Atmospheric  
24 Administration, the National Aeronautics and Space  
25 Administration, and other relevant Federal depart-

1       ments and agencies, including research outcomes re-  
2       lated to the relevant recommended key science and  
3       applications questions and priorities in the National  
4       Academies of Sciences, Engineering, and Medicine’s  
5       2018 report ‘Thriving on Our Changing Planet: A  
6       Decadal Strategy for Earth Observation from  
7       Space’, to understand and predict high-impact  
8       weather phenomena.

9               “(4) Facilitating the expansion and strength-  
10       ening of partnerships with private sector entities to  
11       advance meteorological research, communications,  
12       and computing in collaboration with the Earth sys-  
13       tem science, service, and stakeholder communities.

14              “(5) Sharing information regarding meteorolog-  
15       ical research improvement needs and science oppor-  
16       tunities across relevant Federal departments and  
17       agencies.

18              “(6) Providing advice to all relevant Federal de-  
19       partments and agencies regarding potential collabo-  
20       rations and expected level of resources needed to  
21       maintain and operate the Interagency Council.

22              “(7) Enhancing communication and coordina-  
23       tion and promoting sharing within relevant Federal  
24       departments and agencies and across the Inter-  
25       agency Council.



1           “(8) Developing, recruiting, and sustaining a  
2           professional and diverse workforce for meteorological  
3           research and services.

4           “(e) DATA INVENTORY.—The Interagency Council, in  
5           coordination and avoidance of duplication with the United  
6           States Group on Earth Observations, shall promote data  
7           and metadata access and archive activities to increase ac-  
8           cessibility, interoperability, and reusability by maintaining  
9           a data inventory of meteorological observations. Not less  
10          frequently than every two years for a period of 10 years  
11          beginning on the date of the enactment of this subsection,  
12          the Interagency Council shall solicit updated information  
13          from private sector entities identifying current and near  
14          future sources of such data. Such data shall be made  
15          available to member departments and agencies under sub-  
16          section (a).

17          “(f) COORDINATION OFFICE.—The Interagency Me-  
18          teorological Coordination Office shall provide to the Inter-  
19          agency Council such administrative and logistical support  
20          as the Interagency Council may require, as determined by  
21          the co-chairs.

22          “(g) COST SHARE.—Member departments and agen-  
23          cies of the Interagency Council specified under subsection  
24          (a) may provide reimbursable financial support to the  
25          Interagency Meteorological Coordinating Office to en-

1 hance cost-sharing and collaboration related to weather re-  
2 search and forecast innovation activities.

3 “(h) REPORT.—Not later than one year after the  
4 date of the enactment of this subsection and annually  
5 thereafter until 2029, the Interagency Council shall pub-  
6 lish a report which identifies among member departments  
7 and agencies specified under subsection (a) the following:

8 “(1) Federal programs that use meteorological  
9 observations, data sources, and capabilities.

10 “(2) Federal programs that acquire such obser-  
11 vations, data, and capabilities from private sector  
12 entities.

13 “(3) Advancements in meteorological data col-  
14 lection, assimilation, and forecasting that could im-  
15 prove Federal programmatic operational capabilities.

16 “(4) Barriers to acquiring meteorological obser-  
17 vations, data sources, and capabilities that could be  
18 used to better meet Federal programmatic needs.”.

19 (b) REFERENCES.—Any reference to the Interagency  
20 Committee for Advancing Weather Services in any law,  
21 rule, regulation, paper, document, map, or other record  
22 of the United States shall be deemed to be a reference  
23 to the Interagency Council for Advancing Meteorological  
24 Services.

1 **SEC. 113. OCEAN OBSERVATIONS.**

2 Subsection (b) of section 12304 of the Integrated  
3 Coastal and Ocean Observation System Act of 2009 (33  
4 U.S.C. 3603) is amended by adding at the end the fol-  
5 lowing new paragraph:

6 “(5) SHIPS OF OPPORTUNITY PILOT PRO-  
7 GRAM.—

8 “(A) IN GENERAL.—The Administrator, in  
9 coordination with the heads of relevant Federal  
10 departments and agencies, shall, subject to rel-  
11 evant regulations and certifications, maintain  
12 pilot programs or projects to contract with re-  
13 search or commercial ship operators for data  
14 collection and assess the potential costs, bene-  
15 fits, and viability of a network of ocean and at-  
16 mospheric observing instruments operating on  
17 research or commercial ocean vessels, including  
18 in the Arctic, in order to supplement the Inte-  
19 grated Coastal, Great Lakes, and Ocean Obser-  
20 vation System in improving understanding of  
21 coastal and ocean systems and their relation-  
22 ships to human activities.

23 “(B) STANDARDS AND SPECIFICATIONS.—  
24 The Administrator shall ensure that data ac-  
25 quired through the pilot program established  
26 pursuant to subparagraph (A) meets the most

recent standards and specifications required for observation services and data as published pursuant to subsection (c) of section 302 of the Weather Research and Forecasting Innovation Act of 2017.

“(C) REPORT.—Not later than five years after the date of the enactment of this paragraph, the Administrator, in consultation with the Secretary of Transportation, shall submit to Congress a report on the requirements for a global network of ocean and atmospheric instruments operating on research or commercial ocean vessels for measurement and data transmission.

“(D) SUNSET.—This paragraph shall terminate on the earlier of—

“(i) September 30, 2029; or

“(ii) one year after the date on which the report required under subparagraph (B) is submitted by the Administrator.”.

#### **SEC. 114. CONSOLIDATION OF REPORTS.**

(a) WEATHER RESEARCH AND FORECASTING INNOVATION ACT OF 2017.—

(1) IN GENERAL.—The Weather Research and Forecasting Innovation Act of 2017 is amended—

1 (A) in section 102 (15 U.S.C. 8512), by  
2 striking subsection (d);

3 (B) by amending section 105 (15 U.S.C.  
4 8515) to read as follows:

5 **“SEC. 105. WEATHER RESEARCH AND DEVELOPMENT PLAN-**  
6 **NING.**

7 “Not later than two years after the date of the enact-  
8 ment of this section and not less frequently than every  
9 two years thereafter, the Under Secretary, acting through  
10 the Assistant Administrator for Oceanic and Atmospheric  
11 Research, and in coordination with the Director of the Na-  
12 tional Weather Service and the Assistant Administrator  
13 for Satellite and Information Services, shall issue a re-  
14 search and development and research to operations plan  
15 to maintain United States leadership in numerical weather  
16 prediction and forecasting that—

17 “(1) describes the forecasting skill and tech-  
18 nology goals, technology transfer plan, and progress  
19 of the National Oceanic and Atmospheric Adminis-  
20 tration in carrying out the program conducted under  
21 section 102;

22 “(2) identifies and prioritizes specific research  
23 and development activities, data collection and anal-  
24 ysis, predictive modeling, demonstration of potential  
25 operational forecast application, education, training,

1 and performance metrics, weighted to meet the oper-  
2 ational weather and flood-event mission of the Na-  
3 tional Weather Service to achieve a weather-ready  
4 Nation;

5 “(3) describes how the program conducted  
6 under section 102 will collaborate with Federal  
7 agencies and departments, international partners,  
8 and stakeholders, including the United States weath-  
9 er industry and academic partners, and the role of  
10 each in advancing weather forecasting and commu-  
11 nication;

12 “(4) identifies, through consultation with the  
13 National Science Foundation, the United States  
14 weather industry, and academic partners, research  
15 necessary to advance the scientific understanding of  
16 weather processes and provide information to im-  
17 prove weather warning and forecast systems in the  
18 United States most effectively;

19 “(5) describes the ongoing research projects of  
20 the United States Weather Research Program, the  
21 goals of those projects, and those projects related to  
22 weather observations, short-term weather, or subsea-  
23 sonal forecasts within the Office of Oceanic and At-  
24 mospheric Research that are closest to  
25 operationalization; and

1 “(6) describes how the National Oceanic and  
 2 Atmospheric Administration is advancing community  
 3 weather modeling.”;

4 (C) in section 403 (15 U.S.C. 8543)—

5 (i) in subsection (a), by inserting  
 6 “the” after “Director of”; and

7 (ii) by amending subsection (d) to  
 8 read as follows:

9 “(d) ANNUAL BRIEFING.—Not less frequently than  
 10 once each year, the Under Secretary shall brief the Com-  
 11 mittee on Commerce, Science, and Transportation of the  
 12 Senate and the Committee on Science, Space, and Tech-  
 13 nology of the House of Representatives on participation  
 14 in the program under subsection (a) and shall highlight  
 15 any innovations that come from the interaction described  
 16 in subsection (b).”; and

17 (D) by striking sections 408 through 411  
 18 and section 414 and redesignating sections 412  
 19 and 413 as sections 408 and 409, respectively.

20 (2) CLERICAL AMENDMENTS.—The table of  
 21 contents in section 1(b) of the Weather Research  
 22 and Forecasting Innovation Act of 2017 is amended  
 23 by striking the items relating to sections 408  
 24 through 414 and inserting the following new items:

“Sec. 408. Weather enterprise outreach.

“Sec. 409. Hurricane hunter aircraft.”.

1 (b) NATIONAL OCEANIC AND ATMOSPHERIC ADMIN-  
 2 ISTRATION AUTHORIZATION ACT OF 1992.—The National  
 3 Oceanic and Atmospheric Administration Authorization  
 4 Act of 1992 (Public Law 102–567) is amended—

5 (1) in section 106, by striking subsection (c)  
 6 (15 U.S.C. 1537); and

7 (2) in section 108 (15 U.S.C. 8520)—

8 (A) in subsection (a)—

9 (i) by striking paragraph (5); and

10 (ii) by redesignating paragraphs (6)  
 11 through (12) as paragraphs (5) through  
 12 (11), respectively;

13 (B) by striking subsection (b); and

14 (C) by redesignating subsection (c) as sub-  
 15 section (b).

16 **SEC. 115. PRECIPITATION FORECAST IMPROVEMENT PRO-**  
 17 **GRAM.**

18 (a) IN GENERAL.—Title VI of the Weather Research  
 19 and Forecasting Innovation Act of 2017 (15 U.S.C. 8501  
 20 et seq.) is amended—

21 (1) by redesignating section 603 as section 604;

22 and

23 (2) by inserting after section 602 the following:



1 **“SEC. 603. PRECIPITATION FORECAST IMPROVEMENT PRO-**  
2 **GRAM.**

3 “(a) IN GENERAL.—The Under Secretary, in collabo-  
4 ration with the United States weather industry, other Fed-  
5 eral agencies, and academic partners, shall maintain a  
6 program to improve precipitation forecasting across  
7 timescales.

8 “(b) GOAL.—The goal of the program under sub-  
9 section (a) shall be to provide more accurate, reliable, and  
10 timely precipitation forecasts across timescales through  
11 the development and application of a fully coupled Earth  
12 system prediction model in order to reduce the loss of life  
13 or property related to precipitation extremes, with a focus  
14 on the following:

15 “(1) Improving the understanding and pre-  
16 diction of precipitation extremes from a variety of  
17 weather systems, including atmospheric rivers.

18 “(2) Evaluating and incorporating, as appro-  
19 priate, innovative observations into operational moni-  
20 toring and forecast systems to improve precipitation  
21 forecasts.

22 “(3) Improving earth system model predictions  
23 of precipitation extremes from atmospheric rivers,  
24 tropical cyclones, summer-time thunderstorms, win-  
25 ter storms, and other phenomena, in coordination  
26 with relevant programs.

1           “(4) Enhancing research transition to oper-  
2           ations through testbeds, including the evaluation of  
3           physical and social science, technology, and other re-  
4           search to develop products and services for imple-  
5           mentation and use by relevant stakeholders.

6           “(5) Incorporating social, behavioral, and eco-  
7           nomic sciences best practices into operations for  
8           more effective and actionable watch and warning  
9           products that help drive public safety and damage  
10          mitigation decisions in coordination with the pro-  
11          grams established in accordance with this Act.

12          “(6) Ensuring data and metadata management  
13          processes are in place to support data access and ar-  
14          chive for long term research and operations among  
15          multiple partners.

16          “(c) ACTIVITIES.—In carrying out the program  
17          under subsection (a), the Under Secretary shall support  
18          research-to-operations work, including relating to the fol-  
19          lowing:

20               “(1) Implementing key strategies and following  
21               priorities and objectives outlined by the National  
22               Oceanic and Atmospheric Administration’s ‘Precipi-  
23               tation Prediction Grand Challenge Strategy’.

1           “(2) Improving the physical science, operational  
2           modeling and tools, and technology related to better  
3           forecasting precipitation extremes across timescales.

4           “(3) Improving the social, behavioral, risk, com-  
5           munications, and economic sciences related to  
6           vulnerabilities, risk communication, and delivery of  
7           information critical for reducing the loss of life or  
8           property related to extreme precipitation.

9           “(4) Conducting the research necessary to de-  
10          velop and deploy probabilistic weather forecast guid-  
11          ance technology relating to precipitation extremes in  
12          operational practice.

13          “(5) Enhancing the operational capacity of the  
14          National Weather Service to deliver decision support  
15          for increasing precipitation extremes.

16          “(6) Expanding computational resources to im-  
17          prove precipitation modeling.

18          “(d) ANNUAL BUDGET.—The Under Secretary shall,  
19          not less frequently than annually, submit to Congress a  
20          proposed budget corresponding with carrying out this sec-  
21          tion.

22          “(e) SENSE OF CONGRESS.—It is the Sense of Con-  
23          gress that improved precipitation forecasts should support  
24          improved water resource management and resilience to ex-  
25          treme water related events, such as floods and drought,

1 which may include the use of enhanced streamflow pre-  
 2 diction.”.

3 (b) CLERICAL AMENDMENT.—The table of contents  
 4 in section 1(b) of the Weather Research and Forecasting  
 5 Innovation Act of 2017 is amended by striking the item  
 6 relating to section 603 and inserting the following new  
 7 items:

“Sec. 603. Precipitation forecast improvement program.

“Sec. 604. Definitions.”.

## 8 **TITLE II—ENHANCING FEDERAL** 9 **WEATHER FORECASTING AND** 10 **INNOVATION**

### 11 **SEC. 201. WEATHER INNOVATION FOR THE NEXT GENERA-** 12 **TION.**

13 (a) IN GENERAL.—Not later than 180 days after the  
 14 date of the enactment of this Act, the Under Secretary  
 15 shall establish a Research, Development, Test, and Eval-  
 16 uation Program (in this section referred to as the “Pro-  
 17 gram”) to ensure the continued performance of weather  
 18 radar capabilities based on defined use needs and require-  
 19 ments, including capabilities currently being developed.

20 (b) REQUIREMENTS.—In carrying out the Program,  
 21 the Under Secretary, in consultation with the Interagency  
 22 Council for Advancing Meteorological Services, shall—

23 (1) partner with the private sector, academia,  
 24 Federal, State, and local government entities, and

1 any other entity the Under Secretary considers ap-  
2 propriate;

3 (2) identify, evaluate, and test existing or  
4 emerging technologies and solutions that improve  
5 radar coverage and performance, including by miti-  
6 gating the potential impact of interferences on  
7 weather radar;

8 (3) to the maximum extent practicable, research  
9 additional solutions that could improve radar cov-  
10 erage and performance and mitigate the effects of  
11 interferences on weather radar, such as—

12 (A) signal processing algorithms, including  
13 the capability to merge data from multiple ra-  
14 dars, including commercial radars, and other  
15 supplemental data sources;

16 (B) short-term forecasting algorithms to  
17 improve weather and water-related forecasts  
18 and warnings;

19 (C) gap filling radars to improve radar  
20 coverage and provide supplemental or replace-  
21 ment observations in areas impacted by inter-  
22 ferences on weather radar;

23 (D) solutions to replace or mitigate the ef-  
24 fects of data contaminated by interferences on  
25 weather radar; and

1 (E) solutions from electromagnetic sources;

2 and

3 (4) develop, support, or partner with developers  
4 to provide commercially viable technical mitigation  
5 solutions for interferences to weather radar capabili-  
6 ties that are compatible with the operational require-  
7 ments of the weather radar system.

8 (c) PRIORITY.—In carrying out subsection (b), the  
9 Under Secretary shall prioritize consideration of the fol-  
10 lowing technology-based mitigation solutions:

11 (1) Phased array weather radar systems.

12 (2) Supplementing or replacing contaminated  
13 data with commercial radar data.

14 (3) The use of data from meteorological towers  
15 associated with the private sector, or similar capa-  
16 bilities.

17 (4) The installation and provision of access to  
18 rain gauges.

19 (5) Any other technology-based mitigation solu-  
20 tion the Under Secretary determines could improve  
21 radar coverage by overcoming interferences, beam  
22 blockage, or ghost echoes.

23 (d) REPORT; RECOMMENDATION.—

24 (1) IN GENERAL.—Not later than two years  
25 after the date of the enactment of this section and

1       annually thereafter until the Program terminates  
2       pursuant to subsection (e), the Under Secretary  
3       shall submit to Congress a report on the implemen-  
4       tation of the Program, including an evaluation of  
5       each technology-based mitigation solution identified  
6       for priority consideration pursuant to subsection (c),  
7       and a recommendation regarding additional identi-  
8       fication and testing of new technologies based on  
9       such consideration.

10           (2) FINAL RECOMMENDATION.—Not later than  
11       five years after the date of the enactment of this  
12       section, the Under Secretary shall provide to Con-  
13       gress a recommendation on whether additional re-  
14       search, testing, and development through the Pro-  
15       gram established under subsection (a) is needed, and  
16       a determination of whether a cessation of field re-  
17       search, testing, development and evaluation under  
18       the Program is appropriate.

19           (e) TERMINATION.—The authority of the Under Sec-  
20       retary to carry out the Program shall terminate on the  
21       earlier of—

22           (1) September 30, 2029; or

23           (2) one year after the date on which the final  
24       recommendation required under subsection (d)(2) is  
25       submitted by the Under Secretary.

1 (f) DEFINITIONS.—In this section:

2 (1) GHOST ECHO.—The term “ghost echo”  
3 means radar signal reflectivity or velocity return er-  
4 rors in radar data due to the proximity of an inter-  
5 ference.

6 (2) INTERFERENCE.—The term “interference”  
7 means any natural or human-built structure that af-  
8 fects a weather radar system, including any wind  
9 turbine or building that could disrupt or limit the ef-  
10 fectiveness of a weather radar system.

11 **SEC. 202. RADAR NEXT PROGRAM.**

12 (a) IN GENERAL.—The Under Secretary, in consulta-  
13 tion with the Director of the National Weather Service,  
14 shall establish a program to be known as the “Radar Next  
15 Program” (in this section referred to as the “program”).

16 (b) REQUIREMENTS.—In carrying out the program,  
17 the Under Secretary shall—

18 (1) develop performance and coverage require-  
19 ments for the weather radar network of the United  
20 States, including the territories of the United States;

21 (2) collaborate with the weather enterprise to  
22 determine potential solutions to update the weather  
23 radar network of the United States that meets the  
24 requirements developed under paragraph (1); and



1           (3) develop a plan in accordance with sub-  
2       section (c).

3       (c) PLAN.—

4           (1) IN GENERAL.—The Under Secretary shall  
5       develop a plan to replace the Next Generation  
6       Weather Radar of the National Weather Service sys-  
7       tem in existence as of the date of the enactment of  
8       this Act (in this subsection referred to as the  
9       “NEXRAD system”).

10          (2) ELEMENTS.—The plan developed under this  
11       subsection shall seek to continue and improve weath-  
12       er radar coverage in the United States and its terri-  
13       tories and include the following:

14               (A) Estimates of quantifiable improve-  
15       ments in performance, coverage, and accuracy  
16       to be made from potential options for replace-  
17       ment of the NEXRAD system.

18               (B) Development of a proof-of-concept  
19       phased array radar to test and determine the  
20       specifications and requirements for such re-  
21       placement.

22               (C) Expected actions needed to implement  
23       the recommendations of the report published by  
24       the Environmental Information Services Work-  
25       ing Group of the Science Advisory Board of the

1 National Oceanic and Atmospheric Administra-  
2 tion in November 2023 and entitled “A  
3 NESDIS Observing System Backbone Frame-  
4 work” to assist in defining a radar backbone  
5 architecture that will best serve the United  
6 States.

7 (D) Establishment of a weather surveil-  
8 lance radar testbed for the following:

9 (i) Evaluation of commercial radars  
10 with the potential to replace or supplement  
11 the NEXRAD system.

12 (ii) providing technical assistance for  
13 the use of small, gap-filling radars with  
14 private and local partners in regions where  
15 geographical topography prevents the full  
16 use of large systems or in locations where  
17 such systems may not be commercially via-  
18 ble.

19 (E) Consultation and input solicited from  
20 academia, meteorologists, emergency managers,  
21 and public safety or utility officials regarding  
22 the specifications and requirements for replace-  
23 ment of the NEXRAD system.

1 (F) Prioritized locations for initial deploy-  
2 ment of the system that will replace the  
3 NEXRAD system.

4 (G) Expected locations of the system that  
5 will replace the NEXRAD system, including  
6 sites located more than 75 miles away from an  
7 existing NEXRAD system station and addi-  
8 tional appropriate locations.

9 (H) Expected or planned improvements to  
10 data available for weather and water-related  
11 forecasts and warnings from the system that  
12 will replace the NEXRAD system.

13 (3) PROCUREMENT DEADLINE.—The Under  
14 Secretary shall take such actions as may be nec-  
15 essary to ensure the plan developed under this sub-  
16 section is fully implemented and executed by not  
17 later than September 30, 2040.

18 (d) RADAR-AS-A-SERVICE.—

19 (1) IN GENERAL.—The Under Secretary may  
20 partner or contract with entities outside of the Na-  
21 tional Oceanic and Atmospheric Administration to  
22 fill data gaps in weather radar coverage using di-  
23 verse weather radars and data assimilation tech-  
24 nologies in order to—

1 (A) supplement data gaps in weather radar  
2 coverage, including at low levels and wide areas,  
3 in existence as of the date of the enactment of  
4 this Act;

5 (B) ensure the continued performance of  
6 the United States' weather radar network; and

7 (C) better detect significant precipitation  
8 and severe weather over a greater area across  
9 a population.

10 (2) CONSIDERATIONS.—In carrying out para-  
11 graph (1), the Under Secretary may consider—

12 (A) partnering or contracting with entities  
13 that have participated in the testbed described  
14 in subsection (c)(3), the National Mesonet Pro-  
15 gram, or Cooperative Research and Develop-  
16 ment Agreements; and

17 (B) weather camera systems and services,  
18 including in consultation with the Federal Avia-  
19 tion Administration, as viable technologies to  
20 supplement weather forecasting and prediction  
21 needs.

22 (e) UPDATES TO CONGRESS.—The Under Secretary  
23 shall provide to the Committee on Science, Space, and  
24 Technology of the House of Representatives and the Com-  
25 mittee on Commerce, Science, and Transportation of the

1 Senate periodic updates on the implementation of this sec-  
2 tion.

3 **SEC. 203. DATA VOIDS IN HIGHLY VULNERABLE AREAS OF**  
4 **THE UNITED STATES.**

5 (a) IN GENERAL.—The Under Secretary, in coordi-  
6 nation with the Director of the National Weather Service  
7 and the Administrator of the Federal Emergency Manage-  
8 ment Agency, in consultation with the United States  
9 weather industry, academic partners, and in accordance  
10 with activities implemented through existing regional at-  
11 mospheric, coastal, ocean, and Great Lakes observing sys-  
12 tems, shall carry out activities to ensure equitable and  
13 comprehensive weather observation coverage, impact-  
14 based decision support services, and emergency informa-  
15 tion sharing in the United States, including the following

16 (1) Identifying regions in the United States and  
17 the territories of the United States that are under-  
18 observed or highly vulnerable to weather impacts  
19 that threaten human life, health, and the economy.

20 (2) Identifying any challenges that contribute to  
21 the lack of operations under paragraph (1).

22 (3) Increasing weather observations and devel-  
23 oping new weather observational capabilities, such as  
24 urban heat island mapping campaigns, with respect  
25 to the regions identified under paragraph (1).

1           (4) Establishing or supporting testbeds and de-  
2       ployments of decision-support services to Federal,  
3       State, and local emergency operations centers to de-  
4       velop and integrate new weather, water, and climate  
5       observation or emergency information sharing tools,  
6       with respect to the regions identified under para-  
7       graph (1).

8           (5) To the maximum extent practicable, ad-  
9       vancing weather and water forecasting and climate  
10      modeling capabilities for the regions identified under  
11      paragraph (1).

12          (6) Undertaking workforce development efforts  
13      for emergency management officials and meteorolo-  
14      gists in the regions identified under paragraph (1).

15          (7) Using data-void-filling observations to bet-  
16      ter resolve extreme rainfall in complex topography.

17          (8) Contributing to a national integrated heat  
18      health information system.

19      (b) INTERAGENCY PARTNERSHIP TO SUPPORT PILOT  
20      PROJECTS.—In carrying out this section, the Under Sec-  
21      retary, acting through the Director of the National Weath-  
22      er Service and in collaboration with the Administrator of  
23      the Federal Emergency Management Agency, shall estab-  
24      lish an interagency partnership to support pilot projects  
25      that accelerate coordination and use of localized weather,

1 water, and climate data and impact-based communications  
2 in infrastructure and emergency management decisions by  
3 Federal, State, and local officials.

4 (c) PRIORITY.—At least one pilot project under sub-  
5 section (b) shall address key science challenges to using  
6 mesonet data in local decision making and development  
7 of new tools and training for owners and operators of crit-  
8 ical infrastructure (as such term is defined in section  
9 1016(e) of Public Law 107–56 (42 U.S.C. 5195c(e))),  
10 such as dams, energy generation and distribution facili-  
11 ties, nuclear power plants, and transportation networks.

12 **SEC. 204. ATMOSPHERIC RIVERS FORECAST IMPROVEMENT**  
13 **PROGRAM.**

14 (a) IN GENERAL.—The Under Secretary, in collabo-  
15 ration with the United States weather industry and aca-  
16 demic partners and in coordination with the precipitation  
17 forecast improvement program under section 603 of the  
18 Weather Research and Forecasting Innovation Act of  
19 2017, as added by section 115 of this Act, shall establish  
20 an atmospheric river forecast improvement program (in  
21 this section referred to as the “program”).

22 (b) GOAL.—The goal of the program shall be to re-  
23 duce the loss of life and property and economic losses from  
24 atmospheric rivers through the research, development, and

1 extension of accurate, effective, and actionable forecasts  
2 and warnings including by—

3           (1) establishing atmospheric river forecast skill  
4           metrics that include assessing the benefits of dynam-  
5           ical modeling, data assimilation, and machine learn-  
6           ing improvements in the probabilistic forecasts of  
7           landfall location, extreme wind and precipitation,  
8           and cascading impacts;

9           (2) developing an atmospheric river forecast  
10          system within a unified forecast system, and advancing  
11          next-generation coupled modeling systems, with  
12          the capability of providing seasonal to short-range  
13          atmospheric river forecasts that include forecast of  
14          snow accumulation and other hydrologic components;  
15

16          (3) advancing scientific understanding of the  
17          roles of atmospheric rivers in subseasonal to seasonal  
18          precipitation and probabilistic predictions at  
19          subseasonal and seasonal scales;

20          (4) developing tools and improved forecast  
21          products to predict periods of active or inactive atmospheric  
22          river landfalls and inland penetration over  
23          the United States with a focus on addressing stakeholder  
24          and public needs related to perceiving, com-



1       prehending, and responding to atmospheric river  
2       forecast improvements;

3           (5) enhancing the transition of research to op-  
4       erations through the National Oceanic and Atmos-  
5       pheric Administration’s testbeds, including the eval-  
6       uation of physical and social science, technology, and  
7       other research to develop products and services for  
8       implementation and use by relevant stakeholders;  
9       and

10          (6) incorporating into atmospheric river mod-  
11       eling and forecasting, as appropriate, social, behav-  
12       ioral, risk, communication, and economic sciences.

13       (c) INNOVATIVE OBSERVATIONS, DATA ASSIMILA-  
14       TION, AND MODELING.—The Under Secretary shall en-  
15       sure the program periodically examines, tests, and evalu-  
16       ates the value of incorporating innovative observations,  
17       data, and measurements with respect to the improvement  
18       of atmospheric river analysis, modeling, forecasts, pre-  
19       dictions, and warnings.

20       (d) PROGRAM PLAN.—Not later than 270 days after  
21       the date of the enactment of this Act, the Under Sec-  
22       retary, in consultation with the Secretary of the Air Force  
23       or the Commander of the 53rd Weather Reconnaissance  
24       Squadron of the Air Force Reserve Command, shall de-  
25       velop a plan that details the specific research, develop-

1 ment, data acquisition, partnerships with the weather in-  
2 dustry and academic partners, and technology transfer ac-  
3 tivities, as well as corresponding resources, and timelines,  
4 necessary to achieve the goal of the program under sub-  
5 section (b). Such plan shall be made available to the public  
6 on release.

7 (e) ANNUAL BUDGET FOR PLAN SUBMITTAL.—After  
8 the development of the plan pursuant to subsection (d),  
9 the Under Secretary shall, not less frequently than annu-  
10 ally, submit to Congress a proposed budget corresponding  
11 with the activities identified in such plan.

12 (f) IMPROVED MODELING.—In carrying out the pro-  
13 gram, the Under Secretary may—

14 (1) develop, test, and operationalize prototype  
15 high-resolution Atmospheric River Analysis and  
16 Forecasting System models through research and  
17 operations partnerships with institutions of higher  
18 education and other partners outside the National  
19 Oceanic and Atmospheric Administration;

20 (2) enhance data assimilation of current and  
21 new satellite and ocean observations that is useful  
22 for atmospheric river analysis and forecasting pre-  
23 dictions;

1           (3) improve data processing techniques related  
2           to atmospheric river analysis and forecasting pre-  
3           dictions;

4           (4) use artificial intelligence and machine learn-  
5           ing methods as applicable to atmospheric river anal-  
6           ysis and forecasting predictions;

7           (5) ensure the surface and subsurface observa-  
8           tions of the ocean meet the needs of atmospheric  
9           river analysis and forecasting predictions on dif-  
10          ferent time scales; and

11          (6) to the maximum extent practicable, improve  
12          or establish baseline weather monitoring services in  
13          areas that have historically experienced, or are pre-  
14          dicted to experience, atmospheric rivers.

15          (g) CONDUCT OF RECONNAISSANCE.—The Under  
16          Secretary shall acquire and sustain adequate aircraft, sci-  
17          entific equipment, and personnel to meet mission require-  
18          ments of the National Hurricane Operations Plan and the  
19          National Winter Seasons Operation plan, and to—

20               (1) ensure atmospheric river air reconnaissance  
21               observations are available throughout the expected  
22               seasons of tropical cyclones and atmospheric rivers;

23               (2) to the maximum extent practicable and in  
24               accordance with paragraph (4), ensure data and in-

1       formation collected are made available for research  
2       and operations purposes;

3           (3) participate in research and operations part-  
4       nerships that guide flight planning and use research  
5       methods to improve and expand the capabilities and  
6       effectiveness of atmospheric river reconnaissance  
7       over time;

8           (4) develop data management strategies to en-  
9       sure that data and metadata are adequately  
10      stewarded, maintained, and archived; and

11          (5) undertake such other additional activities as  
12      the Under Secretary, in consultation with the Sec-  
13      retary of the Air Force, considers appropriate to im-  
14      prove and grow the hurricane hunter and atmos-  
15      pheric river reconnaissance mission.

16      (h) IMPROVED ATMOSPHERIC RIVER HAZARD COM-  
17      MUNICATION.—The Under Secretary may conduct reach  
18      and development activities in coordination with the pro-  
19      gram established under section 403(a) to—

20          (1) as appropriate, develop and refine methods  
21      to categorize the intensity of weather and oceans  
22      hazards, including tropical cyclones and atmospheric  
23      rivers, on a quantitative scale and the effectiveness  
24      of such scale in hazard communication;

1           (2) develop best practices for communication of  
 2           atmospheric river events and hazards across regions  
 3           of the United States;

4           (3) gather information from areas prone to hur-  
 5           ricanes and atmospheric rivers regarding levels of  
 6           knowledge and preparedness, including responses to  
 7           early forecasts and warnings by the National Oce-  
 8           anic and Atmospheric Administration; and

9           (4) explore strategies and effectiveness of com-  
 10          municating that hurricane and atmospheric river  
 11          events are beneficial at lower intensities versus haz-  
 12          ardous at higher intensity.

13 **SEC. 205. COASTAL FLOODING AND STORM SURGE FORE-**  
 14 **CAST IMPROVEMENT PROGRAM.**

15          (a) IN GENERAL.—The Under Secretary, in collabo-  
 16          ration with the United States weather industry and aca-  
 17          demic partners, shall establish a coastal flooding and  
 18          storm surge forecast improvement program (in this section  
 19          referred to as the “program”).

20          (b) GOAL.—The goal of the program shall be to re-  
 21          duce the loss of life or property from coastal flooding, in-  
 22          cluding high tide flooding, and storm surge events through  
 23          the development and extension of accurate, effective, ac-  
 24          tionable, and probable forecasts and warnings.

1 (c) PRIORITY.—In implementing the program, the  
2 Under Secretary shall prioritize activities that carry out  
3 the following:

4 (1) Improving understanding and capacity for  
5 real-time operational prediction of the ocean’s role in  
6 coastal flooding, including high tide flooding, and  
7 storm surge events.

8 (2) Improving the capacity to mitigate, adapt  
9 to, or prevent the impacts of coastal flooding, includ-  
10 ing high tide flooding, and storm surge events, in-  
11 cluding by improving the understanding and capac-  
12 ity of coastal communities to perceive, comprehend,  
13 and respond to forecast information.

14 (3) Incorporating data from in situ distributed  
15 sensors into predictive models and re-analyses.

16 (4) Developing probabilistic coastal flooding, in-  
17 cluding high tide flooding, and storm surge esti-  
18 mates to complement worst-case scenario estimates,  
19 including for use in long-term planning and risk  
20 management by States, Tribal governments, local-  
21 ities, and emergency managers in coordination with  
22 the Federal Emergency Management Agency, as ap-  
23 propriate.

24 (5) Establishing skill metrics for coastal inun-  
25 dation forecasting that quantify the benefits of dy-

1        namical modeling, data assimilation, and machine  
2        learning improvements in the probabilistic forecast  
3        of coastal flooding, including high tide flooding, and  
4        storm surge risk and impacts.

5            (6) Improving operational regional storm surge  
6        models and, in collaboration with the United States  
7        Geological Survey, wave prediction models to en-  
8        hance probabilistic guidance and messaging.

9            (d) INNOVATIVE OBSERVATIONS AND MODELING.—  
10    The Under Secretary shall ensure the program periodically  
11    examines, tests, and evaluates the value of incorporating  
12    enhanced model physics, hybrid dynamical or machine  
13    learning based prediction systems, and innovative observa-  
14    tions, such as novel sensor technologies, observation net-  
15    works, crewed or uncrewed systems, and hosted instru-  
16    ments on commercial aircrafts, vessels, and satellites, with  
17    respect to the improvement of coastal flooding, including  
18    high tide flooding, and storm surge forecasts, predictions,  
19    and warnings.

20            (e) PROGRAM PLAN.—Not later than 180 days after  
21    the date of the enactment of this Act, the Under Secretary  
22    shall develop a plan that details the specific research, de-  
23    velopment, data acquisition, and technology transfer ac-  
24    tivities, as well as corresponding resources and timelines,

1 necessary to achieve the goal of the program under sub-  
2 section (b).

3 (f) ANNUAL BUDGET FOR PLAN SUBMITTAL.—After  
4 the development of the plan pursuant to subsection (e),  
5 the Under Secretary shall, not less frequently than annu-  
6 ally, submit to Congress a proposed budget corresponding  
7 with the activities identified in such plan.

8 **SEC. 206. AVIATION WEATHER AND DATA INNOVATION.**

9 (a) PROGRAM.—The Under Secretary shall maintain  
10 an airborne observation program (in this section referred  
11 to as the “program”) for the acquisition of atmospheric  
12 sensor data and the deployment of critical atmospheric  
13 sensors, including in partnership with the weather enter-  
14 prise.

15 (b) ACTIVITIES.—The program shall include activi-  
16 ties that carry out the following:

17 (1) Procurement of weather data available from  
18 commercial aircraft, as determined by the Under  
19 Secretary.

20 (2) Acquisition of additional vertical profile ob-  
21 servations that provide spatial and temporal density,  
22 as determined by the Under Secretary.

23 (3) Analysis of procured data when incor-  
24 porated into the National Oceanic and Atmospheric



1 Administration's unified forecast system in order to  
2 provide improved forecast information for aircraft.

3 (c) BUDGET.—The Under Secretary shall, not less  
4 frequently than annually, submit to Congress a proposed  
5 budget corresponding with the activities described in sub-  
6 section (b), including and analysis of activities that can  
7 be complemented by National Oceanic and Atmospheric  
8 Administration aircraft.

9 (d) AUTHORIZATION OF APPROPRIATIONS.—From  
10 amounts authorized to be appropriated for the Commercial  
11 Data Program under section 302 of the Weather Research  
12 and Forecasting Innovation Act of 2017, there shall be  
13 available not more than \$10,000,000 for each of fiscal  
14 years 2025 through 2029 to carry out the program.

15 (e) AVIATION WEATHER AND TURBULENCE FORE-  
16 CASTING.—The Director of the National Weather Service  
17 shall include turbulence events, icing conditions, or other  
18 phenomena in the forecasting capabilities of the Aviation  
19 Weather Center and the Center Weather Service Units,  
20 and deliver operational forecasts with consistent, timely,  
21 and accurate weather and turbulence information for the  
22 airspace system and the protection of lives and property.

23 (f) COORDINATION.—In carrying out subsection (e),  
24 the Director of the National Weather Service shall give  
25 consideration to recommendations from the Administrator

1 of the Federal Aviation Administration in furtherance of  
2 section 44720 of title 49, United States Code, and improve  
3 weather and turbulence forecasting capabilities by—

4 (1) designating or establishing within the Fed-  
5 eral Government an interagency working group to  
6 determine weather and environmental data or obser-  
7 vation requirements, needs, and potential solutions  
8 related to aviation weather and turbulence modeling  
9 or forecasting;

10 (2) identifying current and future potential  
11 data gaps related to turbulence events or phenomena  
12 that can—

13 (A) identify or inform route specific flight  
14 planning; and

15 (B) be supplemented or filled by commer-  
16 cial aviation tools;

17 (3) transitioning research initiatives and pilot  
18 programs, including a pilot program of instrumenta-  
19 tion for observing greenhouse gases and other at-  
20 mospheric factors deployed on commercial aircraft  
21 and support for the evaluation of a sustained observ-  
22 ing network using such instrumentation, into oper-  
23 ations that improve the forecasting capabilities of  
24 the Aviation Weather Center;

1           (4) developing and deploying improved prob-  
2       abilistic aviation weather forecast guidance tech-  
3       nology; and

4           (5) updating interagency agreements as appro-  
5       priate, including to address reimbursable agree-  
6       ments.

7       (g) NEXT GENERATION AVIATION RESEARCH.—  
8       Paragraph (3) of section 102(b) of the Weather Research  
9       and Forecasting Innovation Act of 2017 (15 U.S.C.  
10      8512(b)), is amended—

11           (1) by redesignating subparagraphs (F) and  
12       (G) as subparagraphs (G) and (H), respectively; and

13           (2) by inserting after subparagraph (E) the fol-  
14       lowing new subparagraph:

15           “(F) aviation weather phenomena, includ-  
16       ing atmospheric composition and turbulence, to  
17       improve scientific understanding and forecast  
18       capabilities for the airspace system;”.

19       (h) AVIATION INFORMATION DISSEMINATION.—The  
20       Under Secretary shall ensure the Aviation Weather Center  
21       is able, to the maximum extent possible, to disseminate  
22       in a timely manner full resolution aviation weather data,  
23       forecasts, and information to meet the needs of aviation  
24       users.

1 (i) PROVISION OF WEATHER SERVICES TO THE FED-  
2 ERAL AVIATION ADMINISTRATION.—

3 (1) SENSE OF CONGRESS.—It is the sense of  
4 Congress that the aviation weather services provided  
5 to the Federal Aviation Administration by the Na-  
6 tional Oceanic and Atmospheric Administration are  
7 critical to the functions of the Federal Aviation Ad-  
8 ministration and the safety of the flying public.

9 (2) INTERAGENCY AGREEMENT.—The Under  
10 Secretary and the Administrator of the Federal  
11 Aviation Administration shall enter into or otherwise  
12 participate in an interagency agreement for a period  
13 of not less than 5 years under which the National  
14 Oceanic and Atmospheric Administration provides  
15 weather services to the Federal Aviation Administra-  
16 tion.

17 (3) BRIEFINGS.—Not less frequently than once  
18 per quarter through 2030, the Under Secretary and  
19 the Administrator of the Federal Aviation Adminis-  
20 tration shall provide a briefing to the Committee on  
21 Commerce, Science, and Transportation of the Sen-  
22 ate and the Committee on Science, Space, and Tech-  
23 nology of the House of Representatives on the status  
24 of the provision by the National Oceanic and Atmos-  
25 pheric Administration of weather services to the

1 Federal Aviation Administration and the interagency  
2 agreement under paragraph (2)

3 **SEC. 207. NESDIS PARTNERSHIP PROGRAM, TRANSITION**  
4 **PROGRAM, AND OPERATIONAL PLANNING.**

5 (a) PARTNERSHIP PROGRAM.—

6 (1) IN GENERAL.—The Assistant Administrator  
7 of the National Environmental Satellite, Data, and  
8 Information Service (in this section referred to as  
9 the “Assistant Administrator”) shall maintain a  
10 partnership program to enhance engagement with  
11 the private sector, academia, and other Federal de-  
12 partments and agencies (in this section referred to  
13 as the “partnership program”).

14 (2) ADMINISTRATION.—The Assistant Adminis-  
15 trator, in consultation with the Administrator of the  
16 National Aeronautics and Space Administration,  
17 shall administer broad agency announcements and  
18 other transactional authority or contracting mecha-  
19 nisms, on an annual or more frequent basis, to sup-  
20 port the partnership program.

21 (b) TRANSITION PROGRAM.—

22 (1) IN GENERAL.—To support the development  
23 of next-generation technologies, missions, data sys-  
24 tems, spacecraft, and instrument design, the Assist-  
25 ant Administrator, in consultation with the Adminis-

1       trator of the National Aeronautics and Space Ad-  
2       ministration, shall maintain a program to transition  
3       selected awards from research and study phases into  
4       demonstration (in this section referred to as the  
5       “transition program”).

6               (2) CONSIDERATIONS.—In selecting awardees  
7       for demonstrations under the transition program,  
8       the Assistant Administrator shall consider tech-  
9       nologies, missions, data systems, spacecraft, and in-  
10      strument design that—

11               (A) improve upon the National Oceanic  
12              and Atmospheric Administration’s satellite ar-  
13              chitecture;

14               (B) have a direct impact on implementing  
15              the recommendations of the Administration’s  
16              2018 Satellite Observing System Architecture  
17              Study entitled, “Building a Plan for NOAA’s  
18              21st Century Satellite Observing System”; and

19               (C) meet current or future mission require-  
20              ments.

21       (c) OPERATIONAL PLANNING.—In carrying out the  
22      transition program , the Assistant Administrator shall  
23      monitor demonstration phase progress and plan for prom-  
24      ising results that meet mission requirements to be

1 transitioned into the operational satellite architecture of  
2 the National Oceanic and Atmospheric Administration.

3 (d) ANNUAL PLAN.—Not less frequently than annu-  
4 ally until 2029, the Assistant Administrator shall submit  
5 to the Committee on Science, Space, and Technology of  
6 the House of Representatives and the Committee on Com-  
7 merce, Science, and Transportation of the Senate an an-  
8 nual plan that outlines the progress made in the partner-  
9 ship program under subsection (a), the transition program  
10 under section (b), and operational planning under sub-  
11 section (c).

12 (e) AUTHORIZATION OF APPROPRIATIONS.—From  
13 amounts authorized to be appropriated to the National  
14 Environmental Satellite, Data, and Information Service,  
15 there shall be available \$20,000,000 for fiscal years 2025  
16 through 2029 to carry out to this section.

17 **SEC. 208. ADVANCED WEATHER INTERACTIVE PROCESSING**  
18 **SYSTEM.**

19 (a) IN GENERAL.—Not later than September 30,  
20 2030, the Under Secretary, acting through the Director  
21 of the National Weather Service, shall develop a strategy  
22 to transition operations of the Advanced Weather Inter-  
23 active Processing System to an operational cloud-based  
24 environment in order to enable a more nimble, flexible,  
25 and mobile workforce.

1       (b) SERVICES.—The Under Secretary shall ensure  
2 that the Advanced Weather Interactive Processing System  
3 in an operational cloud-based environment referred to in  
4 subsection (a) provides impact-based decision support  
5 services to emergency managers at the Federal, State,  
6 local, and Tribal levels, and continues to provide the fol-  
7 lowing services:

8           (1) Integrating and displaying forecast data, in-  
9 cluding meteorological, hydrological, climate, ocean,  
10 satellite, and radar data, for National Weather Serv-  
11 ice field offices and national centers.

12          (2) Acquiring and processing observational data  
13 from sensors and local sources.

14          (3) Providing an interactive communications  
15 system, including any relevant capabilities of the ex-  
16 isting satellite broadcast network, to connect rel-  
17 evant National Weather Service employees and sites.

18          (4) Initiating the dissemination of weather,  
19 water, marine, ecological, climate, aviation, and  
20 space warnings and forecasts in a rapid and highly  
21 reliable manner.

22       (c) ELEMENTS.—The transition of operations re-  
23 quired under subsection (a) may include the following:



1           (1) Establishment or support of testbeds, pilot  
2           projects, and functional testing activities to facilitate  
3           remote evaluation and automated testing.

4           (2) Coordinated training efforts needed for  
5           Federal and non-Federal users and operators of the  
6           Advanced Weather Interactive Processing System in  
7           an operational cloud-based environment referred to  
8           in subsection (a).

9           (3) Evaluation of bandwidth requirements to  
10          achieve a quality user experience.

11          (4) Installation of circuits to reduce lapses in  
12          network operations and support backup functions.

13          (5) Establishment of a cloud-based, remotely  
14          accessible repository for data referred to in sub-  
15          section (b)(2).

16          (6) Development and deployment of virtualized  
17          systems to replace physical hardware at operational  
18          sites.

19          (7) Evaluation of commercial cloud providers,  
20          including hybrid approaches, to meet mission needs.

21          (8) Development, testing, demonstration, eval-  
22          uation, and operationalization of forecast and warn-  
23          ing products, consistent with the mission and sci-  
24          entific expertise of the National Oceanic and Atmos-  
25          pheric Administration.

1 (d) UPDATES TO CONGRESS.—The Under Secretary  
 2 shall submit to the Committee on Science, Space, and  
 3 Technology of the House of Representatives and the Com-  
 4 mittee on Commerce, Science, and Transportation of the  
 5 Senate periodic updates on the implementation of this sec-  
 6 tion.

7 (e) CONTINUED INNOVATION.—Nothing in this sec-  
 8 tion may be construed as prohibiting the development of  
 9 new forecast capabilities, sub-systems, or implementing  
 10 modeling advancements on the operational computing sys-  
 11 tems of the Administration.

12 **SEC. 209. REANALYSIS AND REFORECASTING.**

13 The Under Secretary may support reanalysis and re-  
 14 forecasting activities within the National Oceanic and At-  
 15 mospheric Administration, including through weather  
 16 testbeds of the Administration, for—

17 (1) improving weather forecasts, extreme  
 18 weather predictions, and weather and climate  
 19 datasets; and

20 (2) serving as training data for artificial intel-  
 21 ligence and machine learning data-driven models.

22 **SEC. 210. NATIONAL WEATHER SERVICE WORKFORCE.**

23 (a) HIRING.—The Director of the National Weather  
 24 Service shall annually submit to the Under Secretary and  
 25 Congress an assessment of the milestones, timelines, and

1 service level expectations required for the expeditious hir-  
2 ing and timely on-boarding of employees of the National  
3 Weather Service. Each such assessment may include the  
4 following:

5 (1) Recommendations to outsource hiring to  
6 any entity other than the National Weather Service  
7 in order to meet such milestones, timelines, and  
8 service level expectations.

9 (2) Determinations of the number of staff and  
10 designated positions required at each forecasting of-  
11 fice to provide services to protect lives and property  
12 in the geographic region of responsibility.

13 (b) HEALTH AND MORALE ASSESSMENT.—The Di-  
14 rector of the National Weather Service shall contract or  
15 continue to partner with an entity other than the National  
16 Weather Service to conduct an assessment of medical im-  
17 pacts, including stress and long-term health impacts, on  
18 National Weather Service employees related to required  
19 rotating shift work. Such assessment may include options  
20 for mitigating such impacts on employees and rec-  
21 ommendations for improving benefits related to required  
22 rotating shift work.

23 (c) ROLE OF THE DIRECTOR.—Notwithstanding the  
24 results of the assessment under subsection (a), the Direc-

1 tor of the National Weather Service shall establish service  
2 level standards based on staffing levels.

3 (d) DESIGNATION OF SERVICE HYDROLOGIST.—

4 (1) IN GENERAL.—The Director of the National  
5 Weather Service may designate at least one service  
6 hydrologist at each Weather Forecast Office of the  
7 National Weather Service.

8 (2) LIMITATION.—Nothing in this section may  
9 be construed to authorize or require a change in the  
10 authorized number of full time equivalent employees  
11 of the National Weather Service or otherwise result  
12 in the employment of any additional employees.

13 (3) PERFORMANCE BY OTHER EMPLOYEES.—  
14 Notwithstanding paragraphs (4) and (5), the Direc-  
15 tor of the National Weather Service may assign the  
16 performance of the responsibilities described in this  
17 subsection to such other staff of the National  
18 Weather Service as the Director considers appro-  
19 priate

20 (4) RESPONSIBILITIES.—In order to increase  
21 impact-based decision support services, each service  
22 coordination hydrologist designated under paragraph  
23 (1) shall, with respect to hydrology, carry out the  
24 following:

1 (A) Be responsible for providing service to  
2 the geographic area of responsibility covered by  
3 the Weather Forecast Office at which the serv-  
4 ice coordination hydrologist is employed to help  
5 ensure that users of products and services of  
6 the National Weather Service can respond ef-  
7 fectively to improve outcomes from flood events.

8 (B) Liaise with users of products and serv-  
9 ices of the National Oceanic and Atmospheric  
10 Administration, such as emergency managers,  
11 the public, academia, media outlets, users in the  
12 hydropower, transportation, recreation, and ag-  
13 ricultural communities, and forestry, land, fish-  
14 eries, and water management interests, to  
15 evaluate the adequacy and usefulness of the  
16 products and services referred to in subpara-  
17 graph (A), including extended range streamflow  
18 forecasts, water supply forecasts, drought out-  
19 looks, flood inundation mapping, coastal inun-  
20 dation, and flood warnings.

21 (C) Collaborate with the National Water  
22 Center, River Forecast Centers, other Weather  
23 Forecast Offices, the National Integrate  
24 Drought Information System, Administration  
25 offices, and Federal, State, local, and Tribal

1 government agencies, as the Director considers  
2 appropriate, in developing, proposing, and im-  
3 plementing plans to develop, modify, or tailor  
4 such products and services to improve the use-  
5 fulness of such products and services.

6 (D) Engage in interagency partnerships  
7 with Federal, State, local, and Tribal govern-  
8 ment agencies to explore the use of forecast-in-  
9 formed reservoir operations to reduce flood risk  
10 and inform decisions related to water resources  
11 management.

12 (E) Ensure the maintenance and accuracy  
13 of flooding and water resource management  
14 partner call lists, appropriate office hydrologic  
15 service policy or procedures, and other hydro-  
16 logic information or dissemination methodolo-  
17 gies or strategies.

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.

1 (5) ADDITIONAL RESPONSIBILITIES.—A service  
2 coordination hydrologist designated under this sub-  
3 section 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 concerned;

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

10 (C) develop plans to carry out the respon-  
11 sibilities described in paragraph (4); 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 (e) PILOT PROJECTS.—

18 (1) IN GENERAL.—The Director of the National  
19 Weather Service shall—

20 (A) perform pilot projects for trans-  
21 formational services related to decision support  
22 services and technology, transitioning data and  
23 services to the cloud, provision of on-site deci-  
24 sion support for emergency management oper-  
25 ations, and transition to and communication of

1           probabilistic models, forecasts, and hazard in-  
2           formation; and

3                   (B) conduct a study to assess the capabili-  
4           ties needed to scale those pilot projects toward  
5           a new, more efficient and effective operations  
6           model.

7           (2) SUNSET.—The authority under paragraph  
8           (1) shall terminate two years after the date of the  
9           enactment of this Act.

10 **SEC. 211. ARTIFICIAL INTELLIGENCE FOR WEATHER FORE-**  
11 **CASTING.**

12           (a) DEFINITIONS.—In this section:

13                   (1) ARTIFICIAL INTELLIGENCE.—The term “ar-  
14           tificial intelligence”—

15                           (A) has the meaning given that term in  
16           section 5002 of the National Artificial Intel-  
17           ligence Initiative Act of 2020 (15 U.S.C. 9401);  
18           and

19                           (B) includes machine learning, neural net-  
20           works, and natural language processing.

21                   (2) ARTIFICIAL INTELLIGENCE WEATHER  
22           MODEL.—The term “artificial intelligence weather  
23           model” means a weather model based primarily on  
24           artificial intelligence technology to project future



1 Earth system conditions based on machine learning  
 2 using weather forecasting training datasets.

3 (3) CURATE.—The term “curate”, with respect  
 4 to a dataset, means—

5 (A) to collect and maintain the dataset—

6 (i) to ensure and document its quality;

7 and

8 (ii) to provide metadata on its prove-  
 9 nance; and

10 (B) to update the dataset periodically, as  
 11 appropriate and practicable.

12 (4) NUMERICAL WEATHER MODEL.—The term  
 13 “numerical weather model” means a weather model  
 14 based primarily on coupled Earth System processes  
 15 that uses numerical computation to forecast future  
 16 Earth system conditions.

17 (5) OBSERVATIONAL DATA.—The term “obser-  
 18 vational data” means data and metadata from ac-  
 19 tual observations of environmental conditions, in-  
 20 cluding remote sensing and in situ platforms.

21 (6) SYNTHETIC DATA.—The term “synthetic  
 22 data” means data produced from a model or statis-  
 23 tical method in order to fill gaps in observational  
 24 data.

1           (7) WEATHER FORECASTING TRAINING  
2 DATASET.—The term “weather forecasting training  
3 dataset”—

4           (A) means a dataset that contains contin-  
5 uous global observational data and synthetic  
6 data for Earth system variables relevant to  
7 weather forecasting, aviation weather, marine  
8 weather, and hydrology and water management;  
9 and

10          (B) may include model reanalysis and fore-  
11 casts initialized through a data assimilation sys-  
12 tem.

13 (b) PURPOSE.—The purpose of this section is to—

14          (1) improve accuracy and timeliness of weather,  
15 water, and space weather forecasts and effective dis-  
16 semination of critical information;

17          (2) strengthen analytic capacity to inform re-  
18 source deployments in response to and to mitigate  
19 harm from weather, water, and space weather haz-  
20 ards through the mandated exploration and use of  
21 artificial intelligence by Federal agencies;

22          (3) strengthen public-private partnerships to ac-  
23 celerate adoption and outcomes of the use of artifi-  
24 cial intelligence in response to and to mitigate such  
25 harm; and

1           (4) strengthen public-private partnerships in  
2           highly technical, high-risk, and high-reward fields re-  
3           lated to weather, water, and space weather forecasts.

4           (c) EARTH SYSTEM FORECASTING AND INFORMA-  
5           TION DELIVERY.—

6           (1) TRAINING DATASETS.—Not later than 4  
7           years after the date of the enactment of this Act, the  
8           Under Secretary, in consultation with the Secretary  
9           of Energy, the Administrator of the National Aero-  
10          nautics and Space Administration, the Director of  
11          the National Science Foundation, the Director of the  
12          National Center for Atmospheric Research, the  
13          Interagency Council on Advancing Meteorological  
14          Services, other appropriate Federal advisory commit-  
15          tees as determined by the Under Secretary, and such  
16          other technical experts as the Under Secretary con-  
17          siders appropriate, shall develop and curate com-  
18          prehensive weather forecasting training datasets  
19          with relevant Earth system data, quality informa-  
20          tion, and metadata necessary for weather fore-  
21          casting.

22          (2) USE OF EXISTING DATASETS.—In order to  
23          speed the development of the weather forecasting  
24          training datasets required under paragraph (1), the  
25          Under Secretary shall assess, and to the greatest ex-

1       tent practicable build on, existing Earth system rea-  
2       nalysis datasets of the Federal Government.

3               (3)   ARTIFICIAL   INTELLIGENCE   WEATHER  
4       MODEL.—

5               (A) GLOBAL MODEL.—In carrying out this  
6       subsection, the Under Secretary, in consultation  
7       with appropriate Federal advisory committees  
8       as determined by the Under Secretary, may de-  
9       velop and test a global weather model based on  
10      artificial intelligence technologies utilizing data  
11      of the National Oceanic and Atmospheric Ad-  
12      ministration to the extent possible.

13              (B) REGIONAL AND LOCAL MODELS.—In  
14      addition to a global weather model under sub-  
15      paragraph (A), the Under Secretary may exper-  
16      iment with regional and local weather models  
17      based on artificial intelligence technologies.

18              (4) USE OF ARTIFICIAL INTELLIGENCE TO DIS-  
19      SEMINATE INFORMATION.—In coordination with an  
20      artificial intelligence weather model or models devel-  
21      oped under paragraph (3), the Under Secretary may  
22      explore the use of artificial intelligence to enhance  
23      the dissemination of information with respect to  
24      weather and evaluate the effectiveness of commu-

1        nication for improved public understanding and pre-  
 2        paredness.

3            (5) CONTINUED SUPPORT FOR OBSERVATIONS,  
 4        BASIC RESEARCH, AND NUMERICAL WEATHER MOD-  
 5        ELS.—Notwithstanding the requirements of this sub-  
 6        section, the Under Secretary shall continue to sup-  
 7        port and advance the activities of the National Oce-  
 8        anic and Atmospheric Administration—

9            (A) to collect and acquire traditional and  
 10        novel observational data relevant for artificial  
 11        intelligence and numerical weather, water, and  
 12        space weather forecasting;

13          (B) to advance research on the Earth sys-  
 14        tem and numerical weather model forecasting;

15          (C) to develop and advance numerical  
 16        Earth system modeling for predictions;

17          (D) to develop weather model data post-  
 18        processing techniques; and

19          (E) to improve data assimilation tech-  
 20        niques.

21          (6) OBSERVING SYSTEM COVERAGE.—In car-  
 22        rying out this subsection, the Under Secretary may  
 23        evaluate the use of cost functions in data-driven ma-  
 24        chine learning model training to balance inequities  
 25        in observing system coverage and data poor areas.

1           (7)    UNCERTAINTY    QUANTIFICATION    RE-  
 2    SEARCH.—In carrying out this subsection, the Under  
 3    Secretary may develop uncertainty quantification re-  
 4    search for the purpose of accurate environmental  
 5    risk and hazard communications of probabilistic pre-  
 6    dictions and forecasts.

7           (8) REPORT.—Not later than 2 years after the  
 8    date of the enactment of this Act, and not less fre-  
 9    quently than every 2 years thereafter through 2035,  
 10   the Under Secretary shall submit to the Committee  
 11   on Commerce, Science, and Transportation of the  
 12   Senate and the Committee on Science, Space, and  
 13   Technology of the House of Representatives a report  
 14   on the activities conducted under this subsection.

15       (d) ADVANCED ARTIFICIAL INTELLIGENCE APPLICA-  
 16   TIONS FOR WEATHER AND INFORMATION DELIVERY.—  
 17   The Under Secretary shall explore advanced applications  
 18   of artificial intelligence to improve weather forecasts and  
 19   information delivery, such as by—

20           (1) improving data assimilation;

21           (2) accounting for coupled Earth system proc-  
 22   esses;

23           (3) using artificial intelligence weather models  
 24   to generate ensemble forecasts to more accurately  
 25   assess flow-dependent forecast uncertainties; and

1           (4) improving impact-based decision support to  
2       diverse users and communities for greater societal  
3       benefits based on those forecasts.

4       (e) TECHNICAL ASSISTANCE ON USE OF ARTIFICIAL  
5 INTELLIGENCE WEATHER, WATER, AND SPACE WEATH-  
6 ER MODELS.—

7           (1) IN GENERAL.—The Under Secretary shall  
8       provide—

9           (A) technical assistance, data access, and  
10       support for forecasters, scientists, social sci-  
11       entists, and engineers to test and evaluate the  
12       use and effectiveness of the artificial intel-  
13       ligence models of the National Oceanic and At-  
14       mospheric Administration, including within the  
15       testbeds of the Administration;

16          (B) best practices on providing forecasts  
17       based on outputs from artificial intelligence  
18       weather models and numerical weather models,  
19       or a combination thereof; and

20          (C) support for emergency managers to  
21       make operational decisions based on outputs  
22       from artificial intelligence weather models and  
23       numerical weather models, or a combination  
24       thereof.

25       (2) ASSESSMENT OF WEATHER MODELS.—

1 (A) IN GENERAL.—The Under Secretary  
2 shall support the development of a common  
3 framework for the assessment of numerical  
4 weather models and artificial intelligence weath-  
5 er models by comparing model output and ob-  
6 servational data over a period of time in the  
7 past through the use of such methodologies as  
8 the Under Secretary considers appropriate.

9 (B) BEST PRACTICES.—In carrying out  
10 this paragraph, the Under Secretary may de-  
11 velop and disseminate best practices in collabo-  
12 ration with—

13 (i) the National Institute of Standards  
14 and Technology, the National Aeronautics  
15 and Space Administration, the National  
16 Science Foundation, and the Department  
17 of Energy;

18 (ii) academic and research institu-  
19 tions; and

20 (iii) the private sector.

21 (3) TECHNICAL ASSISTANCE.—In carrying out  
22 this subsection, the Under Secretary may provide  
23 technical assistance, best practices, and support re-  
24 quired under paragraph (1) through the National  
25 Weather Service.



1           (4) INDEPENDENT STUDY ON THE IMPACTS OF  
 2       ARTIFICIAL INTELLIGENCE WEATHER, WATER, AND  
 3       SPACE WEATHER MODELS.—The Under Secretary  
 4       may enter into an agreement with the National  
 5       Academy of Sciences or another entity as determined  
 6       appropriate by the Under Secretary to assess the  
 7       impacts of artificial intelligence weather models on  
 8       the weather enterprise and make recommendations  
 9       to improve the integration of such models in oper-  
 10      ational forecasting.

11       (f) PARTNERSHIPS FOR TRANSFORMATIONAL INNO-  
 12      VATION.—

13           (1) IN GENERAL.—The Under Secretary may  
 14       explore novel structures for partnerships with pri-  
 15       vate, academic, and international entities for re-  
 16       search and development of transformative innovation  
 17       in weather forecasting and other environmental fore-  
 18       casts—

19           (A) to further the understanding of weath-  
 20       er, water, and space weather, and their societal  
 21       impact;

22           (B) to advance the science of weather and  
 23       water forecasting, including seasonal and sub-  
 24       seasonal forecasting; and

1 (C) to develop, evaluate, and transition ar-  
2 tificial intelligence weather, water, and hazard  
3 forecasting applications to operations.

4 (2) CO-INVESTMENT.—Subject to applicable  
5 law, the Under Secretary may consider and adopt  
6 novel co-investment strategies with the private aca-  
7 demic and international sectors to carry out para-  
8 graph (1), including—

9 (A) non-Federal Government contributions  
10 to resource and support high-risk, high-return  
11 research and development in environmental  
12 forecasting, data science, artificial intelligence,  
13 and related fields;

14 (B) shared rights to intellectual property  
15 from research and development activities under  
16 this subsection; and

17 (C) other approaches to sharing resources  
18 and results under this subsection.

19 (g) AVAILABILITY OF DATASET.—

20 (1) IN GENERAL.—The Under Secretary shall  
21 develop and implement a plan to make available to  
22 the public, at no cost and subject to applicable law  
23 and policy, the following:

1           (A) Operational artificial intelligence  
2 weather models developed by the National Oce-  
3 anic and Atmospheric Administration.

4           (B) Artificial intelligence weather models  
5 that are not operational models, including ex-  
6 perimental and developmental models, as the  
7 Under Secretary determines appropriate.

8           (C) Applicable information and documenta-  
9 tion for artificial intelligence weather models  
10 described in subparagraphs (A) and (B), includ-  
11 ing a description of intended model outputs.

12           (D) Subject to subsection (i), all data  
13 owned by the Federal Government and data  
14 that the Under Secretary has the legal right to  
15 redistribute that are associated with artificial  
16 intelligence weather models made available to  
17 the public pursuant to the plan and used in  
18 operational forecasting by the Administration,  
19 including—

20                   (i) relevant metadata; and

21                   (ii) data used for operational artificial  
22 intelligence weather models used by the  
23 Administration.

24           (2) ACCOMMODATIONS.—In developing and im-  
25 plementing the plan under paragraph (1), the Under

1 Secretary may make such accommodations as the  
2 Under Secretary considers appropriate to ensure  
3 that the public release of any artificial intelligence  
4 weather model, information, documentation, or data  
5 pursuant to the plan does not jeopardize—

6 (A) national security;

7 (B) intellectual property or redistribution  
8 rights, including under titles 17 and 35, United  
9 States Code;

10 (C) any trade secret or commercial or fi-  
11 nancial information subject to section 552(b)(4)  
12 of title 5, United States Code;

13 (D) any models or data that are otherwise  
14 restricted by contract or other written agree-  
15 ment; or

16 (E) the mission of the Administration to  
17 protect lives and property.

18 (3) REPORT.—

19 (A) IN GENERAL.—Not later than 1 year  
20 after the date of the enactment of this Act, the  
21 Under Secretary shall submit to Congress a re-  
22 port, in both unclassified and classified form,  
23 regarding the risks to the economic and intellec-  
24 tual security of the United States from foreign

1 countries of concern through access by those  
2 countries to weather data in the United States.

3 (B) ELEMENTS.—The report required  
4 under subparagraph (A) shall include—

5 (i) a full analysis of the national, in-  
6 tellectual, and economic security implica-  
7 tions for the United States with respect to  
8 intellectual property theft or cyber or  
9 human espionage through access to weath-  
10 er data; and

11 (ii) conclusions of the Under Sec-  
12 retary and recommendations for legislative  
13 and administrative action, if any.

14 (C) FOREIGN COUNTRY OF CONCERN DE-  
15 FINED.—In this paragraph, the term “foreign  
16 country of concern” has the meaning given that  
17 term in section 9901 of the William M. (Mac)  
18 Thornberry National Defense Authorization Act  
19 for Fiscal Year 2021 (15 U.S.C. 4651).

20 (h) RETENTION OF FEDERAL GOVERNMENT EXPER-  
21 TISE.—Subject to applicable law, the Under Secretary  
22 may consider novel methods to recruit, retrain, and retain  
23 expert personnel to support activities under this section,  
24 including by—

1           (1) using methods to be competitive with sala-  
2       ries outside the Federal Government;

3           (2) developing staff exchange programs and  
4       training programs; and

5           (3) leveraging diverse hiring strategies.

6       (i) PROTECTION OF NATIONAL SECURITY INTER-  
7       ESTS.—

8           (1) IN GENERAL.—Notwithstanding any other  
9       provision of this section, the Under Secretary, in  
10      consultation with the Secretary of Defense, as ap-  
11      propriate, may withhold models or data used under  
12      this section if the Under Secretary determines doing  
13      so to be necessary to protect the national security  
14      interests of the United States.

15          (2) RULE OF CONSTRUCTION.—Nothing in this  
16      section shall be construed to supersede any other  
17      provision of law governing the protection of the na-  
18      tional security interests of the United States.

19   **SEC. 212. COMPOSITION OF THE ATMOSPHERE AND ATMOS-**  
20                   **PHERIC OBSERVATIONS.**

21          (a) ASSESSMENTS.—Not later than 2 years after the  
22      date of the enactment of this Act, the Under Secretary  
23      shall submit to the appropriate committees of Congress  
24      a report that includes the following:

1           (1) An identification of Federal observation ca-  
2           pabilities and data gaps related to the composition  
3           of Earth's atmosphere, including the troposphere  
4           and stratosphere.

5           (2) An analysis of Federal efforts that advance  
6           scientific understanding of the effects on the Earth's  
7           radiation budget of direct or indirect actions that  
8           may change the composition of Earth's atmosphere.

9           (3) The current and projected use of ground  
10          based, space based, and maritime based remote and  
11          in situ sensing capabilities, autonomous and manned  
12          aerial platforms, and other commercially available  
13          technologies and platforms of opportunity to accel-  
14          erate research and increase observations and moni-  
15          toring of Earth's atmosphere.

16          (4) Recommendations for the adaptation or ex-  
17          pansion of technologies and platforms identified  
18          under paragraph (3).

19          (5) An identification and prioritization of addi-  
20          tional observation and analysis capabilities needed to  
21          ensure comprehensive monitoring that detects future  
22          changes in atmospheric composition.

23          (b) CONSIDERATIONS.—In preparing an assessment  
24          required by subsection (a), the Under Secretary shall con-  
25          sider and use, as appropriate, reports and studies con-

1 ducted by Federal agencies, the National Research Coun-  
2 cil, or other entities.

3 (c) PILOT PROJECTS.—

4 (1) PILOT PROJECTS.—The Under Secretary  
5 may conduct pilot projects of atmospheric composi-  
6 tion observational systems and platforms including—

7 (A) the use of atmospheric observing in-  
8 struments on commercial and uncrewed air-  
9 craft;

10 (B) the use of atmospheric and oceanic ob-  
11 serving instruments on uncrewed ocean surface  
12 platforms or deployed on commercial or other  
13 nondedicated ocean vessels; and

14 (C) in-situ observation capability to con-  
15 duct regular atmospheric observations of the  
16 troposphere and stratosphere.

17 (2) CONSULTATION AND COORDINATION.—The  
18 Under Secretary shall consult and coordinate with  
19 relevant Federal agencies to develop processes for  
20 the appropriate deployment of systems and plat-  
21 forms pursuant to pilot projects required by para-  
22 graph (1).

23 (d) AUTHORITY TO ENTER INTO AGREEMENTS.—

24 Notwithstanding any other provision of law, the Under  
25 Secretary may enter into agreements, to the extent nec-



1 essary to carry out this section, with governmental and  
 2 nongovernmental entities—

3           (1) for the purchase of atmospheric composition  
 4       data from commercial providers;

5           (2) for the hosting of observational instruments  
 6       on government or private platforms; and

7           (3) to leverage data from international plat-  
 8       forms as appropriate.

9       (e) DEFINITION OF APPROPRIATE COMMITTEES OF  
 10 CONGRESS.—In this section, the term “appropriate com-  
 11 mittees of Congress” means—

12           (1) the Committee on Commerce, Science, and  
 13       Transportation of the Senate; and

14           (2) the Committee on Science, Space, and  
 15       Technology of the House of Representatives.

16 **SEC. 213. PROJECT TO IMPROVE FORECASTS OF COASTAL**  
 17 **MARINE FOG.**

18       (a) IN GENERAL.—The Under Secretary shall con-  
 19       duct a project to improve forecasts of coastal marine fog.

20       (b) GOAL.—The goal of the project required under  
 21       subsection (a) is to enhance vessel safety and reduce the  
 22       economic impact of coastal marine fog events, with a focus  
 23       on—

24           (1) increasing the number of marine-based ob-  
 25       servations through additional Federal platforms and

1 commercially acquired observations in locations  
2 where impacts from marine fog and reduced visi-  
3 bility have major safety and economic impacts, in-  
4 cluding through the use of—

5 (A) buoys;

6 (B) meteorological stations measuring visi-  
7 bility, temperature, dewpoint, and wind speed  
8 and direction as a stand-alone or co-located  
9 with water level sensors, such as those that are  
10 part of the physical oceanographic observation  
11 system program of the National Oceanic and  
12 Atmospheric Administration;

13 (C) stationary platforms or drifting instru-  
14 ments;

15 (D) vessels;

16 (E) unmanned systems;

17 (F) remote sensing technologies, including  
18 rapid refresh hyperspectral satellite imagery;  
19 and

20 (G) advanced algorithms that extract ac-  
21 tionable information from observational data,  
22 including early detection and regular moni-  
23 toring of marine fog;

24 (2) advancing geographic coverage, resolution,  
25 skill, and accuracy of marine fog modeling, includ-

1 ing, when feasible, additional locations and advance-  
2 ments in marine channel forecast capability;

3 (3) improving communication of marine fog  
4 advisories by the National Oceanic and Atmospheric  
5 Administration;

6 (4) communicating risks posed by hazardous  
7 marine fog events in a way that maximizes informed  
8 decision making by the public; and

9 (5) providing decision support services based on  
10 environmental information that is actionable to the  
11 recipient of a marine fog advisory.

12 (c) STAKEHOLDER ENGAGEMENT.—In implementing  
13 the project required under subsection (a), the Under Sec-  
14 retary shall meet with public and private stakeholders re-  
15 garding the planning, development, and implementation of  
16 the project.

17 (d) TRIBAL ENGAGEMENT.—The Under Secretary  
18 shall meet with Indian tribes (as defined in section 4 of  
19 the Indian Self-Determination and Education Assistance  
20 Act (25 U.S.C. 5304)) regarding the planning, develop-  
21 ment, and implementation of the project required under  
22 subsection (a).

23 (e) PROJECT PLAN.—Not later than one year after  
24 the date of the enactment of this Act, the Under Secretary  
25 shall develop a plan for the project required under sub-

1 section (a) that details the specific research, development,  
2 and technology transfer activities, as well as corresponding  
3 resources and timelines, necessary to achieve the goal set  
4 forth under subsection (b).

5 **TITLE III—COMMERCIAL WEATH-**  
6 **ER AND ENVIRONMENTAL OB-**  
7 **SERVATIONS**

8 **SEC. 301. COMMERCIAL DATA PROGRAM.**

9 The Weather Research and Forecasting Innovation  
10 Act of 2017 is amended by striking section 302 (15 U.S.C.  
11 8532) and inserting the following:

12 **“SEC. 302. COMMERCIAL DATA PROGRAM.**

13 “(a) PROGRAM ESTABLISHMENT.—The Under Sec-  
14 retary, in coordination with the heads of appropriate of-  
15 fices of the National Oceanic and Atmospheric Adminis-  
16 tration, shall maintain a Commercial Data Program to co-  
17 ordinate and execute acquisition of weather and environ-  
18 mental data and services from private sector entities for  
19 operational use.

20 “(b) PROGRAM ELEMENTS.—The Under Secretary  
21 may acquire satellite, ground-based, airborne, or marine-  
22 based in situ, remote sensing, or crowd-sourced data and  
23 services for operational use relating to weather and envi-  
24 ronmental forecasting and modeling.

1       “(c) COORDINATION AND COLLABORATION.—The  
2 Under Secretary shall ensure the Commercial Data Pro-  
3 gram coordinates, collaborates, and ensures access to data  
4 across the Administration, including among the following:

5           “(1) The National Mesonet Program.

6           “(2) The Aircraft Based Observation Program.

7           “(3) The National Integrated Drought Informa-  
8 tion System, including the National Coordinated Soil  
9 Moisture Monitoring Network.

10          “(4) The National Integrated Flood Informa-  
11 tion System.

12          “(5) The Global Ocean Monitoring and Observ-  
13 ing Program.

14          “(6) The National Data Buoy Center.

15          “(7) The Uncrewed Systems Operation Center.

16          “(8) The Ocean Exploration Program.

17          “(9) Any other program or office the Under  
18 Secretary determines appropriate.

19       “(d) STANDARDS AND SPECIFICATIONS.—Not later  
20 than 180 days after the date of the enactment of this sec-  
21 tion and on a continuous basis thereafter, the Under Sec-  
22 retary shall publish data, metadata, and service standards  
23 and specifications required for acquired observation serv-  
24 ices and data for use, licensing, and attribution to ensure  
25 quality, impact, and compatibility of such services and

1 data with National Oceanic and Atmospheric Administra-  
 2 tion modeling capabilities, meteorological situational  
 3 awareness, and forecasting.

4 “(e) PRIORITIZATION.—In acquiring data and serv-  
 5 ices from private sector entities, the Under Secretary shall  
 6 prioritize obtaining surface-based, airborne-based, space-  
 7 based, and coastal- and ocean-based data, metadata, and  
 8 services for operational use from entities that participate  
 9 in the Commercial Data Pilot Program or other programs  
 10 of the National Oceanic and Atmospheric Administration  
 11 that acquire commercial data or observations.

12 “(f) NOAA OBSERVING SYSTEMS AND FLEET COUN-  
 13 CILS.—

14 “(1) IN GENERAL.—The Under Secretary shall  
 15 maintain the National Oceanic and Atmospheric Ad-  
 16 ministration Observing Systems Council and the  
 17 NOAA Fleet Council (in this subsection referred to  
 18 as the ‘Councils’) to provide strategic recommenda-  
 19 tions and guidance regarding the prioritization, de-  
 20 sign, development, acquisition, upgrading, lifecycle,  
 21 performance monitoring, and retiring of major com-  
 22 ponents of observing systems and portfolios, includ-  
 23 ing related to the acquisition of commercial weather  
 24 and environmental data and services.

1           “(2) LINE OFFICE COORDINATION.—The Coun-  
2       cils shall ensure coordination and adherence to uni-  
3       form policies by providing guidance to all line offices  
4       of the National Oceanic and Atmospheric Adminis-  
5       tration engaged in observing systems portfolio de-  
6       sign, technology, development, execution, and oper-  
7       ation.

8           “(3) COMMITTEE.—The Under Secretary shall  
9       maintain a Committee within the Councils to develop  
10      and approve procedural directives, guides, or hand-  
11      books relevant to management of data and informa-  
12      tion, including commercial data, and coordinate data  
13      governance and management practices across the  
14      National Oceanic and Atmospheric Administration  
15      to promote consistent processes.

16      “(g) AUTHORIZATION OF APPROPRIATIONS.—

17           “(1) IN GENERAL.—There are authorized to be  
18      appropriated \$100,000,000 for each of fiscal years  
19      2025 through 2029 to carry out this section.

20           “(2) SENSE OF CONGRESS.—It is the sense of  
21      Congress that the Under Secretary should seek to  
22      enter into contracts or other appropriate agreements  
23      that enable the expenditure, to the maximum extent  
24      practicable, of amounts authorized to be appro-

1        priated or otherwise made available in a fiscal year  
2        to carry out this section.

3        “(h) DATA AND HOSTED PAYLOADS.—Notwith-  
4        standing any other provision of law, the Secretary of Com-  
5        merce may enter into agreements relating to the following:

6                “(1) The purchase of weather and environ-  
7        mental data and services through contracts with pri-  
8        vate sector commercial data and service providers.

9                “(2) The placement of weather instruments on  
10       co-hosted Federal, international, or private space,  
11       airborne, maritime, or ground platforms.

12       “(i) OMBUDSMAN.—The Under Secretary shall estab-  
13       lish or designate at least one Ombudsman position within  
14       the Commercial Data Program to implement the rec-  
15       ommendations of the Observing System Council under  
16       subsection (e) related to commercial weather and environ-  
17       mental data and services acquisitions. Such an Ombuds-  
18       man shall act as the liaison between private sector data  
19       and service providers and the National Oceanic and At-  
20       mospheric Administration with respect to receiving rec-  
21       ommendations and resolving issues related to engagement,  
22       testing, contracting, or other areas related to the Adminis-  
23       tration’s efforts to acquire commercial weather and envi-  
24       ronmental data and services.



1       “(j) REPORT.—Not later than two years after the  
 2 date of the enactment of this section, the Under Secretary  
 3 shall submit to the Committee on Science, Space, and  
 4 Technology of the House of Representatives and the Com-  
 5 mittee on Commerce, Science, and Transportation of the  
 6 Senate a report evaluating the activities and needed au-  
 7 thorities related to data governance and management  
 8 practices, including acquisition, collection, documentation,  
 9 quality control, validation, reprocessing, storage, retrieval,  
 10 dissemination, and long-term preservation activities across  
 11 all National Oceanic and Atmospheric Administration line,  
 12 staff, and corporate offices.”.

13 **SEC. 302. COMMERCIAL DATA PILOT PROGRAM.**

14       The Weather Research and Forecasting Innovation  
 15 Act of 2017 is amended by striking section 303 (15 U.S.C.  
 16 8533) and inserting the following new section:

17 **“SEC. 303. COMMERCIAL DATA PILOT PROGRAM.**

18       “(a) PROGRAM ESTABLISHMENT.—Within the Com-  
 19 mercial Data Program under section 302, there shall, to  
 20 the maximum extent practicable, be a Commercial Data  
 21 Pilot Program to engage with external partners and pro-  
 22 viders to test and develop shared standards and meth-  
 23 odologies for quality, use, licensing, and attribution of ob-  
 24 servation services and data, and to ensure quality, impact,  
 25 and compatibility of such services and data with National

1 Oceanic and Atmospheric Administration modeling capa-  
2 bilities, meteorological situational awareness, and fore-  
3 casting. The Program is authorized to test and evaluate  
4 all sources and types of observation services, imagery,  
5 products, and data from private sector entities, including  
6 new and innovative surface-based, airborne-based, space-  
7 based, and coastal- and ocean-based data, metadata, and  
8 model components.

9 “(b) CRITERIA.—The Under Secretary shall ensure  
10 that data acquired through the Commercial Data Pilot  
11 Program described in subsection (a) meets the most recent  
12 standards and specifications required for observation serv-  
13 ices and data as published pursuant to section 302(c).

14 “(c) PILOT CONTRACTS.—The Under Secretary shall,  
15 through an open competition, regularly enter into pilot  
16 contracts with private sector entities capable of providing  
17 observation services and data referred to in subsection (a)  
18 that meet the standards and specifications published pur-  
19 suant to section 302(c) for so providing such services and  
20 data in a manner that allows the Under Secretary to cali-  
21 brate and evaluate such services and data for use in Na-  
22 tional Oceanic and Atmospheric Administration activities.

23 “(d) ASSESSMENT OF VIABILITY.—The Under Sec-  
24 retary shall annually assess and submit to the Committee  
25 on Commerce, Science, and Transportation of the Senate

1 and the Committee on Science, Space, and Technology of  
2 the House of Representatives a summary of the pilot con-  
3 tracts entered into pursuant to subsection (c), an assess-  
4 ment of the extent to which such contracts meet the stand-  
5 ards and specifications published pursuant to section  
6 302(c), and any additional information determined nec-  
7 essary related to the following:

8           “(1) The viability of integrating observation  
9           services and data from private sector entities into  
10          National Oceanic and Atmospheric Administration  
11          forecasts and models.

12          “(2) The expected value added or improvements  
13          from such services and data if integrated into Na-  
14          tional Oceanic and Atmospheric Administration fore-  
15          casts and models.

16          “(3) The accuracy, quality, timeliness, validity,  
17          reliability, usability, information technology security,  
18          and cost-effectiveness of obtaining observation serv-  
19          ices and data from private sector entities.

20          “(4) If the Under Secretary determines it is  
21          viable to integrate such services and data into the  
22          forecasts and models of the National Oceanic and  
23          Atmospheric Administration, the steps to integrate,  
24          not later than one year after the date of the deter-  
25          mination, such services and data into operational use

1 by the National Oceanic and Atmospheric Adminis-  
2 tration or any associated challenges in doing so.

3 “(e) OBTAINING FUTURE DATA.—If an assessment  
4 under subsection (d) demonstrates the ability of services  
5 and data from private sector entities to meet the stand-  
6 ards and specifications published pursuant to section  
7 302(c), the Under Secretary shall—

8 “(1) when cost-effective and feasible, obtain ob-  
9 servation services and data from private sector enti-  
10 ties through the Commercial Data Program under  
11 section 302;

12 “(2) as early as possible in the acquisition proc-  
13 ess for any future National Oceanic and Atmos-  
14 pheric Administration satellite system, determine  
15 whether there is a suitable, cost-effective, commer-  
16 cial capability available or that will be available to  
17 meet applicable instrument, spacecraft, or system re-  
18 quirements before completion of the critical design  
19 phase of such planned satellite system;

20 “(3) if the Under Secretary determines under  
21 paragraph (2) that a suitable, cost-effective, com-  
22 mercial capability is or will be available, determine  
23 whether and how such capability is in the national  
24 interest if developed as a solely governmental sys-  
25 tem; and

1 “(4) submit to the Committee on Commerce,  
 2 Science, and Transportation of the Senate and the  
 3 Committee on Science, Space, and Technology of the  
 4 House of Representatives a report detailing any de-  
 5 terminations made under paragraphs (2) and (3).

6 “(f) AUTHORIZATION OF APPROPRIATIONS.—From  
 7 amounts authorized to be appropriated pursuant to sec-  
 8 tion 302 to carry out such section, not less than 15 per-  
 9 cent of such amounts each fiscal year are authorized to  
 10 be appropriated to carry out this section.”.

11 **SEC. 303. CONTRACTING AUTHORITY AND AVOIDANCE OF**  
 12 **DUPLICATION.**

13 Title III of the Weather Research and Forecasting  
 14 Innovation Act of 2017 is amended by adding at the end  
 15 the following new section:

16 **“SEC. 304. CONTRACTING AUTHORITY AND AVOIDANCE OF**  
 17 **DUPLICATION.**

18 “(a) IN GENERAL.—Consistent with the authorities  
 19 of other Federal agencies that contract and partner with  
 20 private sector entities, including under section 3903 of  
 21 title 41, United States Code, the Under Secretary is au-  
 22 thorized to use contracting mechanisms and enter into  
 23 agreements that use multiyear contract options. In car-  
 24 rying out sections 302 and 303, the Under Secretary shall,  
 25 to the greatest extent possible—

1           “(1) enter into year-long or multiyear contracts  
2           using contracting mechanisms that foster resiliency  
3           of service and data purchased;

4           “(2) partner and contract with multiple obser-  
5           vation service and data providers simultaneously to  
6           reduce risks of data gaps and improve mission  
7           robustness; and

8           “(3) use authorities, such as additional forms of  
9           transaction agreements under section 301, that  
10          allow for innovative partnerships with private sector  
11          entities.

12          “(b) SAVINGS CLAUSE.—Nothing in this title may be  
13          construed as infringing on the acquisition authority or  
14          strategy of Federal entities authorized under title 10,  
15          United States Code.

16          “(c) UNNECESSARY DUPLICATION.—In meeting the  
17          requirements under this title, the Under Secretary shall  
18          avoid unnecessary duplication between the National Oce-  
19          anic and Atmospheric Administration, the National Aero-  
20          nautics and Space Administration, other Federal depart-  
21          ments and agencies, and private sector entities, including  
22          relating to corresponding expenditures of funds and em-  
23          ployment of personnel by—

24                 “(1) coordinating existing activities with other  
25                 civilian Federal departments and agencies which

1 provide, contract, or partner with private sector enti-  
 2 ties to acquire, weather and environmental observa-  
 3 tions and data; and

4 “(2) coordinating and soliciting weather and en-  
 5 vironmental observations and data requirements and  
 6 needs from other civilian Federal departments and  
 7 agencies to be acquired by the Commercial Data  
 8 Program under section 302.

9 “(d) FAIR COMPENSATION FOR INTERAGENCY  
 10 NEEDS.—The Under Secretary, to the maximum extent  
 11 practicable, shall ensure that Federal departments and  
 12 agencies utilizing services and data under sections 302  
 13 and 303 fairly compensate the National Oceanic and At-  
 14 mospheric Administration, or the non-Federal entities pro-  
 15 viding such services or data, as appropriate, for use.”.

16 **SEC. 304. DATA ASSIMILATION, MANAGEMENT, AND SHAR-**  
 17 **ING PRACTICES.**

18 Title III of the Weather Research and Forecasting  
 19 Innovation Act of 2017, as amended by section 303 of this  
 20 Act, is further amended by adding at the end the following  
 21 new section:

22 **“SEC. 305. DATA ASSIMILATION, MANAGEMENT, AND SHAR-**  
 23 **ING PRACTICES.**

24 “(a) DATA STANDARDS.—The Under Secretary, in  
 25 collaboration with the weather enterprise, shall seek to es-

1 tablish consistent and open data and metadata standards  
2 to support open science, including simple cloud-optimized  
3 data formats and application programming interfaces that  
4 support findability, accessibility, usability, and  
5 preservability.

6 “(b) DATA INFRASTRUCTURE.—

7 “(1) IN GENERAL.—The Under Secretary, in  
8 consultation with the Chief Information Officer and  
9 appropriate program heads, shall consolidate and ar-  
10 range data infrastructure needs to ensure efficient  
11 and effective data transfer between National Oceanic  
12 and Atmospheric Administration offices by consid-  
13 ering the use of commercial cloud technologies, or  
14 similar hybrid structures, to host and transmit data  
15 and metadata.

16 “(2) FEDERAL PARTNERSHIPS.—In carrying  
17 out paragraph (1), the Under Secretary may partner  
18 with the heads of other Federal departments and  
19 agencies, including the National Aeronautics and  
20 Space Administration, the Department of Energy,  
21 the United States Space Force, the United States  
22 Coast Guard, the United States Navy, the Federal  
23 Aviation Administration, the United States Forest  
24 Service, the Environmental Protection Agency, the  
25 National Science Foundation, and the United States



1 Geological Survey, to collocate data with joint utility  
2 and support a transition to cloud architectures, in-  
3 cluding commercial cloud networks.

4 “(3) LONG TERM DATA ARCHIVE.—The Under  
5 Secretary shall ensure the long-term management,  
6 maintenance, and stewardship of archival data and  
7 metadata acquired through the Commercial Data  
8 Program under section 302 is conducted within the  
9 National Centers for Environmental Information.

10 “(c) DATA SHARING WITH THE WEATHER ENTER-  
11 PRISE.—

12 “(1) IN GENERAL.—To the greatest extent  
13 practicable, the Under Secretary shall—

14 “(A) continue to ensure the delivery of  
15 data through sound and robust infrastructure,  
16 such as data sharing capabilities of the industry  
17 proving grounds; and

18 “(B) make accessible to members of the  
19 weather enterprise that are United States per-  
20 sons data that is—

21 “(i) not subject to redistribution con-  
22 tract permissions; or

23 “(ii) purchased through the Commer-  
24 cial Data Program under section 302 or

1 shared through international government  
2 partners.

3 “(2) DATA ASSIMILATED INTO MODELS OR  
4 FORECASTS.—If data described in paragraph (1)(B)  
5 must be assimilated into numerical weather pre-  
6 diction models or automated forecast guidance to  
7 satisfy terms of a redistribution contract, the Under  
8 Secretary shall make accessible without delay to  
9 members of the weather enterprise that are United  
10 States persons the numerical weather prediction  
11 model or automated forecast guidance output, as the  
12 case may be.

13 “(d) DATA ASSIMILATION.—

14 “(1) IN GENERAL.—The Under Secretary, in  
15 coordination with the Commercial Data Program  
16 under section 302, the National Centers for Envi-  
17 ronmental Prediction, the National Centers for Envi-  
18 ronmental Information, the Office of Oceanic and  
19 Atmospheric Research, and any other relevant of-  
20 fices within the National Oceanic and Atmospheric  
21 Administration, shall establish a program to test,  
22 advance, and implement data assimilation methods,  
23 which may include artificial intelligence, machine  
24 learning, data pre- and post-processing, efficient  
25 input and output, and next-generation algorithms.

1           “(2) DATA ASSIMILATION UNIVERSITY CONSOR-  
2           TIUM.—Through the program established pursuant  
3           to paragraph (1), the Under Secretary shall estab-  
4           lish a consortium consisting of institutions of higher  
5           education (as such term is defined in section 101 of  
6           the Higher Education Act of 1965 (20 U.S.C.  
7           1001)) to address critical research challenges for  
8           data assimilation and foster a growing data assimi-  
9           lation workforce. The consortium shall seek to—

10               “(A) solve critical research issues for data  
11               assimilation through innovative research;

12               “(B) increase significantly the number of  
13               students, including Ph.D. candidates and other  
14               graduate level students, in data assimilation;

15               “(C) use modern software and frameworks,  
16               such as the Joint Effort for Data Assimilation  
17               Integration, or emerging technologies, such as  
18               artificial intelligence and machine learning tech-  
19               niques, to conduct data assimilation research  
20               and development and facilitate research- to- op-  
21               erations efforts to improve weather modeling  
22               and prediction;

23               “(D) identify and prioritize critical re-  
24               search areas in data assimilation and facilitate  
25               operations to research efforts;

1           “(E) establish and enable an effective col-  
2           laboration infrastructure between National Oee-  
3           anic and Atmospheric Administration facilities,  
4           such as laboratories, centers, or joint agency in-  
5           stitutes, and the research community, including  
6           a mechanism for external partners to host Ad-  
7           ministration employees; and

8           “(F) establish mechanisms to enable all  
9           members of the consortium to archive and ac-  
10          cess data required to support the work under  
11          this subsection.

12          “(3) COORDINATION.—In carrying out this sub-  
13          section, the Under Secretary shall ensure the Na-  
14          tional Oceanic and Atmospheric Administration and  
15          its associated activities focus on research-to-oper-  
16          ations and operations-to-research efforts, including  
17          by coordinating and collaborating with the Joint  
18          Center for Satellite Data Assimilation.

19          “(4) DATA ASSIMILATION, MANAGEMENT, AND  
20          SHARING PRACTICES SECURITY.—The activities au-  
21          thorized under this subsection shall be conducted in  
22          a manner consistent with subtitle D of title VI of  
23          the Research and Development, Competition, and  
24          Innovation Act (enacted as division B of Public Law  
25          117–167; 42 U.S.C. 19231 et seq.).

1 “(e) STUDY ON DATA MANAGEMENT.—

2 “(1) IN GENERAL.—Not later than 90 days  
3 after the date of the enactment of this section, the  
4 Under Secretary shall seek to enter into an agree-  
5 ment with a non-Federal entity to conduct a study  
6 on matters concerning data practices and manage-  
7 ment needs at the National Oceanic and Atmos-  
8 pheric Administration. In conducting the study, the  
9 outside entity shall—

10 “(A) assess the costs and benefits of cur-  
11 rent data management needs for observational  
12 and operational mission requirements;

13 “(B) develop recommendations regarding  
14 how to make more robust and cost-effective the  
15 data portfolio of the Administration;

16 “(C) identify data infrastructure tech-  
17 nologies and needs that are essential to the per-  
18 formance of modeling systems of the Adminis-  
19 tration;

20 “(D) assess the sharing needs and prac-  
21 tices of the Administration for both internal  
22 and external dissemination;

23 “(E) develop recommendations for methods  
24 of data infrastructure sharing, including data  
25 purchased from the commercial sector; and

1           “(F) develop recommendations for data  
 2           standards, formats, and protocols to support ar-  
 3           tificial intelligence and machine learning tech-  
 4           niques.

5           “(2) AUTHORIZATION OF APPROPRIATIONS.—Of  
 6           amounts authorized to be appropriated to the Com-  
 7           mercial Data Program under section 302,  
 8           \$1,000,000 shall be available to carry out the study  
 9           under paragraph (1) to remain available until ex-  
 10          pended.”.

11 **SEC. 305. CLERICAL AMENDMENT.**

12          The table of contents in section 1(b) of the Weather  
 13          Research and Forecasting Innovation Act of 2017 is  
 14          amended by striking the items relating to sections 302 and  
 15          303 and inserting the following new items:

“Sec. 302. Commercial Data Program.

“Sec. 303. Commercial Data Pilot Program.

“Sec. 304. Contracting authority and avoidance of duplication.

“Sec. 305. Data assimilation, management, and sharing practices.”.

16           **TITLE IV—COMMUNICATING**  
 17           **WEATHER TO THE PUBLIC**

18 **SEC. 401. DEFINITIONS.**

19          In this title:

20           (1) HAZARDOUS WEATHER OR WATER  
 21           EVENTS.—The term “hazardous weather or water  
 22           events” means weather or water events that have a

1 high risk of loss of life or property, including the fol-  
2 lowing:

3 (A) Severe storms, such as hurricanes and  
4 short-fused, small-scale hazardous weather or  
5 hydrologic events produced by thunderstorms,  
6 including large hail, damaging winds, torna-  
7 does, and flash floods.

8 (B) Winter storms, such as freezing or fro-  
9 zen precipitation (including freezing rain, sleet,  
10 and snow), or combined effects of freezing or  
11 frozen precipitation and strong winds.

12 (C) Other weather hazards, such as ex-  
13 treme heat or cold, wildfire, drought, dense fog,  
14 high winds, and river, coastal, or lakeshore  
15 flooding.

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

20 (3) NOAA WEATHER RADIO.—The term  
21 “NOAA Weather Radio” means the National Oce-  
22 anic and Atmospheric Administration Weather Radio  
23 All Hazards network.

24 (4) PUBLIC CLOUD.—The term “public cloud”  
25 means an information technology model in which

1 service providers make computing services, including  
 2 compute and storage and develop-and-deploy envi-  
 3 ronments and applications, available on-demand to  
 4 organizations and individuals over the public inter-  
 5 net or other means that allows for the widest dis-  
 6 semination of information.

7 (5) WATCH; WARNING.—

8 (A) IN GENERAL.—The terms “watch” and  
 9 “warning”, with respect to a hazardous weather  
 10 or water event, mean products issued by the  
 11 National Oceanic and Atmospheric Administra-  
 12 tion, intended for consumption by the general  
 13 public, to alert the general public to the poten-  
 14 tial for or presence of such event and to inform  
 15 action to prevent loss of life or property.

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

20 **SEC. 402. HAZARDOUS WEATHER OR WATER EVENT RISK**  
 21 **COMMUNICATION.**

22 (a) IN GENERAL.—The Under Secretary shall main-  
 23 tain and improve the system of the National Oceanic and  
 24 Atmospheric Administration by which the risks of haz-  
 25 ardous weather and water events are communicated to the



1 general public, with the goal of informing action and en-  
2 couraging response to prevent loss of life and property.

3 (b) HAZARD RISK COMMUNICATION IMPROVEMENT  
4 AND SIMPLIFICATION.—

5 (1) IN GENERAL.—The Under Secretary shall  
6 maintain a hazard risk communication program (in  
7 this subsection referred to as the “Program”), for  
8 the purposes of simplifying and improving the com-  
9 munication of hazardous weather and water event  
10 risks.

11 (2) TERMINOLOGY.—The Program shall iden-  
12 tify, eliminate, or modify unnecessary, redundant, or  
13 confusing terms for hazardous weather and water  
14 event communications and add new terminology, as  
15 appropriate.

16 (3) COMMUNICATIONS IMPROVEMENT.—The  
17 Program shall improve the form, content, and meth-  
18 ods of hazardous weather and water event commu-  
19 nications to more clearly inform action and increase  
20 the likelihood that the public takes such action to  
21 prevent the loss of life or property.

22 (4) EVALUATIONS.—The Program shall, in co-  
23 ordination with the performance branch of the Na-  
24 tional Weather Service, develop metrics for that  
25 branch to track and evaluate the degree to which

1 hazardous weather and water event communications  
2 inform action and encourage response.

3 (5) SUPPORT PLAN.—The Program shall de-  
4 velop a plan for the purpose of supporting the activi-  
5 ties described in paragraph (3). The plan shall be  
6 periodically updated and informed by internal and  
7 extramural research and the results of the evalua-  
8 tion of hazardous weather and water event commu-  
9 nications conducted under paragraph (4).

10 (6) METHODS.—In carrying out this subsection,  
11 the Program shall develop and implement rec-  
12 ommendations that—

13 (A) are based on the best and most recent  
14 understanding from social, behavioral, risk, and  
15 communication science research;

16 (B) are validated by social, behavioral,  
17 risk, and communication science, taking into ac-  
18 count the importance of methods that support  
19 reproduction and replication of scientific stud-  
20 ies, use of rigorous statistical analyses, and, as  
21 applicable, data analysis supported by artificial  
22 intelligence and machine learning technologies;

23 (C) account for the needs of various demo-  
24 graphics, vulnerable populations, and geo-  
25 graphic regions;

1 (D) account for the differences between  
2 various types of weather and water hazards;

3 (E) respond to the needs of Federal, State,  
4 and local government partners and media part-  
5 ners; and

6 (F) account for necessary changes in the  
7 infrastructure, technology, and protocols for  
8 creating and disseminating Federally operated  
9 watches and warnings.

10 (7) COORDINATION.—The Program shall co-  
11 ordinate with—

12 (A) Federal partners, including National  
13 Laboratories, cooperative institutes, and re-  
14 gional integrated sciences and assessments pro-  
15 grams;

16 (B) State and local government partners;

17 (C) Indian Tribes;

18 (D) institutions of higher education; and

19 (E) media partners.

20 (8) TIMELINESS AND CONSISTENCY.—The Pro-  
21 gram shall develop best practices and guidance for  
22 ensuring timely and consistent communication  
23 across public facing platforms that disseminate haz-  
24 ardous weather and water event information.

1 **SEC. 403. HAZARD COMMUNICATION RESEARCH AND EN-**  
2 **GAGEMENT.**

3 (a) IN GENERAL.—The Under Secretary may main-  
4 tain, as appropriate, a program to—

5 (1) modernize the development and communica-  
6 tion of risk-based, statistically reliable, probabilistic  
7 hazard information, with the goal of informing ap-  
8 propriate responses to hazardous weather or water  
9 events; and

10 (2) improve the fundamental social, behavioral,  
11 economic, risk, and communication science relating  
12 to communications, including by means of collecting  
13 voluntary data, regarding hazardous weather or  
14 water events.

15 (b) COORDINATION.—In carrying out the program  
16 under subsection (a), the Under Secretary shall coordinate  
17 and communicate with States, Tribal governments, local-  
18 ities, and emergency managers regarding research prior-  
19 ities and results.

20 (c) PILOT PROGRAM FOR TORNADO HAZARD COMMU-  
21 NICATIONS.—

22 (1) IN GENERAL.—The Under Secretary, in co-  
23 ordination with the VORTEX-USA program under  
24 section 103 of the Weather Research and Fore-  
25 casting Innovation Act of 2017 (15 U.S.C. 8513), as  
26 amended by section 103 of this Act, and in collabo-

1       ration with one or more eligible institutions (or con-  
2       sortia thereof), shall establish a pilot program for  
3       tornado hazard communications to test incorporation  
4       of research into operations with respect to torna-  
5       does.

6               (2) ELIGIBLE INSTITUTION DEFINED.—In this  
7       subsection, the term “eligible institution” means any  
8       of the following:

9               (A) A historically Black college or univer-  
10       sity located in an area of persistent poverty  
11       that is subjected to frequent severe weather,  
12       such as tornadoes, hurricanes, and floods.

13              (B) An institution of higher education in  
14       close proximity to a Weather Forecast Office of  
15       the National Weather Service.

16       (d) PILOT STUDY FOR HURRICANE HAZARD COMMU-  
17       NICATION.—

18              (1) IN GENERAL.—The Under Secretary, in co-  
19       ordination with the hurricane forecast improvement  
20       program under section 104 of the Weather Research  
21       and Forecasting Innovation Act of 2017 (15 U.S.C.  
22       8514), as amended by section 104 of this Act, and  
23       in collaboration with one or more eligible institutions  
24       (or consortia thereof), shall enter into an agreement  
25       with an appropriate entity, as determined by the

1 Under Secretary, to conduct a pilot study using a  
2 mixed methods approach, including surveys, focus  
3 groups, and interviews, to gather information from  
4 hurricane prone population areas regarding the lev-  
5 els of preparedness of such areas for hurricanes or  
6 in response to the National Oceanic and Atmos-  
7 pheric Administration's early forecasts and warn-  
8 ings.

9 (2) ELEMENTS.—The pilot study required  
10 under paragraph (1) shall evaluate the following:

11 (A) Possession of disaster supplies.

12 (B) Evacuation decisions.

13 (C) Levels of trust of tropical cyclone in-  
14 formation and hurricane path prediction from  
15 various sources.

16 (D) Access to tropical cyclone and hurri-  
17 cane forecasts and warnings in such study par-  
18 ticipant's first language.

19 (E) Any reasoning or deliberation by the  
20 individuals interviewed as part of the study that  
21 may hinder the ability or willingness of the indi-  
22 viduals to evacuate.

23 (3) ADDITIONAL CRITERIA.—The Under Sec-  
24 retary shall publish the methodology of the pilot  
25 study described in paragraph (1) on a publicly acces-

1       sible website of the National Oceanic and Atmos-  
2       pheric Administration.

3           (4) ELIGIBLE INSTITUTION DEFINED.—In this  
4       subsection, the term “eligible institution” means any  
5       of the following:

6           (A) An institution of higher education,  
7       nonprofit organization, or other institution lo-  
8       cated in a jurisdiction eligible to participate in  
9       the program under section 113 of the National  
10      Science Foundation Authorization Act of 1988  
11      (42 U.S.C. 1862g).

12          (B) An institution of higher education,  
13      nonprofit organization, or other institution lo-  
14      cated in proximity to a Weather Forecast Office  
15      of the National Weather Service.

16      (e) HURRICANE SOCIAL, BEHAVIORAL, AND ECO-  
17      NOMIC SCIENCES.—

18          (1) IN GENERAL.—The Under Secretary shall  
19      carry out research and development activities to im-  
20      prove how the public receives, interprets, responds  
21      to, and values hurricane forecasts and warnings.

22          (2) ELEMENTS.—In conducting activities under  
23      paragraph (1), the Under Secretary shall—

24           (A) conduct a comprehensive review of the  
25      manner by which the public receives, interprets,

1            responds to, and makes decisions regarding  
2            hurricane forecasts and warnings, including—

3                    (i) how weather observations, down-  
4                    stream models, and processes affect the de-  
5                    cision tools or products derived from hurri-  
6                    cane forecasts and warnings;

7                    (ii) how hurricane forecasts and warn-  
8                    ings generated by decision tools and prod-  
9                    ucts are used by emergency managers, gov-  
10                   ernments, and other users to benefit the  
11                   public and stakeholder groups;

12                   (iii) how past experiences with hurri-  
13                   canes impact the decision making of the  
14                   general public;

15                   (iv) how the source of such hurricane  
16                   forecasts and warnings affects interpreta-  
17                   tion;

18                   (v) how tropical cyclone forecasts and  
19                   warnings are received and interpreted by  
20                   the general public;

21                   (vi) how understanding of and re-  
22                   sponse to hurricane forecasts and warnings  
23                   varies across demographic groups, includ-  
24                   ing the elderly, people with disabilities, and  
25                   other vulnerable populations;



(vii) the effect of language barriers on the accessibility of hurricane forecasts and warnings; and

(viii) how understanding of and response to such hurricane forecasts and warnings varies across geographic areas, including rural, urban, and suburban areas;

(B) identify communication data gaps based on the review conducted pursuant to subparagraph (A);

(C) carry out research, including data collection and baseline assessments, in coordination with the hurricane forecast improvement program under section 104 of the Weather Research and Forecasting Innovation Act of 2017 (15 U.S.C. 8514), as amended by section 104 of this Act, to evaluate and quantify the economic value of extending lead times of tropical cyclone and hurricane forecasts and warnings, including identifying the most affected or vulnerable populations and potential impacts to those populations of extending leads times;

(D) using the post-storm surveys and assessments conducted under section 406 of this

1 Act to conduct retrospective or ex ante assess-  
 2 ments of previous hurricane forecasts and  
 3 warnings to better understand the key compo-  
 4 nents of such forecasts and warnings that af-  
 5 fected actions or initiated behavior changes;

6 (E) conduct cost- benefit analyses of fore-  
 7 casts and warnings improvement alternatives  
 8 developed through the hurricane forecast im-  
 9 provement program under section 104 of the  
 10 Weather Research and Forecasting Innovation  
 11 Act of 2017 (15 U.S.C. 8514), as amended by  
 12 section 104 of this Act; and

13 (F) conduct assessments of the risk to the  
 14 elderly for pre-, during, and post-storm periods  
 15 in regions and communities with significant el-  
 16 derly populations, including retirement commu-  
 17 nities.

18 **SEC. 404. NATIONAL WEATHER SERVICE COMMUNICATIONS**

19 **IMPROVEMENT.**

20 (a) **IMPROVEMENT OF NWS INSTANT MESSAGING**  
 21 **SERVICE.**—The Director of the National Weather Service  
 22 shall improve the instant messaging service used by per-  
 23 sonnel of the National Weather Service by implementing,  
 24 not later than October 1, 2027, a commercial off-the-shelf

1 communications solution that replaces the instant mes-  
2 saging service commonly referred to as “NWSSchat”.

3 (b) REQUIREMENTS.—The communications solution  
4 implemented under this section shall—

5 (1) be hosted on the public cloud; and

6 (2) satisfy requirements set forth by the Direc-  
7 tor of the National Weather Service to ensure such  
8 solution—

9 (A) best accommodates future growth;

10 (B) performs successfully with increased  
11 numbers of users;

12 (C) is easy to use for the majority of users;

13 and

14 (D) is similar to systems already in com-  
15 mercial use.

16 (c) FUNDING.—From amounts made available for  
17 Operations, Research, and Facilities, the Director of the  
18 National Weather Service shall allocate not more than  
19 \$3,000,000 for each of fiscal years 2025 through 2027  
20 to carry out this section.

21 **SEC. 405. NOAA WEATHER RADIO MODERNIZATION.**

22 (a) IN GENERAL.—The Under Secretary shall, to the  
23 maximum extent practicable, expand coverage of the  
24 NOAA Weather Radio and ensure its reliability. In car-  
25 rying out this subsection, the Under Secretary shall—

1           (1) maintain support for existing systems serv-  
2           ing areas not covered by or having poor quality cel-  
3           lular service;

4           (2) ensure consistent maintenance and oper-  
5           ations monitoring, with timely repairs to broadcast  
6           transmitter site equipment and antennas;

7           (3) enhance the ability to amplify Non-Weather  
8           Emergency Messages via NOAA Weather Radio as  
9           necessary; and

10          (4) acquire additional transmitters as required  
11          to expand coverage to rural and underserved com-  
12          munities, units of the National Park System, and  
13          National Recreation Areas.

14          (b) MODERNIZATION INITIATIVE.—To the maximum  
15          extent practicable, the Under Secretary shall modernize  
16          NOAA Weather Radio to ensure its capabilities and cov-  
17          erage remain valuable to the public. In carrying out this  
18          subsection, the Under Secretary shall—

19               (1) upgrade telecommunications infrastructure  
20               of NOAA Weather Radio to accelerate the transition  
21               of broadcasts to internet protocol-based communica-  
22               tions over non-copper media;

23               (2) accelerate software upgrades to the Ad-  
24               vanced Weather Interactive Processing System, or

1 any relevant system successors, in order to imple-  
2 ment partial county notifications and alerts;

3 (3) enhance accessibility and usability of NOAA  
4 Weather Radio data and feeds with feedback from  
5 relevant stakeholders, including the private sector;

6 (4) develop options, including satellite backup  
7 capability and commercial provider partnerships, for  
8 NOAA Weather Radio continuity of service in the  
9 event of Weather Forecast Office outages;

10 (5) research and develop alternative options, in-  
11 cluding microwave capabilities, to transmit NOAA  
12 Weather Radio signals to transmitters that are re-  
13 mote or do not have internet protocol capability; and  
14 (6) transition critical applications to the Inte-  
15 grated Dissemination Program, or any relevant pro-  
16 gram successors.

17 (c) PRIORITY.—In carrying out subsection (b), the  
18 Under Secretary shall prioritize practices, capabilities, and  
19 technologies recommended in accordance with the assess-  
20 ment under subsection (d) to maximize the accessibility  
21 of NOAA Weather Radio, particularly in remote and un-  
22 derserved areas of the United States.

23 (d) ASSESSMENT FOR MANAGEMENT AND DISTRIBUTION.—Not later than one year after the date of the enact-  
24 tion.—Not later than one year after the date of the enact-  
25 ment of this Act, the Under Secretary shall complete an

1 assessment of access to NOAA Weather Radio. In con-  
2 ducting such assessment, the Under Secretary shall take  
3 into consideration and provide recommendations regarding  
4 the following:

5 (1) The need for continuous, adequate, and  
6 operational real-time broadcasts of the NOAA  
7 Weather Radio in both urban and rural areas.

8 (2) Input from relevant stakeholders on the  
9 compatibility of NOAA Weather Radio data with  
10 third party platforms that provide online services,  
11 such as websites and mobile device applications, or  
12 provide NOAA Weather Radio access.

13 (3) The manner by which existing or new man-  
14 agement systems may promote consistent, efficient,  
15 and compatible access to NOAA Weather Radio.

16 (4) The ability of the National Oceanic and At-  
17 mospheric Administration to aggregate real-time  
18 broadcast feeds at one or more central locations.

19 (5) Effective coordination between agencies  
20 with responsibilities relating to emergencies and nat-  
21 ural disasters.

22 (6) The potential effects of an electromagnetic  
23 pulse or geomagnetic disturbance on NOAA Weather  
24 Radio.

1           (7) Any other function or element the Under  
2       Secretary considers appropriate.

3   **SEC. 406. POST-STORM SURVEYS AND ASSESSMENTS.**

4       (a) IN GENERAL.—The Under Secretary shall per-  
5       form one or more post-storm surveys and assessments fol-  
6       lowing every hazardous weather or water event determined  
7       by the Under Secretary to be of sufficient societal impor-  
8       tance to warrant a post-storm survey and assessment.

9       (b) COORDINATION.—The Under Secretary shall co-  
10      ordinate with Federal, State, and local governments, pri-  
11      vate entities, and relevant institutions of higher education  
12      (or a consortia thereof) when conducting post-storm sur-  
13      veys and assessments under this section to optimize data  
14      collection, sharing, integration, archiving, and access, as  
15      appropriate for research needs.

16      (c) DATA AVAILABILITY.—The Under Secretary shall  
17      make the appropriate data obtained from each post-storm  
18      survey or assessment conducted under this section avail-  
19      able to the public as soon as practicable after conducting  
20      each such survey or assessment.

21      (d) IMPROVEMENT.—In carrying out this section, the  
22      Under Secretary shall—

23           (1) examine the role of uncrewed aerial and ma-  
24      rine systems in data collection during post-storm

1 surveys and assessments conducted under this sec-  
2 tion;

3 (2) identify gaps in tactics and procedures and  
4 update such tactics and procedures to enhance the  
5 efficiency and reliability of data obtained from post-  
6 storm surveys and assessments;

7 (3) to the maximum extent practicable, increase  
8 the number of post-storm community impact studies,  
9 particularly among under-observed, underserved, or  
10 highly vulnerable populations, including—

11 (A) surveying-individual responses;

12 (B) conducting reviews of the accuracy of  
13 prior risk evaluations;

14 (C) evaluating the efficacy of prior mitiga-  
15 tion activity; and

16 (D) gathering survivability statistics; and

17 (4) as appropriate, integrate community-based,  
18 social, behavioral, risk, communication, and eco-  
19 nomic sciences elements into existing post-storm sur-  
20 veys and assessments, including elements related to  
21 the efficacy of forecast and warning information that  
22 was shared with the public, barriers that affected  
23 the ability of the public to take action, and any chal-  
24 lenges with respect to messaging about the haz-  
25 ardous weather or water event.



1 (e) SUPPORT FOR EMPLOYEES.—The Under Sec-  
 2 retary shall provide training, resources, and access to pro-  
 3 fessional counseling to support the emotional and mental  
 4 health and well-being of employees conducting post-storm  
 5 surveys and assessments under this section.

6 (f) EXEMPTION.—Subchapter I of chapter 35 of title  
 7 44, United States Code, shall not apply to the collection  
 8 of information during a survey or assessment conducted  
 9 under subsection (a).

10 **SEC. 407. GOVERNMENT ACCOUNTABILITY OFFICE REPORT**  
 11 **ON ALERT DISSEMINATION FOR HAZARDOUS**  
 12 **WEATHER OR WATER EVENTS.**

13 (a) IN GENERAL.—Not later than 18 months after  
 14 the date of the enactment of this Act, the Comptroller  
 15 General of the United States shall submit to the Com-  
 16 mittee on Commerce, Science, and Transportation of the  
 17 Senate and the Committee on Science, Space, and Tech-  
 18 nology of the House of Representatives a report that ex-  
 19 amines the information technology infrastructure of the  
 20 National Weather Service, specifically regarding the sys-  
 21 tem for timely public notification via alerts and updates  
 22 regarding hazardous weather or water events.

23 (b) ELEMENTS.—The report required by subsection  
 24 (a) shall include the following:

1           (1) An analysis of the information technology  
2           infrastructure of the National Weather Service, in-  
3           cluding software and hardware capabilities and limi-  
4           tations, including an examination of server and data  
5           storage methods, broadband, data management, and  
6           data sharing.

7           (2) An identification of secondary and tertiary  
8           fail-safes for the timely distribution to the public of  
9           notifications via alerts and updates regarding haz-  
10          ardous weather or water events.

11          (3) A determination of the extent to which pub-  
12          lic notifications via alerts and updates regarding  
13          hazardous weather or water events have been de-  
14          layed and an identification of possible improvements  
15          or corrective measures to address latency in the noti-  
16          fication process.

17          (4) An assessment of whether collaboration with  
18          other Federal departments and agencies, States, or  
19          private entities could reduce delays in notifications  
20          to the public.

21          (5) A description of actions being undertaken to  
22          better identify critical steps in public notification via  
23          alerts and updates for hazardous weather or water  
24          events that may be vulnerable to disruption or fail-

(6) The geographical differences in availability and effectiveness of rural systems, including an estimated number of rural areas affected by unreliable or unavailable systems and barriers to obtain or upgrade such systems.

(a) DATA COLLECTION.—The Under Secretary may collect social, behavioral, and economic data, including data relating to Federal communication of hazardous weather or water events and the public response to such communications. Where appropriate, the Under Secretary shall encourage the collection of secondary data, purchase data, or partner with the private sector to obtain data.

(b) DATA MANAGEMENT.—The Under Secretary shall establish and maintain a central repository system for the National Oceanic and Atmospheric Administration for data related to the communication of and related public response to hazardous weather or water events, including data developed or received pursuant to this title.

(c) PROTECTION OF DATA.—The Under Secretary shall ensure that data is collected, managed, and used by the National Oceanic and Atmospheric Administration in

1 accordance with legal, regulatory, and contractual obliga-  
 2 tions, including chapter 31 of title 44, United States Code,  
 3 and the Foundations for Evidence-Based Policymaking  
 4 Act of 2018 (Public Law 115–435).

5 (d) DIGITAL WATERMARKING.—The Under Secretary  
 6 shall develop methods to reduce the likelihood of unauthor-  
 7 ized tampering with online public notifications of haz-  
 8 ardous weather or water events, such as developing digital  
 9 watermarks.

10 (e) POLICIES AND PROCEDURES.—The Under Sec-  
 11 retary shall establish policies and procedures for the collec-  
 12 tion, archiving, and managing of data related to commu-  
 13 nity response, including the response of effected or vulner-  
 14 able populations, to hazardous weather or water events.

15 **TITLE V—IMPROVING WEATHER**  
 16 **INFORMATION FOR AGRI-**  
 17 **CULTURE AND WATER MAN-**  
 18 **AGEMENT**

19 **SEC. 501. WEATHER AND CLIMATE INFORMATION IN AGRI-**  
 20 **CULTURE AND WATER MANAGEMENT.**

21 Section 1762 of the Food Security Act of 1985 (15  
 22 U.S.C. 8521) is amended—

23 (1) by amending subsection (c) to read as fol-  
 24 lows:

25 “(c) FUNCTIONS.—

1           “(1) IN GENERAL.—The Under Secretary  
2 shall—

3           “(A) conduct and support research to im-  
4 prove understanding of subseasonal to seasonal  
5 predictability for temperature, precipitation,  
6 and other Earth system variables and applica-  
7 tions;

8           “(B) collect and use data to make usable,  
9 reliable, and timely foundational forecasts of  
10 subseasonal-to-seasonal temperature and pre-  
11 cipitation;

12           “(C) support the advancement of multi-  
13 model ensemble forecast systems and forecast  
14 verification and evaluation capacity, including  
15 by—

16           “(i) developing advanced coupled data  
17 assimilation methods using robust Earth  
18 system observational data;

19           “(ii) developing improved coupled sub-  
20 seasonal-to-seasonal ensemble prediction  
21 systems;

22           “(iii) improving exchanges and inter-  
23 actions between datasets across different  
24 models and Earth system observations to  
25 increase model accuracy of local relation-

1 ships between and drivers of ocean, land,  
2 snow, and ice observations; and

3 “(iv) developing data management  
4 strategies to support operations and re-  
5 search activities;

6 “(D) leverage existing research and models  
7 from the weather and Earth system enterprises  
8 to improve the forecasts under subparagraph  
9 (B);

10 “(E) accelerate the operationalization of  
11 emerging modeling technologies developed to  
12 support and assist the cross development of  
13 fully coupled subseasonal-to-seasonal forecast  
14 systems, including during collaborations with  
15 other agencies and entities;

16 “(F) determine and provide information on  
17 how subseasonal-to-seasonal temperature and  
18 precipitation may relate to—

19 “(i) droughts;

20 “(ii) fires;

21 “(iii) tornadoes;

22 “(iv) hurricanes;

23 “(v) floods, storm surges, and coastal  
24 inundation;

1 “(vi) heat waves and marine heat  
2 waves;

3 “(vii) winter storms, snowpack, and  
4 permafrost thaw;

5 “(viii) sea ice conditions; and

6 “(ix) other high impact weather or  
7 relevant weather disasters.”;

8 (2) by amending subsection (h) to read as fol-  
9 lows:

10 “(h) SUBSEASONAL TO SEASONAL FORECASTING  
11 PILOT PROJECTS.—

12 “(1) ESTABLISHMENT.—The Under Secretary  
13 shall establish not fewer than 2 pilot projects, in ac-  
14 cordance with paragraph (2), within the United  
15 States Weather Research Program of the Office of  
16 Oceanic and Atmospheric Research of the National  
17 Oceanic and Atmospheric Administration to support  
18 improved subseasonal to seasonal precipitation fore-  
19 casts for—

20 “(A) water management in areas of the  
21 United States in which there is—

22 “(i) a high level of drought; and

23 “(ii) a reliance on reservoirs for water  
24 storage; and

1           “(B) agriculture in the central United  
2 States.

3           “(2) OBJECTIVES.—In carrying out this sub-  
4 section, the Under Secretary shall ensure the fol-  
5 lowing:

6           “(A) A pilot project under subparagraph  
7 (A) of paragraph (1) addresses key science  
8 challenges to improving forecasts and devel-  
9 oping related products for water management,  
10 including the following:

11           “(i) Improving operational model reso-  
12 lution, both horizontal and vertical, to re-  
13 solve issues associated with mountainous  
14 terrain, such as intensity of precipitation  
15 and relative fraction of rain versus snow  
16 precipitation.

17           “(ii) Improving modeling of interstate  
18 or cross-boundary water movement and  
19 storage through rivers, tributaries, and  
20 aquifers with relation to water availability.

21           “(iii) Improving fidelity in the oper-  
22 ational modeling of the atmospheric bound-  
23 ary layer in mountainous regions.

24           “(iv) Resolving challenges in pre-  
25 dicting winter atmospheric circulation and



1 storm tracks, including periods of blocked  
2 versus unblocked flow over the eastern  
3 North Pacific Ocean and western United  
4 States.

5 “(v) Utilizing outcomes from the at-  
6 mospheric rivers forecast improvement pro-  
7 gram under section 204 of the Weather  
8 Act Reauthorization Act of 2024 and the  
9 precipitation forecast improvement pro-  
10 gram under section 603 of the Weather  
11 Research and Forecasting Innovation Act  
12 of 2017 to produce operational tools and  
13 services.

14 “(vi) Improving the quality and tem-  
15 poral and spatial resolution of observations  
16 and accurate operational modeling of air-  
17 sea interactions, and the influence of  
18 oceans on subseasonal and seasonal fore-  
19 casting.

20 “(B) A pilot project under subparagraph  
21 (B) of paragraph (1) addresses key science  
22 challenges to improving forecasts and devel-  
23 oping related products for agriculture in the  
24 central United States, including the following:

1                   “(i) Improving the quality and tem-  
 2                   poral and spatial resolution of observations  
 3                   and accurate operational modeling of the  
 4                   land surface and hydrologic cycle, includ-  
 5                   ing soil moisture and flash drought proc-  
 6                   esses.

7                   “(ii) Improving fidelity in the oper-  
 8                   ational modeling of warm season precipita-  
 9                   tion processes.

10                  “(iii) Understanding and predicting  
 11                  large-scale upper-level dynamical flow  
 12                  anomalies that occur in spring and sum-  
 13                  mer.

14                  “(iv) Improving modeling of interstate  
 15                  or cross-boundary water movement and  
 16                  storage through rivers, tributaries, and  
 17                  aquifers with relation to water availability  
 18                  for agriculture.

19                  “(3) ACTIVITIES.—A pilot project under this  
 20                  subsection shall include activities that carry out the  
 21                  following:

22                       “(A) Best implement recommendations of  
 23                       the 2020 Report of the National Weather Serv-  
 24                       ice, entitled ‘Subseasonal and Seasonal Fore-

1           casting Innovation: Plans for the Twenty-First  
2           Century’.

3           “(B) Achieve measurable objectives for  
4           operational forecast improvement.

5           “(C) Engage with, and leverage the re-  
6           sources of—

7                   “(i) institutions of higher education  
8                   (as such term is defined in section 101 of  
9                   the Higher Education Act of 1965 (20  
10                  U.S.C. 1001));

11                  “(ii) a consortia of institutions as de-  
12                  scribed under clause (i);

13                  “(iii) entities within the National Oce-  
14                  anic and Atmospheric Administration in  
15                  existence as of the date of the enactment  
16                  of this subsection, including Regional Cli-  
17                  mate Centers and the National Centers for  
18                  Environmental Information; and

19                  “(iv) other Federal agencies, as ap-  
20                  propriate.

21           “(D) Are carried out in coordination with  
22           the Assistant Administrator for the Office of  
23           Oceanic and Atmospheric Research and the Di-  
24           rector of the National Weather Service.

1 “(4) SUNSET.—The authority under this sub-  
 2 section shall terminate on the date that is 5 years  
 3 after the date of the enactment of this subsection.”;  
 4 and

5 (3) by amending subsection (j) to read as fol-  
 6 lows:

7 “(j) AUTHORIZATION OF APPROPRIATIONS.—There  
 8 are authorized to be appropriated \$50,300,000 for each  
 9 of fiscal years 2025 through 2029 to carry out the activi-  
 10 ties under this section.”.

11 **SEC. 502. NATIONAL INTEGRATED DROUGHT INFORMATION**  
 12 **SYSTEM.**

13 (a) IN GENERAL.—Section 3 of the National Inte-  
 14 grated Drought Information System Act of 2006 (15  
 15 U.S.C. 313d) is amended—

16 (1) in subsection (a), by striking “, through the  
 17 National Weather Service and other appropriate  
 18 weather and climate programs in the National Oce-  
 19 anic and Atmospheric Administration,”;

20 (2) in subsection (b)—

21 (A) in paragraph (1)—

22 (i) in subparagraph (A), by striking  
 23 “and” after the semicolon;

24 (ii) in subparagraph (B), by inserting  
 25 “and” after the semicolon; and

1 (iii) by adding at the end the fol-  
2 lowing new subparagraph:

3 “(C) incorporates flash drought research  
4 and tools to enhance timely response;”;

5 (B) in paragraph (5), by striking “im-  
6 provements in seasonal precipitation and tem-  
7 perature, subseasonal precipitation and tem-  
8 perature, and low flow water prediction; and”  
9 and inserting “support improvements in subsea-  
10 sonal to seasonal precipitation and temperature,  
11 and low flow water prediction;”;

12 (C) in paragraph (6), by striking the pe-  
13 riod and inserting a semicolon; and

14 (D) by adding at the end the following new  
15 paragraphs:

16 “(7) advance and deploy next generation tech-  
17 nologies related to drought, such as monitoring, pre-  
18 paredness, and forecasting capabilities utilizing arti-  
19 ficial intelligence, machine learning, and cloud tech-  
20 nologies;

21 “(8) use observational networks, including the  
22 National Weather Service cooperative observer pro-  
23 gram and State or regional hydrological monitoring  
24 projects;

1 “(9) refine drought indicators across multiple  
2 spatial and temporal scales;

3 “(10) improve decision-support products;

4 “(11) optimize data and resources from across  
5 the Federal Government;

6 “(12) investigate and address data gaps, includ-  
7 ing snowpack monitoring, space-based or in-situ soil  
8 moisture monitoring, groundwater data, and data re-  
9 lated to rapid intensification events; and

10 “(13) engage with, and leverage the resources  
11 of, entities within the National Oceanic and Atmos-  
12 pheric Administration in existence as of the date of  
13 the enactment of the Weather Act Reauthorization  
14 Act of 2024 to improve coordination of water moni-  
15 toring, forecasting, and management.”;

16 (3) in subsection (c)—

17 (A) in paragraph (2), by striking “and”  
18 after the semicolon;

19 (B) in paragraph (3), by striking the pe-  
20 riod and inserting “; and”; and

21 (C) by adding at the end the following new  
22 paragraph:

23 “(4) in partnership with the National Mesonet  
24 Program, establish memoranda of understanding to  
25 provide coordinated, high-quality data.”; and

1 (4) by adding at the end the following:

2 “(g) MODELING UPDATE.—Not later than one year  
3 after the date of the enactment of the Weather Act Reau-  
4 thorization Act of 2024, the Under Secretary, acting  
5 through the National Integrated Drought Information  
6 System and the Climate Prediction Center of the National  
7 Weather Service, shall develop a plan to incorporate exist-  
8 ing drought products of the National Oceanic and Atmos-  
9 pheric Administration and improved dynamical and statis-  
10 tical forecast modeling tools into probabilistic forecasts.”.

11 (b) AUTHORIZATION OF APPROPRIATIONS.—Section  
12 4 of the National Integrated Drought Information System  
13 Act of 2006 (Public Law 109–430; 15 U.S.C. 313d note)  
14 is amended to read as follows:

15 **“SEC. 4. AUTHORIZATION OF APPROPRIATIONS.**

16 “There are authorized to be appropriated to carry out  
17 this Act—

18 “(1) \$15,000,000 for fiscal year 2025.

19 “(2) \$15,500,000 for fiscal year 2026.

20 “(3) \$16,000,000 for fiscal year 2027.

21 “(4) \$16,500,000 for fiscal year 2028.

22 “(5) \$17,000,000 for fiscal year 2029.”.

1 **SEC. 503. NATIONAL MESONET PROGRAM.**

2 (a) PROGRAM.—The Under Secretary shall maintain  
3 the National Mesonet Program (referred to in this section  
4 as the “Program”), which shall—

5 (1) obtain observations to improve under-  
6 standing of and forecast capabilities for atmospheric,  
7 drought, fire, and water events, with a prioritization  
8 on leveraging available commercial, academic, and  
9 other non-Federal Government environmental data  
10 to enhance coordination across the private, public,  
11 and academic sectors of the weather enterprise in  
12 the United States;

13 (2) establish means to integrate greater density  
14 and more types of environmental observations into  
15 the Program on an annual basis, including by en-  
16 couraging local and regional networks of environ-  
17 mental monitoring stations and in situ sensor net-  
18 works, including soil moisture and ground-based  
19 profilers, to participate in the Program;

20 (3) establish memoranda of understanding with  
21 networks outside of the scope of the Program in fur-  
22 therance of this section; and

23 (4) coordinate with satellite data and services  
24 acquired through the Commercial Data Program  
25 under section 302 of the Weather Research and



1       Forecasting Innovation Act of 2017 (15 U.S.C.  
2       8532), as amended by section 401 of this Act.

3       (b) PROGRAM ELEMENTS.—In carrying out the Pro-  
4       gram, the Under Secretary shall—

5               (1) increase data density by—

6                       (A) improving and increasing the quantity  
7                       and density of environmental observations used  
8                       by the Administration and the National Weath-  
9                       er Service to support baseline forecasts, includ-  
10                      ing nowcasts, warnings, and hyper local fore-  
11                      casts that protect individuals, businesses, agri-  
12                      cultural production, food security, military, and  
13                      government agencies in the United States, and  
14                      enabling such individuals and entities to operate  
15                      in a safe, efficient, and orderly manner;

16                     (B) yielding increased quantities of bound-  
17                     ary-layer data to improve numerical weather  
18                     prediction performance, including in subsea-  
19                     sonal to seasonal timescales;

20                     (C) identifying available terrestrial or ma-  
21                     rine environmental data, or quantifiable gaps in  
22                     such data, to improve the understanding of air-  
23                     sea interactions; and

24                     (D) supporting the National Weather Serv-  
25                     ice in reaching its target of a 30-minute warn-

1 ing time for severe weather through better pre-  
2 dictive model algorithms driven by increasingly  
3 effective observations;

4 (2) monitor local meteorological conditions by—

5 (A) acquiring soil and moisture data to  
6 monitor soil moisture, vegetation water content,  
7 and moisture loss from evaporation, in support  
8 of operational forecasting, the National Inte-  
9 grated Drought Information System, and local  
10 commercial, agricultural, and emergency man-  
11 agement needs;

12 (B) supporting the National Coordinated  
13 Soil Moisture Monitoring Network in acquiring  
14 soil moisture and related data to support the  
15 development of decision-support products and  
16 other information services; and

17 (C) expanding and enhancing environ-  
18 mental observational networks in the roadway  
19 environment to provide real-time road weather  
20 and surface conditions for surface transpor-  
21 tation and related economic sectors; and

22 (3) administer the Program by—

23 (A) obtaining data in furtherance of this  
24 section only when demonstrably cost effective  
25 and meeting or exceeding data quality stand-

ards available to the National Oceanic and Atmospheric Administration (referred to in this section as the “Administration”);

(B) subject to the requirement in subparagraph (A), leveraging existing networks of environmental monitoring stations, including supplemental radar systems, to increase the quantity and density of environmental observations and data available to the Administration;

(C) providing the critical technical and administrative infrastructure needed to facilitate rapid integration and sustained use of new and emerging networks of environmental monitoring stations anticipated in coming years from non-Federal Government sources;

(D) coordinating with existing data developed by the Administration and used for forecasts, including data from the National Environmental Satellite, Data, and Information Service, the Integrated Ocean Observing System, the Global Ocean Monitoring and Observing Program, the National Data Buoy Center, and the National Ocean Service; and

(E) identifying and communicating to the Office of Oceanic and Atmospheric Research

1           and other partners priorities of research and  
2           development needed to advance observations in  
3           the Program.

4       (c) FINANCIAL AND TECHNICAL ASSISTANCE.—

5           (1) IN GENERAL.—In furtherance of the Pro-  
6           gram, in a fiscal year, the Under Secretary may  
7           award not less than 15 percent of the amount appro-  
8           priated for the Program for that fiscal year for fi-  
9           nancial assistance to State, Tribal, private, and aca-  
10          demic entities seeking to build, expand, or upgrade  
11          equipment and capacity of mesonet systems.

12          (2) OTHER FEDERAL AWARDS.—Financial as-  
13          sistance under this subsection may be made in co-  
14          ordination with and in addition to awards from  
15          other Federal agencies.

16          (3) AGREEMENTS.—Before receiving financial  
17          assistance under paragraph (1), the State, Tribal,  
18          private, or academic entity seeking financial assist-  
19          ance under this subsection shall enter into an agree-  
20          ment with the Under Secretary to provide data to  
21          the Program, subject to verification by the Program  
22          of the relative operational value and evaluation of  
23          the cost of such data, for use in weather prediction,  
24          severe weather warnings, and emergency response.

1           (4) ASSISTANCE AND OTHER SUPPORT.—The  
2 Under Secretary may provide—

3           (A) technical assistance, project implemen-  
4 tation support, and guidance to State, Tribal,  
5 private, and academic entities seeking financial  
6 assistance under this subsection; and

7           (B) technical and financial assistance for  
8 maintenance of monitoring stations in under-  
9 represented or remote areas of the country  
10 where it is financially unfeasible for 1 entity to  
11 operate such stations without such assistance.

12          (5) TERMS.—In providing financial assistance  
13 under this subsection, the Under Secretary shall es-  
14 tablish terms to ensure that each State, Tribal, pri-  
15 vate, or academic entity that receives financial as-  
16 sistance under this subsection receives a level of sup-  
17 port commensurate with the quality and other char-  
18 acteristics of the data to be provided.

19          (6) DETERMINATION.—A State, Tribal, private,  
20 or academic entity may only receive financial assist-  
21 ance under this subsection if the Under Secretary  
22 determines such entity will provide sufficient finan-  
23 cial support from non-Federal Government sources  
24 and fully maintain the quality of the mesonet system

1 and associated data standards required by the Pro-  
2 gram for a period of not less than 5 years.

3 (7) PRIORITY.—The Under Secretary shall  
4 prioritize providing assistance under paragraph (1)  
5 to not fewer than 1 entity in a remote area or an  
6 area that has a lack of environmental monitoring  
7 stations described in subsection (a)(2).

8 (d) ADVISORY COMMITTEE.—

9 (1) IN GENERAL.—The Under Secretary shall  
10 ensure the Program has an active advisory com-  
11 mittee of subject matter experts to make rec-  
12 ommendations to the Administration on the identi-  
13 fication, implementation, procurement, and tracking  
14 of data needed to supplement the Program, and rec-  
15 ommend improvements, expansions, and acquisitions  
16 of available data.

17 (2) DESIGNATION OF EXISTING COMMITTEE.—  
18 The Under Secretary may designate an existing ad-  
19 visory committee, subcommittee, or working group of  
20 the Federal Government, including the Science Advi-  
21 sory Board of the Administration, to carry out the  
22 requirement under paragraph (1).

23 (3) ACADEMIC EXPERTISE.—The advisory com-  
24 mittee under paragraph (1), in consultation with the  
25 Program, shall include expertise from 1 or more in-

stitutions of higher education (as defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)) to assist the advisory committee to identify, evaluate, and recommend potential partnerships, regional or subregional consortia, and collaborative methods that would expand the number of participants and volume of data in the Program.

(e) REGULAR BRIEFINGS.—

(1) IN GENERAL.—Not less frequently than annually through 2035, the Under Secretary shall provide regular briefings to the Committee on Commerce, Science, and Transportation of the Senate and the Committee on Science, Space, and Technology of the House of Representatives on all activities under the Program.

(2) BRIEFING CONTENT.—Each briefing required under paragraph (1) shall include information relating to the following:

(A) Efforts to implement the activities described in subsection (b).

(B) Any financial or technical assistance provided pursuant to subsection (c).

(C) Efforts to address recommendations received from the advisory committee under subsection (d), if any.

1 (D) The potential need and associated ben-  
 2 efits of a coastal and ocean mesonet, or other  
 3 emerging areas of weather data needs.

4 (E) Progress toward eliminating gaps in  
 5 weather observation data in States and regions  
 6 of the United States.

7 (F) Any other topic the Under Secretary  
 8 determines relevant.

9 (f) AUTHORIZATION OF APPROPRIATIONS.—From  
 10 amounts authorized to be appropriated to the National  
 11 Weather Service, there shall be available not more than  
 12 the following amounts to carry out this section:

13 (1) \$50,000,000 for fiscal year 2025.

14 (2) \$55,000,000 for fiscal year 2026.

15 (3) \$61,000,000 for fiscal year 2027.

16 (4) \$68,000,000 for fiscal year 2028.

17 (5) \$70,000,000 for fiscal year 2029.

18 **SEC. 504. NATIONAL COORDINATED SOIL MOISTURE MONI-**  
 19 **TORING NETWORK.**

20 (a) IN GENERAL.—The Under Secretary, in collabo-  
 21 ration with the Secretary of Agriculture, the Director of  
 22 the United States Geological Survey, the Administrator of  
 23 the National Aeronautics and Space Administration, and  
 24 the heads of other relevant Federal agencies and depart-  
 25 ments, shall support the development, deployment, and



1 maintenance of soil moisture monitoring networks by man-  
2 aging the National Coordinated Soil Moisture Monitoring  
3 Network (in this section referred to as the “Network”)  
4 within the National Integrated Drought Information Sys-  
5 tem.

6 (b) ACTIVITIES.—The Under Secretary shall ensure  
7 the Network includes activities that carry out the fol-  
8 lowing:

9 (1) Establishing a visible, user-friendly website.

10 (2) Developing a set of criteria for high-quality  
11 data sources.

12 (3) Supporting research necessary to develop or  
13 improve soil moisture monitoring products at a na-  
14 tional scale.

15 (4) Increasing the number of long-term, high-  
16 quality, in situ and remote sensing soil moisture  
17 monitoring stations across the United States.

18 (5) Sharing methodologies and validation proto-  
19 cols with the private sector.

20 (6) Engaging with the citizen science commu-  
21 nity.

22 (7) Developing, releasing, and promoting new,  
23 nationwide point-based and gridded soil moisture  
24 data products that meet the needs of diverse end-  
25 user groups.

1           (8) Supporting community building and out-  
 2           reach to the network of individuals engaged with soil  
 3           moisture information delivery, from data provision to  
 4           end-user decision making.

5 **SEC. 505. NATIONAL WATER CENTER.**

6           Section 301 of the Coordinated Ocean Observations  
 7           and Research Act of 2020 (42 U.S.C. 10371) is amend-  
 8           ed—

9           (1) in subsection (a)—

10           (A) in paragraph (1)(A)—

11           (i) in the matter preceding clause (i),  
 12           by inserting “, within the Office of Water  
 13           Prediction of the National Weather Serv-  
 14           ice,” after “shall establish”;

15           (ii) in clause (i), by striking “and”  
 16           after the semicolon;

17           (iii) in clause (ii), by striking the pe-  
 18           riod and inserting “; and”; and

19           (iv) by adding at the end the following  
 20           new clause:

21           “(iii) to lead the transition of water  
 22           research by the Federal Government, in-  
 23           cluding model development, into operations  
 24           of the National Oceanic and Atmospheric

1 Administration and the National Weather  
2 Service.”; and

3 (B) in paragraph (2), by adding at the end  
4 the following new subparagraphs:

5 “(F) Serving as the primary Center within  
6 the National Oceanic and Atmospheric Admin-  
7 istration for research, development, collabora-  
8 tion, and coordination of the water research  
9 and forecast activities of the Administration  
10 and other centers and networks of the Federal  
11 Government, including those of the Department  
12 of Agriculture, the Army Corps of Engineers,  
13 the Bureau of Reclamation, the United States  
14 Geological Survey, and the Federal Emergency  
15 Management Agency.

16 “(G) Integrating and promoting consist-  
17 ency among national and regional hydrological  
18 forecast operations and service delivery.”; and

19 (C) by adding at the end the following:

20 “(3) INCORPORATION INTO UNIFIED FORECAST  
21 SYSTEM.—The Under Secretary shall use the Weath-  
22 er and Climate Operational Supercomputing System,  
23 or any other successor system, to support the devel-  
24 opment and implementation of advanced water re-  
25 sources modeling capabilities under paragraph

1       (2)(B) and shall incorporate those modeling capabili-  
2       ties into the unified forecast system.”;

3               (2) by striking subsection (b);

4               (3) by redesignating subsection (c) as sub-  
5       section (b);

6               (4) by inserting after subsection (b), as redesign-  
7       nated by paragraph (3), the following:

8       “(c) ORGANIZATION.—The Under Secretary, acting  
9       through the Director of the Office of Water Prediction of  
10      the National Weather Service, shall—

11              “(1) supervise and oversee the administration,  
12      management, and operations of each River Forecast  
13      Center of the National Weather Service and coordi-  
14      nate those operations with the National Water Cen-  
15      ter; and

16              “(2) administer the duties and activities of the  
17      National Oceanic and Atmospheric Administration  
18      related to the Cooperative Institute for Research to  
19      Operations in Hydrology, or any successor entity,  
20      and coordinate the activities of the Institute with the  
21      National Water Center.”; and

22              (5) in subsection (d)(4), by striking “fiscal year  
23      2024” and inserting “each of fiscal years 2024  
24      through 2029”.

1 **SEC. 506. SATELLITE TRANSFERS BRIEFING.**

2 Not later than 180 days after the date of the enact-  
3 ment of this Act, the Secretary of Commerce shall brief  
4 the Committee on Commerce, Science, and Transportation  
5 of the Senate and the Committee on Science, Space, and  
6 Technology of the House of Representatives on the De-  
7 partment of Commerce's authorities and policies and Fed-  
8 eral Government-wide policies related to transferring any  
9 portion of the weather satellite systems operated by the  
10 Department of Commerce to any other Federal depart-  
11 ment or agency, including—

12 (1) a description of the process for decommis-  
13 sioning a Department of Commerce operational  
14 weather satellite, any existing agreements related to  
15 transfers of weather satellites, whether decommis-  
16 sioned or not, and any reimbursable agreements re-  
17 lated to the transfer of physical property or the op-  
18 eration of Department of Commerce weather sat-  
19 ellites on behalf of any other Federal department or  
20 agency; and

21 (2) a summary of any Department of Com-  
22 merce plans for potential transfer of existing or fu-  
23 ture weather satellite systems to any other Federal  
24 department or agency.

1 **TITLE VI—HARMFUL ALGAL**  
 2 **BLOOM AND HYPOXIA RE-**  
 3 **SEARCH AND CONTROL**  
 4 **AMENDMENTS ACT OF 2024**

5 **SEC. 601. SHORT TITLE.**

6 This title may be cited as the “Harmful Algal Bloom  
 7 and Hypoxia Research and Control Amendments Act of  
 8 2024”.

9 **SEC. 602. AMENDMENTS TO THE HARMFUL ALGAL BLOOMS**  
 10 **AND HYPOXIA RESEARCH AND CONTROL ACT**  
 11 **OF 1998.**

12 (a) **ASSESSMENTS.**—

13 (1) **IN GENERAL.**—Section 603 of the Harmful  
 14 Algal Blooms and Hypoxia Research and Control  
 15 Act of 1998 (33 U.S.C. 4001) is amended—

16 (A) in the section heading, by striking  
 17 “**ASSESSMENTS**” and inserting “**TASK**  
 18 **FORCE, ASSESSMENTS, AND ACTION**  
 19 **STRATEGY**”;

20 (B) in subsection (a)—

21 (i) by redesignating paragraphs (13)  
 22 and (14) as paragraphs (14) and (15), re-  
 23 spectively; and

24 (ii) by inserting after paragraph (12)  
 25 the following:

1 “(13) the Department of Energy;”;

2 (C) by striking subsections (b), (c), (d),  
3 (e), (g), (h), and (i) and redesignating sub-  
4 section (f) as subsection (b);

5 (D) in subsection (b), as so redesignated—

6 (i) in paragraph (1), in the first sen-  
7 tence, by striking “coastal waters including  
8 the Great Lakes” and inserting “marine,  
9 estuarine, and freshwater systems”; and

10 (ii) in paragraph (2)—

11 (I) by amending subparagraph  
12 (A) to read as follows:

13 “(A) examine—

14 “(i) the causes and ecological con-  
15 sequences of hypoxia on marine and aquat-  
16 ic species in their environments; and

17 “(ii) the costs of hypoxia, including  
18 impacts on food safety and security;”;

19 (II) by redesignating subpara-  
20 graphs (B), (C), and (D) as subpara-  
21 graphs (D), (E), and (F), respectively;

22 (III) by inserting after subpara-  
23 graph (A) the following:

24 “(B) examine the effect of other environ-  
25 mental stressors on hypoxia;

“(C) evaluate alternatives for reducing, mitigating, and controlling hypoxia and its environmental impacts;”;

(IV) in subparagraph (D), as redesignated by subclause (II), by inserting “, social,” after “ecological”; and

(V) in subparagraph (E), as redesignated by subclause (II), by striking “hypoxia modeling and monitoring data” and inserting “hypoxia modeling, forecasting, and monitoring and observation data”; and

(E) by adding at the end the following:

“(c) ACTION STRATEGY AND SCIENTIFIC ASSESSMENT FOR MARINE AND FRESHWATER HARMFUL ALGAL BLOOMS.—

“(1) IN GENERAL.—Not less frequently than once every 5 years, the Task Force shall complete and submit to Congress an action strategy for harmful algal blooms in the United States.

“(2) ELEMENTS.—Each Action Strategy shall—



1           “(A) examine, and include a scientific as-  
 2           sessment of, marine and freshwater harmful  
 3           algal blooms, including such blooms—

4                   “(i) in the Great Lakes;

5                   “(ii) in the upper reaches of estuaries;

6                   “(iii) in freshwater lakes and rivers;

7                   “(iv) in coastal and marine waters;

8                   and

9                   “(v) that originate in freshwater lakes  
 10                  or rivers and migrate to coastal waters;

11           “(B) examine the causes, ecological con-  
 12           sequences or physiological consequences on fish  
 13           function, and economic or socio-cultural im-  
 14           pacts, including food safety and security, of  
 15           harmful algal blooms;

16           “(C) examine the effect of other environ-  
 17           mental stressors on harmful algal blooms;

18           “(D) examine potential methods to pre-  
 19           vent, control, and mitigate harmful algal blooms  
 20           and the potential ecological, social, cultural, and  
 21           economic costs and benefits of such methods;

22           “(E) identify priorities for research needed  
 23           to advance techniques and technologies to de-  
 24           tect, predict, monitor, respond to, and minimize  
 25           the occurrence, duration, and severity of harm-

1           ful algal blooms, including recommendations to  
2           eliminate significant gaps in harmful algal  
3           bloom forecasting, monitoring, and observation  
4           data;

5           “(F) evaluate progress made by, and the  
6           needs of, activities and actions of the Task  
7           Force to prevent, control, and mitigate harmful  
8           algal blooms;

9           “(G) identify ways to improve coordination  
10          and prevent unnecessary duplication of effort  
11          among Federal agencies with respect to re-  
12          search on harmful algal blooms; and

13          “(H) include regional chapters relating to  
14          the requirements described in this paragraph in  
15          order to highlight geographically and eco-  
16          logically diverse locations with significant eco-  
17          logical, social, cultural, and economic impacts  
18          from harmful algal blooms.

19          “(d) CONSULTATION.—In carrying out subsections  
20 (b) and (c), the Task Force shall consult with—

21               “(1) States, Indian tribes, and local govern-  
22               ments; and

23               “(2) appropriate industries (including fisheries,  
24               agriculture, and fertilizer), academic institutions,

1 and nongovernmental organizations with relevant ex-  
 2 pertise.”.

3 (2) CLERICAL AMENDMENT.—The table of con-  
 4 tents in section 2 of the Coast Guard Authorization  
 5 Act of 1998 (Public Law 105–383; 112 Stat. 3412;  
 6 136 Stat. 1268) is amended by striking the item re-  
 7 lating to section 603 and inserting the following:

“Sec. 603. Task Force, assessments, and Action Strategy.”.

8 (3) CONFORMING AMENDMENT.—Section 102  
 9 of the Harmful Algal Bloom and Hypoxia Amend-  
 10 ments Act of 2004 (33 U.S.C. 4001a) is amended  
 11 by striking “In developing” and all that follows  
 12 through “management.”.

13 (b) NATIONAL HARMFUL ALGAL BLOOM AND HY-  
 14 POXIA PROGRAM.—Section 603A of the Harmful Algal  
 15 Blooms and Hypoxia Research and Control Act of 1998  
 16 (33 U.S.C. 4002) is amended—

17 (1) in subsection (a)—

18 (A) in paragraph (1)—

19 (i) by striking “predicting,” and in-  
 20 serting “monitoring, observing, fore-  
 21 casting,”; and

22 (ii) by striking “and” after the semi-  
 23 colon; and

24 (B) by striking paragraph (2) and insert-  
 25 ing the following:

1 “(2) the scientific assessment submitted under  
2 section 603(b); and

3 “(3) the Action Strategy.”;

4 (2) in subsection (c)—

5 (A) in paragraph (3), by striking “ocean  
6 and Great Lakes science and management pro-  
7 grams and centers” and inserting “programs  
8 and centers relating to the science and manage-  
9 ment of marine, estuarine, and freshwater sys-  
10 tems”; and

11 (B) in paragraph (5), by inserting “while  
12 recognizing each agency is acting under its own  
13 independent mission and authority” before the  
14 semicolon;

15 (3) in subsection (d), by striking “Except as  
16 provided in subsection (h), the” and inserting  
17 “The”;

18 (4) in subsection (e)—

19 (A) by striking paragraph (2) and insert-  
20 ing the following:

21 “(2) examine the causes, ecological con-  
22 sequences, and costs of harmful algal blooms and  
23 hypoxia;”;

24 (B) in paragraph (3)—

1 (i) in subparagraph (B), by inserting  
2 “, including the annual Gulf of Mexico hy-  
3 poxia zone mapping cruise” after “Pro-  
4 gram”;

5 (ii) in subparagraph (C), by striking  
6 “and” after the semicolon; and

7 (iii) by adding at the end the fol-  
8 lowing:

9 “(E) to identify opportunities to improve  
10 monitoring of harmful algal blooms and hy-  
11 poxia, with a particular focus on waters that  
12 may affect fisheries, public health, or subsist-  
13 ence harvest;

14 “(F) to evaluate adaptation and mitigation  
15 strategies to address the impacts of harmful  
16 algal blooms and hypoxia;

17 “(G) to support the resilience of the sea-  
18 food industry to harmful algal blooms and to  
19 expand access to testing for harmful algal  
20 bloom toxins, including for subsistence and rec-  
21 reational harvesters, through innovative meth-  
22 ods that increase the efficiency and effective-  
23 ness of such testing in rural and remote areas;

24 “(H) to support sustained observations to  
25 provide State and local entities, Indian tribes,

1 and other entities access to real-time or near  
 2 real-time observations data for decision-making  
 3 to protect human and ecological health and  
 4 local economies; and

5 “(I) to assess the combined effects of  
 6 harmful algal blooms, hypoxia, and stressors  
 7 such as runoff and infrastructure changes on  
 8 marine, freshwater, or estuarine ecosystems and  
 9 living resources;”;

10 (C) in paragraph (4), by striking “agen-  
 11 cies” and inserting “entities, regional coastal  
 12 observing systems (as defined in section 12303  
 13 of the Integrated Coastal and Ocean Observa-  
 14 tion System Act of 2009 (33 U.S.C. 3602)),”;

15 (D) in paragraph (6), by inserting “and  
 16 communities” after “ecosystems”;

17 (E) in paragraph (8), by inserting “and  
 18 Indian tribes” after “managers”;

19 (F) in paragraph (9)(A), by striking “,  
 20 tribal, and local stakeholders” and inserting  
 21 “and local stakeholders and Indian tribes, Trib-  
 22 al organizations, and Native Hawaiian organi-  
 23 zations”;

24 (G) by redesignating paragraphs (3), (4),  
 25 (5), (6), (7), (8), (9), (10), and (11) as para-

1           graphs (4), (5), (6), (7), (8), (9), (10), (12),  
2           and (13), respectively;

3           (H) by inserting after paragraph (2) the  
4           following:

5           “(3) consult with entities that are most depend-  
6           ent on coastal and water resources that may be im-  
7           pacted by marine and freshwater harmful algal  
8           blooms and hypoxia, including—

9           “(A) State and local entities;

10          “(B) Indian tribes, Tribal organizations,  
11          and Native Hawaiians organizations;

12          “(C) island communities;

13          “(D) low-population rural communities;

14          “(E) subsistence communities; and

15          “(F) fisheries and recreation industries;”;

16          and

17          (I) by inserting after paragraph (10), as  
18          redesignated by subparagraph (G), the fol-  
19          lowing:

20          “(11) expand access to testing for harmful algal  
21          bloom toxins, including for subsistence and rec-  
22          reational harvesters, through innovative methods  
23          that increase the efficiency and effectiveness of such  
24          testing in rural and remote areas;”;

1           (5) by amending subsections (f) to read as fol-  
2       lows:

3       “(f) COOPERATION; DUPLICATION OF EFFORT.—The  
4       Under Secretary shall work cooperatively with and avoid  
5       duplication of effort of other agencies on the Task Force  
6       and States, Indian tribes, Tribal organizations, Native  
7       Hawaiian organizations, and nongovernmental organiza-  
8       tions concerned with marine and freshwater issues.”; and  
9       (6) by striking subsection (g), (h), and (i).

10       (c) NATIONAL OCEANIC AND ATMOSPHERIC ADMIN-  
11       ISTRATION ACTIVITIES.—

12       (1) IN GENERAL.—Section 603B of the Harm-  
13       ful Algal Blooms and Hypoxia Research and Control  
14       Act of 1998 (33 U.S.C. 4003) is amended to read  
15       as follows:

16       **“SEC. 603B. NATIONAL OCEANIC AND ATMOSPHERIC AD-**  
17       **MINISTRATION ACTIVITIES.**

18       “(a) IN GENERAL.—The Under Secretary shall—

19           “(1) carry out response activities for marine,  
20       coastal, and Great Lakes harmful algal bloom and  
21       hypoxia events;

22           “(2) develop and enhance operational harmful  
23       algal bloom observing and forecasting programs, in-  
24       cluding operational observations and forecasting,



1 monitoring, modeling, data management, and infor-  
2 mation dissemination;

3 “(3) develop forecast modeling that includes the  
4 effect of hurricanes and other weather events on the  
5 resuspension of bioavailable nutrients in sediments  
6 and related interactions with harmful algal blooms;

7 “(4) enhance communication and coordination  
8 among Federal agencies carrying out activities and  
9 research relating to marine and freshwater harmful  
10 algal bloom and hypoxia;

11 “(5) leverage existing resources and expertise  
12 available from local research universities and institu-  
13 tions; and

14 “(6) use cost effective methods in carrying out  
15 this section.

16 “(b) INTEGRATED COASTAL AND OCEAN OBSERVA-  
17 TION SYSTEM.—The collection of monitoring and observ-  
18 ing data under this section shall comply with all data  
19 standards and protocols developed pursuant to the Inte-  
20 grated Coastal and Ocean Observation System Act of  
21 2009 (33 U.S.C. 3601 et seq.). Such data shall be made  
22 available through the National Integrated Coastal and  
23 Ocean Observation System established under section  
24 12304 of that Act (33 U.S.C. 3603).”.

1           (2) CLERICAL AMENDMENT.—The table of con-  
 2           tents in section 2 of the Coast Guard Authorization  
 3           Act of 1998 (Public Law 105–383; 112 Stat. 3412;  
 4           136 Stat. 1268) is amended by striking the item re-  
 5           lating to section 603B and inserting the following:

“Sec. 603B. National Oceanic and Atmospheric Administration activities.”.

6           (d) ENVIRONMENTAL PROTECTION AGENCY ACTIVI-  
 7           TIES.—

8           (1) IN GENERAL.—The Harmful Algal Bloom  
 9           and Hypoxia Research and Control Act of 1998 is  
 10          amended by inserting after section 603B (33 U.S.C.  
 11          4003) the following:

12       **“SEC. 603C. ENVIRONMENTAL PROTECTION AGENCY AC-**  
 13       **TIVITIES.**

14       “(a) IN GENERAL.—The Administrator shall—

15           “(1) carry out research on the ecology and  
 16           human health impacts of freshwater harmful algal  
 17           blooms and hypoxia events;

18           “(2) develop and enhance operational fresh-  
 19           water harmful algal bloom monitoring, observing,  
 20           and forecasting programs in lakes, rivers, and res-  
 21           ervoirs, and coordinate with the National Oceanic  
 22           and Atmospheric Administration on such programs  
 23           in the Great Lakes and estuaries (including tribu-  
 24           taries thereof), including operational observations  
 25           and forecasting, monitoring, modeling, data manage-

1       ment, and information dissemination, to support  
2       event response, prioritization, prevention, adapta-  
3       tion, and mitigation activities;

4           “(3) enhance communication and coordination  
5       among Federal agencies carrying out freshwater  
6       harmful algal bloom and hypoxia activities and re-  
7       search;

8           “(4) to the greatest extent practicable, leverage  
9       existing resources and expertise available from Fed-  
10      eral and State partners and local research univer-  
11      sities and institutions; and

12           “(5) use cost-effective methods in carrying out  
13      this section.

14      “(b) NONDUPLICATION.—The Administrator shall  
15      ensure that activities carried out under subsection (a)  
16      focus on new approaches to addressing freshwater harmful  
17      algal blooms and are not duplicative of existing research  
18      and development programs authorized by this title or any  
19      other law.”.

20           (2) CLERICAL AMENDMENT.—The table of con-  
21      tents in section 2 of the Coast Guard Authorization  
22      Act of 1998 (Public Law 105–383; 112 Stat. 3412;  
23      136 Stat. 1268) is amended by inserting after the  
24      item relating to section 603B the following:

“Sec. 603C. Environmental Protection Agency activities.”.

1 (e) NATIONAL HARMFUL ALGAL BLOOM AND HY-  
2 POXIA OBSERVING NETWORK.—

3 (1) IN GENERAL.—Section 606 of the Harmful  
4 Algal Blooms and Hypoxia Research and Control  
5 Act of 1998 (33 U.S.C. 4005) is amended to read  
6 as follows:

7 **“SEC. 606. NATIONAL HARMFUL ALGAL BLOOM OBSERVING**  
8 **NETWORK.**

9 “(a) IN GENERAL.—The Under Secretary, acting  
10 through the National Centers for Coastal Ocean Science  
11 and the Integrated Ocean Observing System of the Na-  
12 tional Oceanic and Atmospheric Administration, shall in-  
13 tegrate Federal, State, regional, and local observing capa-  
14 bilities to establish a national network of observing sys-  
15 tems for the monitoring, detection, and forecasting of  
16 harmful algal blooms by leveraging the capacity of re-  
17 gional associations of the Integrated Ocean Observing Sys-  
18 tem, including through the incorporation of emerging tech-  
19 nologies and new data integration methods.

20 “(b) COORDINATION AND DATA ASSEMBLY.—In car-  
21 rying out subsection (a), the Program Office of the Inte-  
22 grated Ocean Observing System shall—

23 “(1) coordinate with the National Centers for  
24 Coastal Ocean Science regarding observations, data  
25 integration, and information dissemination;

1           “(2) organize, integrate, disseminate, and pro-  
 2       vide a central architecture to support ecological fore-  
 3       casting of harmful algal blooms; and

4           “(3) coordinate with the Water Quality Portal  
 5       to store and serve discrete data related to the moni-  
 6       toring of freshwater, estuarine, and coastal harmful  
 7       algal blooms.”.

8           (2) CLERICAL AMENDMENT.—The table of con-  
 9       tents in section 2 of the Coast Guard Authorization  
 10      Act of 1998 (Public Law 105–383; 112 Stat. 3412;  
 11      136 Stat. 1268) is amended by striking the item re-  
 12      lating to section 606 and inserting the following:

“Sec. 606. National harmful algal bloom observing network.”.

13      (f) NATIONAL-LEVEL INCUBATOR PROGRAM.—

14           (1) IN GENERAL.—The Harmful Algal Blooms  
 15      and Hypoxia Research and Control Act of 1998 is  
 16      amended by inserting after section 606 (33 U.S.C.  
 17      4005) the following:

18      **“SEC. 606A. NATIONAL-LEVEL INCUBATOR PROGRAM.**

19           “(a) IN GENERAL.—The Under Secretary, in collabo-  
 20      ration with the Administrator and research universities  
 21      and institutions, shall establish a national-level incubator  
 22      program (in this section referred to as the ‘program’) to  
 23      increase the number of strategies, technologies, and meas-  
 24      ures available to prevent, mitigate, and control harmful  
 25      algal blooms.

1       “(b) FRAMEWORK.—The program shall establish a  
 2 framework for preliminary assessments of novel strategies,  
 3 technologies, and measures to prevent, mitigate, and con-  
 4 trol harmful algal blooms in order to determine the poten-  
 5 tial effectiveness and scalability of such technologies.

6       “(c) FUNDING.—The program shall provide merit-  
 7 based funding, using amounts otherwise available to the  
 8 Under Secretary for the award of grants, for strategies,  
 9 technologies, and measures that eliminate or reduce,  
 10 through biological, chemical, or physical means, the levels  
 11 of harmful algae and associated toxins resulting from  
 12 harmful algal blooms.

13       “(d) DATABASE.—The program shall include a data-  
 14 base for cataloging the licensing and permitting require-  
 15 ments, economic costs, feasibility, effectiveness, and  
 16 scalability of novel and established strategies, tech-  
 17 nologies, and measures to prevent, mitigate, and control  
 18 harmful algal blooms.

19       “(e) PRIORITIZATION.—In carrying out the program,  
 20 the Under Secretary shall prioritize proposed strategies,  
 21 technologies, and measures that would, to the maximum  
 22 extent practicable—

- 23               “(1) protect key habitats for fish and wildlife;
- 24               “(2) maintain biodiversity;
- 25               “(3) protect public health;

1           “(4) protect coastal resources of national, his-  
2           torical, and cultural significance; or

3           “(5) benefit low-income communities, Indian  
4           tribes, and rural communities.”.

5           (2) CLERICAL AMENDMENT.—The table of con-  
6           tents in section 2 of the Coast Guard Authorization  
7           Act of 1998 (Public Law 105–383; 112 Stat. 3412;  
8           136 Stat. 1268) is amended by inserting after the  
9           item relating to section 606 the following:

“Sec. 606A. National-level incubator program.”.

10          (g) DEFINITIONS.—Section 609 of the Harmful Algal  
11       Blooms and Hypoxia Research and Control Act of 1998  
12       (33 U.S.C. 4008) is amended—

13           (1) in paragraph (1), by striking “means the  
14           comprehensive research plan and action strategy es-  
15           tablished under section 603B” and inserting “means  
16           the action strategy for harmful algal blooms in the  
17           United States most recently submitted under section  
18           603(c)”;

19           (2) by amending paragraph (3) to read as fol-  
20           lows:

21           “(3) HARMFUL ALGAL BLOOM.—The term  
22           ‘harmful algal bloom’ means a high concentration of  
23           marine or freshwater algae (including diatoms),  
24           macroalgae (including Sargassum), or cyanobacteria  
25           resulting in nuisance conditions or harmful impacts

1 on marine and freshwater ecosystems, subsistence  
 2 resources, communities, or human health through  
 3 the production of toxic compounds or other biological,  
 4 chemical, or physical impacts of the bloom.”;

5 (3) by striking paragraph (9);

6 (4) by redesignating paragraphs (4), (5), (6),  
 7 (7), and (8) as paragraphs (5), (8), (9), (11), and  
 8 (13), respectively;

9 (5) by inserting after paragraph (3) the following:  
 10

11 “(4) HARMFUL ALGAL BLOOM AND HYPOXIA  
 12 EVENT.—The term ‘harmful algal bloom and hypoxia event’ means the occurrence of a harmful algal  
 13 bloom or hypoxia as a result of a natural, anthropogenic, or undetermined cause.”;

16 (6) in paragraph (5), as redesignated by paragraph (4)—  
 17

18 (A) by striking “aquatic” and inserting  
 19 “marine or freshwater”; and

20 (B) by striking “resident” and inserting  
 21 “marine or freshwater”;

22 (7) by inserting after paragraph (5), as redesignated by paragraph (4), the following:

24 “(6) INDIAN TRIBE.—The term ‘Indian tribe’  
 25 has the meaning given that term in section 4 of the



1 Indian Self-Determination and Education Assistance  
2 Act (25 U.S.C. 5304).

3 “(7) NATIVE HAWAIIAN ORGANIZATION.—The  
4 term ‘Native Hawaiian organization’ has the mean-  
5 ing given that term in section 6207 of the Elemen-  
6 tary and Secondary Education Act of 1965 (20  
7 U.S.C. 7517) and includes the Department of Ha-  
8 waiian Home Lands and the Office of Hawaiian Af-  
9 fairs.”;

10 (8) by inserting after paragraph (9), as redesign-  
11 nated by paragraph (4), the following:

12 “(10) SUBSISTENCE USE.—The term ‘subsist-  
13 ence use’ means the customary and traditional use  
14 of fish, wildlife, or other freshwater, coastal, or ma-  
15 rine resources by any individual or community to  
16 meet personal or family needs, including essential  
17 economic, nutritional, or cultural applications.”; and

18 (9) by inserting after paragraph (11), as redes-  
19 igned by paragraph (4), the following:

20 “(12) TRIBAL ORGANIZATION.—The term ‘Trib-  
21 al organization’ has the meaning given that term in  
22 section 4 of the Indian Self-Determination and Edu-  
23 cation Assistance Act (25 U.S.C. 5304).”.

1 (h) AUTHORIZATION OF APPROPRIATIONS.—Section  
2 610 of the Harmful Algal Blooms and Hypoxia Research  
3 and Control Act of 1998 (33 U.S.C. 4009) is amended—

4 (1) by amending subsection (a) to read as fol-  
5 lows:

6 “(a) IN GENERAL.—There is authorized to be appro-  
7 priated to carry out this title, for each of fiscal years 2025  
8 through 2029—

9 “(1) \$19,500,000 to the Under Secretary; and

10 “(2) \$8,000,000 to the Administrator.”; and

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

12 “(c) TRANSFER AUTHORITY.—As specifically pro-  
13 vided in advance in appropriations Acts, the Under Sec-  
14 retary or the Administrator may transfer funds made  
15 available to carry out this title to the head of any Federal  
16 department or agency, with the concurrence of such head,  
17 to carry out, as appropriate, relevant provisions of this  
18 title and section 9(g) of the National Integrated Drought  
19 Information System Reauthorization Act of 2018 (33  
20 U.S.C. 4010).”.

21 **SEC. 603. OTHER HARMFUL ALGAL BLOOM MATTERS.**

22 (a) IN GENERAL.—Section 9(g) of the National Inte-  
23 grated Drought Information System Reauthorization Act  
24 of 2018 (33 U.S.C. 4010) is amended—

25 (1) in paragraph (1)—

1 (A) in subparagraph (B), by adding at the  
2 end the following new sentence: “The appro-  
3 priate Federal official may waive the non-Fed-  
4 eral share requirements of the preceding sen-  
5 tence if such official determines no reasonable  
6 means are available through which the recipient  
7 of the Federal share can meet the non-Federal  
8 share requirement.”; and

9 (B) by adding at the end the following:

10 “(D) CONTRACT, COOPERATIVE AGREE-  
11 MENT, AND GRANT AUTHORITY.—The appro-  
12 priate Federal official may enter into contracts,  
13 cooperative agreements, and grants with States,  
14 Indian Tribes, Tribal organizations, Native Ha-  
15 waiian organizations, local governments, or  
16 other entities to pay for or reimburse costs in-  
17 curred by such entities for the purposes of sup-  
18 porting the determination of, and assessing the  
19 environmental, economic, social, subsistence  
20 use, and public health effects of, a harmful  
21 algal bloom or hypoxia event of national signifi-  
22 cance.”;

23 (2) in paragraph (2)—

24 (A) in subparagraph (A), by inserting “a  
25 leadership official of an affected Indian Tribe,

1 the executive official of the District of Colum-  
2 bia, or the executive official of an affected terri-  
3 tory or possession of the United States,” after  
4 “State,”; and

5 (B) in subparagraph (B), by striking “con-  
6 sider” and all that follows through “boundary.”  
7 and inserting “consider factors such as—

8 “(i) the risk to public health and the  
9 potential severity of the detrimental envi-  
10 ronmental effects of the harmful algal  
11 bloom or hypoxia event, as indicated by—

12 “(I) data on shellfish or water  
13 quality obtained through sampling  
14 programs, including baseline data,  
15 and regulatory or advisory thresholds  
16 established to explain management ac-  
17 tions related to the event;

18 “(II) toxin levels in fish, marine  
19 mammals, seabirds, shellfish, or water  
20 during the event;

21 “(III) toxic aerosols produced  
22 during the event, including potential  
23 human exposures to toxic aerosols;

1                   “(IV) reports of human or ani-  
2                   mal illnesses or mortalities during the  
3                   event;

4                   “(V) any closures of fishing or  
5                   shellfish harvesting locations or rec-  
6                   reational public waters, including  
7                   beaches, during the event;

8                   “(VI) the duration and spatial  
9                   extent of the event; or

10                  “(VII) impacts to habitats or  
11                  ecosystems associated with the event;

12                  “(ii) the potential economic, social,  
13                  and subsistence impacts associated with  
14                  the harmful algal bloom or hypoxia event,  
15                  including to fisheries and aquaculture,  
16                  recreation and tourism, monitoring and  
17                  management, social or cultural resource  
18                  use, and event response activities, assessed  
19                  in comparison with historical data from  
20                  when a State or region did not experience  
21                  such an event, as possible, as indicated  
22                  by—

23                  “(I) increases in public health ex-  
24                  penditures;

1                   “(II) losses to commercial fish-  
2                   eries and aquaculture industries,  
3                   recreation and tourism, real estate,  
4                   and other impacted industries or busi-  
5                   nesses;

6                   “(III) increases in monitoring  
7                   and management expenditures, includ-  
8                   ing costs incurred for event response  
9                   and clean-up (such as for beach clean-  
10                  up following an influx of biomass or a  
11                  fish-kill) by public or private sectors;  
12                  or

13                  “(IV) impacts to subsistence re-  
14                  sources, including nutritional, cul-  
15                  tural, and economic effects on subsist-  
16                  ence communities;

17                  “(iii) the relative magnitude of those  
18                  impacts in relation to past occurrences of  
19                  harmful algal bloom or hypoxia events that  
20                  occur on a recurrent or annual basis; and

21                  “(iv) the geographic scope of the  
22                  harmful algal bloom or hypoxia event, in-  
23                  cluding the potential of the event to affect  
24                  several municipalities, to affect more than

1           1 State, or to cross an international  
2           boundary.”;

3           (3) in paragraph (3), by adding at the end the  
4           following:

5           “(D) INDIAN TRIBE.—The term ‘Indian  
6           Tribe’ has the meaning given that term in sec-  
7           tion 4 of the Indian Self-Determination and  
8           Education Assistance Act (25 U.S.C. 5304).

9           “(E) NATIVE HAWAIIAN ORGANIZATION.—  
10          The term ‘Native Hawaiian organization’ has  
11          the meaning given that term in section 6207 of  
12          the Elementary and Secondary Education Act  
13          of 1965 (20 U.S.C. 7517) and includes the De-  
14          partment of Hawaiian Home Lands and the Of-  
15          fice of Hawaiian Affairs.

16          “(F) TRIBAL ORGANIZATION.—The term  
17          ‘Tribal organization’ has the meaning given  
18          that term in section 4 of the Indian Self-Deter-  
19          mination and Education Assistance Act (25  
20          U.S.C. 5304).”; and

21          (4) by adding at the end the following:

22          “(4) AUTHORIZATION OF APPROPRIATIONS.—  
23          There is authorized to be appropriated to carry out  
24          this subsection \$2,000,000 for each of fiscal years

(b) PROTECT FAMILIES FROM TOXIC ALGAL  
BLOOMS.—Section 128 of the Water Resources Develop-  
ment Act of 2020 (33 U.S.C. 610 note) is amended—

6 (1) by redesignating subsection (e) as sub-  
7 section (f); and

(2) by inserting after subsection (d) the following new subsection:

10           “(e) HARMFUL ALGAL BLOOM TECHNOLOGIES.—In  
11 carrying out the demonstration program under subsection  
12 (a), the Secretary may enter into agreements with water  
13 and irrigation districts located in the focus areas described  
14 in subsections (c) and (d) for the use or sale of any new  
15 technologies developed under the program to expedite the  
16 removal of harmful algal blooms in such areas.”.

17 **TITLE** **VII—PREVENTING**  
18 **HEALTH EMERGENCIES AND**  
19 **TEMPERATURE-RELATED ILL-**  
20 **NESS AND DEATHS ACT OF**  
21 **2024**

22 **SEC. 701. SHORT TITLE.**

23 This title may be cited as the “Preventing Health  
24 Emergencies And Temperature-related Illness and Deaths



1 Act of 2024” or the “Preventing HEAT Illness and  
2 Deaths Act of 2024”.

3 **SEC. 702. DEFINITIONS.**

4 In this title:

5 (1) **EXTREME HEAT.**—The term “extreme  
6 heat” means heat that substantially exceeds local  
7 temperature norms in terms of any combination of  
8 the following:

9 (A) Duration.

10 (B) Intensity.

11 (C) Season length.

12 (D) Frequency.

13 (2) **HEAT.**—The term “heat” means any com-  
14 bination of the atmospheric parameters associated  
15 with modulating human thermoregulation, such as  
16 air temperature, humidity, solar exposure, and wind  
17 speed.

18 (3) **HEAT EVENT.**—The term “heat event”  
19 means an occurrence of extreme heat of 2 days or  
20 more that may have heat-health implications.

21 (4) **HEAT-HEALTH.**—The term “heat-health”  
22 means health effects to humans from heat, during or  
23 outside of heat events, including from vulnerability  
24 and exposure, or the risk of such effects.

1           (5) PLANNING.—The term “planning” means  
 2           activities performed across timescales (including  
 3           days, weeks, months, years, and decades) with sce-  
 4           nario-based, probabilistic or deterministic informa-  
 5           tion to identify and take actions to proactively miti-  
 6           gate heat-health risks.

7           (6) PREPAREDNESS.—The term “preparedness”  
 8           means activities performed across timescales with  
 9           decision support tools to manage risk in advance of  
 10          a heat event and increased ambient temperature.

11          (7) TRIBAL GOVERNMENT.—The term “Tribal  
 12          government” means the recognized governing body  
 13          of any Indian or Alaska Native tribe, band, nation,  
 14          pueblo, village, community, component band, or com-  
 15          ponent reservation, individually identified (including  
 16          parenthetically) in the list published most recently as  
 17          of the date of enactment of this Act pursuant to sec-  
 18          tion 104 of the Federally Recognized Indian Tribe  
 19          List Act of 1994 (25 U.S.C. 5131).

20   **SEC. 703. NATIONAL INTEGRATED HEAT HEALTH INFORMA-**  
 21                           **TION SYSTEM INTERAGENCY COMMITTEE.**

22          (a) ESTABLISHMENT OF COMMITTEE.—There is es-  
 23          tablished within the National Oceanic and Atmospheric  
 24          Administration an interagency committee, to be known as  
 25          the “National Integrated Heat Health Information Sys-

1 tem Interagency Committee” (in this section referred to  
2 as the “Committee”).

3 (b) PURPOSE.—The Committee shall coordinate  
4 agencies represented on the Committee to execute, as ap-  
5 propriate, activities across such agencies to ensure a  
6 united Federal approach to reducing health risks from  
7 heat.

8 (c) MEMBERSHIP.—

9 (1) IN GENERAL.—In order to carry out and  
10 achieve the purpose described in subsection (b), the  
11 Committee shall include the following:

12 (A) The Director of the National Inte-  
13 grated Heat Health Information System.

14 (B) Not fewer than 1 representative from  
15 each of the following:

16 (i) From the Department of Com-  
17 merce, the following:

18 (I) From the National Oceanic  
19 and Atmospheric Administration, the  
20 following:

21 (aa) The National Weather  
22 Service.

23 (bb) The Office of Oceanic  
24 and Atmospheric Research.

1 (cc) The National Environ-  
2 mental Satellite, Data, and Infor-  
3 mation Service.

4 (II) The National Institute of  
5 Standards and Technology.

6 (III) The Bureau of the Census.

7 (ii) From the Department of Health  
8 and Human Services, the following:

9 (I) The Centers for Disease Con-  
10 trol and Prevention, including the Na-  
11 tional Institute for Occupational Safe-  
12 ty and Health.

13 (II) The Office of the Assistant  
14 Secretary of Health and Human Serv-  
15 ices for Preparedness and Response.

16 (III) The Substance Abuse and  
17 Mental Health Services Administra-  
18 tion.

19 (IV) The National Institutes of  
20 Health.

21 (V) The Indian Health Service.

22 (iii) From the Department of the In-  
23 terior, the following:

24 (I) The Bureau of Indian Affairs.

1 (II) The Bureau of Land Man-  
2 agement.

3 (III) The National Park Service.

4 (IV) The Office of Hawaiian Re-  
5 lations.

6 (iv) From the Environmental Protec-  
7 tion Agency, the following:

8 (I) The Office of Air and Radi-  
9 ation, if the Administrator of the En-  
10 vironmental Protection Agency deter-  
11 mines appropriate.

12 (II) The Office of Research and  
13 Development, if the Administrator de-  
14 termines appropriate.

15 (III) The Office of International  
16 and Tribal Affairs.

17 (v) The Federal Emergency Manage-  
18 ment Agency.

19 (vi) The Department of Defense.

20 (vii) The Department of Agriculture.

21 (viii) The Department of Housing and  
22 Urban Development.

23 (ix) The Department of Transpor-  
24 tation.

25 (x) The Department of Energy.

1 (xi) The Department of Labor, includ-  
2 ing the Occupational Safety and Health  
3 Administration.

4 (xii) The Department of Veteran Af-  
5 fairs.

6 (xiii) The Department of Education.

7 (xiv) The Department of State.

8 (xv) The United States Agency for  
9 International Development.

10 (xvi) Such other Federal agencies as  
11 the Under Secretary of Commerce for  
12 Oceans and Atmosphere considers appro-  
13 priate.

14 (2) SELECTION OF REPRESENTATIVES.—The  
15 head of an agency specified in paragraph (1)(B)  
16 shall, in appointing representatives of the agency to  
17 the Committee, select representatives who have ex-  
18 pertise in areas relevant to the responsibilities of the  
19 Committee, such as weather prediction, health im-  
20 pacts, behavioral science, public health hazard pre-  
21 paredness and response, or mental health services.

22 (3) CO-CHAIRS.—

23 (A) IN GENERAL.—The members of the  
24 Committee shall select 3 individuals from  
25 among such members to serve as co-chairs of

1 the Committee, subject to the approval of the  
2 Under Secretary of Commerce for Oceans and  
3 Atmosphere.

4 (B) SELECTION.—

5 (i) INITIAL SELECTION.—Of the co-  
6 chairs first selected, one shall be from the  
7 National Oceanic and Atmospheric Admin-  
8 istration, one shall be from the Depart-  
9 ment of Health and Human Services, and  
10 one shall be from the Federal Emergency  
11 Management Agency.

12 (ii) SUBSEQUENT SELECTION.—Sub-  
13 sequent co-chairs shall be selected from  
14 among the members of the Committee, ex-  
15 cept the National Oceanic and Atmospheric  
16 Administration shall have the opportunity  
17 to maintain a co-chair position.

18 (C) TERMS.—Each co-chair shall serve for  
19 a term of not more than 5 years.

20 (D) RESPONSIBILITIES OF CO-CHAIRS.—  
21 The co-chairs of the Committee shall, in con-  
22 sultation with the Director of the National Inte-  
23 grated Heat Health Information System—

1 (i) determine the agenda of the Com-  
2 mittee, in consultation with other members  
3 of the Committee;

4 (ii) direct the work of the Committee;  
5 and

6 (iii) convene meetings of the Com-  
7 mittee not less frequently than once each  
8 fiscal quarter.

9 (d) RESPONSIBILITIES OF COMMITTEE.—The Com-  
10 mittee shall coordinate an integrated, Federal Govern-  
11 ment-wide approach to reducing health risks and impacts  
12 of heat, including by—

13 (1) developing the strategic plan required by  
14 subsection (e);

15 (2) coordinating across Federal agencies on  
16 heat-health communication, engagement, research,  
17 service delivery, and workforce development; and

18 (3) building capacity and partnerships with  
19 Federal and non-Federal entities.

20 (e) STRATEGIC PLAN.—

21 (1) IN GENERAL.—Not later than 2 years after  
22 the date of the enactment of this Act, the Committee  
23 shall submit to Congress and make available on a  
24 public website a 5-year strategic plan that outlines  
25 the goals and projects of the Committee, including



1       how the Committee will improve coordination and in-  
2       tegration of interagency Federal capacity and capa-  
3       bilities to address health risks of heat, including—

4               (A) a strategy for improving and coordi-  
5               nating existing Federal data collection and data  
6               management to include sharing of data and sta-  
7               tistics on heat-related illnesses and mortalities  
8               and other impacts to inform heat-related activi-  
9               ties;

10              (B) a strategy for improving and coordi-  
11              nating Federal activities to understand user  
12              gaps and needs, conduct research, foster inno-  
13              vative solutions, and provide actionable infor-  
14              mation and services; and

15              (C) mechanisms for financing heat plan-  
16              ning and preparedness within such agencies as  
17              the Committee considers appropriate.

18              (2) IMPLEMENTATION.—The head of an agency  
19       represented on the Committee may implement the  
20       portions of the strategic plan required by paragraph  
21       (1) that are relevant to that agency.

22              (3) UPDATES.—Not later than 5 years after the  
23       submission of the strategic plan required by para-  
24       graph (1), and every 5 years thereafter, the Com-  
25       mittee shall brief Congress on an update of the plan,

1       which shall include progress made toward goals out-  
2       lined in the previous plan and new priorities that  
3       emerge.

4       (f) CONSULTATION.—In carrying out the responsibil-  
5       ities of the Committee, the Committee shall consult with  
6       relevant—

7               (1) regional, State, Tribal, and local govern-  
8       ments;

9               (2) international organizations and partners;

10              (3) research institutions;

11              (4) nongovernmental organizations and associa-  
12       tions;

13              (5) medical experts with expertise in emergency  
14       response; and

15              (6) environmental health, economic or business  
16       development, or other stakeholders.

17   **SEC. 704. NATIONAL INTEGRATED HEAT HEALTH INFORMA-**  
18                           **TION SYSTEM.**

19       (a) ESTABLISHMENT.—The Under Secretary of Com-  
20       merce for Oceans and Atmosphere shall establish within  
21       the National Oceanic and Atmospheric Administration a  
22       system, to be known as the “National Integrated Heat  
23       Health Information System” (NIHHIS) (in this section  
24       referred to as the “System”).

1 (b) PURPOSE.—The purpose of the System is to re-  
2 duce heat-related impacts by—

3 (1) improving the delivery of data, information,  
4 forecasts, warnings, predictions, and projections re-  
5 lated to temperature and extreme heat and related  
6 impacts;

7 (2) through the Office of Oceanic and Atmos-  
8 pheric Research, developing science-based solutions  
9 and tools to improve impact-based decision support  
10 services for heat impacts to human life, property,  
11 and the United States economy; and

12 (3) supporting a research program on heat  
13 health, in coordination with the agencies represented  
14 on the National Integrated Heat Health Information  
15 System Interagency Committee.

16 (c) DATA MANAGEMENT.—

17 (1) AVAILABILITY.—The data and metadata as-  
18 sociated with the System shall be fully and openly  
19 available, within the legal right to redistribute, in ac-  
20 cordance with chapter 31 of title 44, United States  
21 Code (commonly known as the “Federal Records Act  
22 of 1950”), and the Federal Evidence-Based Policy-  
23 making Act of 2018 (Public Law 115–435; 132 Stat.  
24 5529) and the amendments made by that Act, to

1 maximize use of such data to support the goals of  
2 the System.

3 (2) NATIONAL CENTERS FOR ENVIRONMENTAL  
4 INFORMATION.—

5 (A) IN GENERAL.—The Under Secretary of  
6 Commerce for Oceans and Atmosphere shall  
7 manage, maintain, and steward archival data  
8 and metadata associated with the System with-  
9 in the National Centers for Environmental In-  
10 formation.

11 (B) WARNING COORDINATION METEOROLO-  
12 GIST.—The Under Secretary of Commerce for  
13 Oceans and Atmosphere shall designate at least  
14 one warning coordination meteorologist, as de-  
15 scribed in section 405 of the Weather Research  
16 and Forecasting Innovation Act of 2017 (15  
17 U.S.C. 8545), at the National Centers for Envi-  
18 ronmental Information.

19 **SEC. 705. AUTHORIZATION OF APPROPRIATIONS.**

20 There is authorized to be appropriated to the Na-  
21 tional Oceanic and Atmospheric Administration to carry  
22 out sections 703 and 704, including for any administrative  
23 costs for the National Integrated Heat Health Information  
24 System Interagency Committee and the National Inte-

1 grated Heat Health Information System, \$5,000,000 for  
 2 each of fiscal years 2025 through 2029.

3 **TITLE VIII—NATIONAL LAND-**  
 4 **SLIDE PREPAREDNESS ACT**  
 5 **REAUTHORIZATION ACT OF**  
 6 **2024**

7 **SEC. 801. SHORT TITLE.**

8 This title may be cited as the “National Landslide  
 9 Preparedness Act Reauthorization Act of 2024”.

10 **SEC. 802. CERTAIN DEFINITIONS UNDER FLOOD LEVEL OB-**  
 11 **SERVATION, OPERATIONS, AND DECISION**  
 12 **SUPPORT ACT.**

13 (a) DEFINITIONS.—Section 12(a) of the Flood Level  
 14 Observation, Operations, and Decision Support Act (15  
 15 U.S.C. 9707(a)) is amended—

16 (1) by redesignating paragraphs (1) and (2) as  
 17 paragraphs (4) and (5), respectively; and

18 (2) by inserting before paragraph (4) (as so re-  
 19 designated) the following:

20 “(1) ATMOSPHERIC RIVER.—The term ‘atmos-  
 21 pheric river’ means a transient corridor of strong  
 22 water vapor in the atmosphere that—

23 “(A) produces significant quantities of rain  
 24 or snow; and

1           “(B) may be primarily beneficial to the  
2           water supply or hazardous due to flooding.

3           “(2) ATMOSPHERIC RIVER FLOODING EVENT.—  
4           The term ‘atmospheric river flooding event’ means  
5           an atmospheric river that—

6           “(A) results in flooding of rivers and  
7           streams or other hazards to human life, prop-  
8           erty, or the economy; and

9           “(B) is of particular concern to human  
10          health, property, and the economy, as deter-  
11          mined by the Secretary of Commerce.

12          “(3) EXTREME PRECIPITATION EVENT.—The  
13          term ‘extreme precipitation event’ means precipita-  
14          tion quantities exceeding the 5-year annual recur-  
15          rence interval for a specific location.”.

16          (b) REQUIREMENTS.—Section 12(d)(1) of the Flood  
17          Level Observation, Operations, and Decision Support Act  
18          (15 U.S.C. 9707(d)(1)) is amended by inserting “, such  
19          as precipitation resulting from hurricanes, atmospheric  
20          river flooding events, and extreme precipitation events”  
21          before the period at the end.

22          **SEC. 803. REAUTHORIZATION OF NATIONAL LANDSLIDE**  
23          **PREPAREDNESS ACT.**

24          (a) DEFINITIONS.—Section 2 of the National Land-  
25          slide Preparedness Act (43 U.S.C. 3101) is amended—

1           (1) by redesignating paragraphs (4) through  
2           (11) as paragraphs (7), (8), (10), (11), (13), (14),  
3           (15), and (16), respectively;

4           (2) by inserting after paragraph (3) the fol-  
5           lowing:

6           “(4) ATMOSPHERIC RIVER.—The term ‘atmos-  
7           pheric river’ has the meaning given the term in sec-  
8           tion 12(a) of the Flood Level Observation, Oper-  
9           ations, and Decision Support Act (15 U.S.C.  
10          9707(a)).

11          “(5) ATMOSPHERIC RIVER FLOODING EVENT.—  
12          The term ‘atmospheric river flooding event’ has the  
13          meaning given the term in section 12(a) of the  
14          Flood Level Observation, Operations, and Decision  
15          Support Act (15 U.S.C. 9707(a)).

16          “(6) EXTREME PRECIPITATION EVENT.—The  
17          term ‘extreme precipitation event’ has the meaning  
18          given the term in section 12(a) of the Flood Level  
19          Observation, Operations, and Decision Support Act  
20          (15 U.S.C. 9707(a)).”;

21          (3) by inserting after paragraph (8) (as so re-  
22          designated) the following:

23          “(9) INSTITUTION OF HIGHER EDUCATION.—  
24          The term ‘institution of higher education’ has the  
25          meaning given the term in section 101(a) of the

1 Higher Education Act of 1965 (20 U.S.C.  
2 1001(a)).”;

3 (4) by inserting after paragraph (11) (as so re-  
4 designated) the following:

5 “(12) NATIVE HAWAIIAN ORGANIZATION.—The  
6 term ‘Native Hawaiian organization’ has the mean-  
7 ing given the term in section 6207 of the Elemen-  
8 tary and Secondary Education Act of 1965 (20  
9 U.S.C. 7517), except that the term includes the De-  
10 partment of Hawaiian Home Lands and the Office  
11 of Hawaiian Affairs.”; and

12 (5) by adding at the end the following:

13 “(17) TRIBAL ORGANIZATION.—The term ‘Trib-  
14 al organization’ has the meaning given the term in  
15 section 4 of the Indian Self-Determination and Edu-  
16 cation Assistance Act (25 U.S.C. 5304).”.

17 (b) NATIONAL LANDSLIDE HAZARDS REDUCTION  
18 PROGRAM.—

19 (1) ESTABLISHMENT.—Section 3(a)(3) of the  
20 National Landslide Preparedness Act (43 U.S.C.  
21 3102(a)(3)) is amended by striking “protect” and  
22 inserting “contribute to protecting”.

23 (2) PROGRAM ACTIVITIES.—Section  
24 3(b)(1)(C)(ii) of the National Landslide Prepared-  
25 ness Act (43 U.S.C. 3102(b)(1)(C)(ii)) is amended



1 by striking “implement” and inserting “dissemi-  
2 nate”.

3 (3) NATIONAL STRATEGY.—Section 3(b)(2) of  
4 the National Landslide Preparedness Act (43 U.S.C.  
5 3102(b)(2)) is amended—

6 (A) by redesignating subparagraphs (A)  
7 through (C) as clauses (i) through (iii), respec-  
8 tively, and indenting appropriately;

9 (B) in the matter preceding clause (i) (as  
10 so redesignated), by striking “Not later than”  
11 and inserting the following:

12 “(A) IN GENERAL.—Not later than”; and

13 (C) by adding at the end the following:

14 “(B) ASSESSMENT.—For purposes of the  
15 first national strategy published after the date  
16 of enactment of the National Landslide Pre-  
17 paredness Act Reauthorization Act of 2024  
18 under subparagraph (A), the Secretary, in con-  
19 sultation with the Secretary of Commerce, shall  
20 include an assessment of the risks that atmos-  
21 pheric river flooding events and extreme pre-  
22 cipitation events pose to the safety of life and  
23 property in the United States with respect to  
24 landslide hazards.”.

1           (4) NATIONAL LANDSLIDE HAZARDS DATA-  
2       BASE.—Section 3(b)(3) of the National Landslide  
3       Preparedness Act (43 U.S.C. 3102(b)(3)) is amend-  
4       ed—

5           (A) by redesignating subparagraphs (C)  
6       and (D) as subparagraphs (D) and (E), respec-  
7       tively; and

8           (B) by inserting after subparagraph (B)  
9       the following:

10           “(C) the identification of areas in need of  
11       additional hazard risk assessment, including  
12       areas that may be at risk due to—

13           “(i) hydrology or changes in hydrology  
14       that may include erosion, drought, or other  
15       characteristics that could impact landslide  
16       risk;

17           “(ii) atmospheric river flooding events  
18       and extreme precipitation events, as identi-  
19       fied by the Secretary of Commerce and the  
20       Secretary;

21           “(iii) geologic activity, such as vol-  
22       canic eruptions, earthquakes, or tsunamis;  
23       or

1 “(iv) data-poor areas or hazards with  
 2 poor monitoring that could contribute to  
 3 increased landslide risk;”.

4 (5) LANDSLIDE HAZARD AND RISK PREPARED-  
 5 NESS FOR COMMUNITIES.—Section 3(b)(4) of the  
 6 National Landslide Preparedness Act (43 U.S.C.  
 7 3102(b)(4)) is amended—

8 (A) in the matter preceding subparagraph  
 9 (A), by inserting “Native Hawaiian organiza-  
 10 tions and other stakeholders, as appropriate,”  
 11 before “and Indian tribes”;

12 (B) in subparagraph (A)—

13 (i) in the matter preceding clause (i),  
 14 by striking “local, and Tribal governments  
 15 and decisionmakers” and inserting “and  
 16 local governments, Indian tribes, Tribal or-  
 17 ganizations, Native Hawaiian organiza-  
 18 tions, and other decisionmakers”;

19 (ii) by striking clause (iii) and insert-  
 20 ing the following:

21 “(iii) health and safety with respect to  
 22 landslides;”;

23 (iii) by redesignating clause (iv) as  
 24 clause (v); and

1 (iv) by inserting after clause (iii) the  
 2 following:

3 “(iv) reducing losses from landslides,  
 4 including the threats caused by atmos-  
 5 pheric rivers and other extreme precipita-  
 6 tion events; and”; and

7 (C) in subparagraph (B)—

8 (i) in clause (i), by striking “local,  
 9 and Tribal officials” and inserting “and  
 10 local officials, Indian tribes, Tribal organi-  
 11 zations, and Native Hawaiian organiza-  
 12 tions”; and

13 (ii) in clause (ii), by striking “local,  
 14 and Tribal emergency managers” and in-  
 15 serting “and local emergency managers  
 16 and emergency managers of Indian tribes,  
 17 Tribal organizations, and Native Hawaiian  
 18 organizations”.

19 (6) DEBRIS FLOW EARLY WARNING SYSTEM.—  
 20 Section 3(b)(5) of the National Landslide Prepared-  
 21 ness Act (43 U.S.C. 3102(b)(5)) is amended—

22 (A) in subparagraph (B), by striking  
 23 “State, territorial, local, and Tribal govern-  
 24 ments” and inserting “State, territorial, and

1 local governments, Indian tribes, Tribal organi-  
 2 zations, and Native Hawaiian organizations”;

3 (B) by redesignating subparagraphs (A)  
 4 through (C) as clauses (i) through (iii), respec-  
 5 tively, and indenting appropriately;

6 (C) in the matter preceding clause (i) (as  
 7 so redesignated), by striking “In carrying out”  
 8 and inserting the following:

9 “(A) IN GENERAL.—In carrying out”; and

10 (D) by adding at the end the following:

11 “(B) CONSULTATION.—In carrying out  
 12 subparagraph (A), the Secretary may consult  
 13 with an institution of higher education de-  
 14 scribed in subsection (d)(2)(B)(iv) and other  
 15 stakeholders to establish and support emer-  
 16 gency response procedures, as appropriate.”.

17 (7) EMERGENCY RESPONSE ACTIVITIES.—Sec-  
 18 tion 3(b)(6) of the National Landslide Preparedness  
 19 Act (43 U.S.C. 3102(b)(6)) is amended—

20 (A) by redesignating subparagraphs (A)  
 21 through (C) as clauses (i) through (iii), respec-  
 22 tively, and indenting appropriately;

23 (B) in the matter preceding clause (i) (as  
 24 so redesignated), by striking “In carrying” and  
 25 inserting the following:

1 “(A) IN GENERAL.—In carrying”;

2 (C) in subparagraph (A) (as so des-  
3 ignated)—

4 (i) in the matter preceding clause (i)  
5 (as so redesignated), by inserting “Native  
6 Hawaiian organizations,” before “and In-  
7 dian tribes”;

8 (ii) in clause (ii) (as so redesignated),  
9 by striking “and” at the end;

10 (iii) in clause (iii) (as so redesign-  
11 ated), by striking the period at the end  
12 and inserting “; and”; and

13 (iv) by adding at the end the fol-  
14 lowing:

15 “(iv) to improve real-time risk man-  
16 agement during landslide events, including  
17 with respect to landslide events caused  
18 by—

19 “(I) hydrology or changes in hy-  
20 drology that may include erosion,  
21 drought, or other characteristics that  
22 could impact landslide risk;

23 “(II) atmospheric river flooding  
24 events and extreme precipitation

1 events, as identified by the Secretary  
2 of Commerce and the Secretary;

3 “(III) geologic activity, such as  
4 volcanic eruptions, earthquakes, or  
5 tsunamis;

6 “(IV) data-poor areas or hazards  
7 with poor monitoring that could con-  
8 tribute to increased landslide risk; or

9 “(V) thawing permafrost and gla-  
10 cial retreat causing destabilization of  
11 slopes.”; and

12 (D) by adding at the end the following:

13 “(B) CONSULTATION.—In carrying out  
14 subparagraph (A), the Secretary may consult  
15 with an institution of higher education de-  
16 scribed in subsection (d)(2)(B)(iv) and the pri-  
17 vate sector.”.

18 (8) INTERAGENCY COORDINATING COMMITTEE  
19 ON LANDSLIDE HAZARDS.—Section 3(c)(2) of the  
20 National Landslide Preparedness Act (43 U.S.C.  
21 3102(c)(2)) is amended by adding at the end the fol-  
22 lowing:

23 “(J) The Administrator of the National  
24 Aeronautics and Space Administration.”.

1           (9) ADVISORY COMMITTEE.—Section 3(d)(2)(B)  
2       of the National Landslide Preparedness Act (43  
3       U.S.C. 3102(d)(2)(B)) is amended—

4           (A) in clause (iii), by striking “geological”;  
5       and

6           (B) in clause (vi), by striking “local, and  
7       Tribal emergency management agencies” and  
8       inserting “and local emergency management  
9       agencies and emergency management agencies  
10      of Indian tribes and Native Hawaiian organiza-  
11      tions”.

12          (10) REGIONAL PARTNERSHIPS.—Section 3 of  
13      the National Landslide Preparedness Act (43 U.S.C.  
14      3102) is amended—

15          (A) by redesignating subsections (e)  
16      through (i) as subsections (f) through (j), re-  
17      spectively; and

18          (B) by inserting after subsection (d) the  
19      following:

20      “(e) REGIONAL PARTNERSHIPS.—

21          “(1) IN GENERAL.—As soon as practicable  
22      after the date of enactment of the National Land-  
23      slide Preparedness Act Reauthorization Act of 2024,  
24      the Secretary shall establish in the State of Alaska  
25      and other regions, as the Secretary determines to be



1 appropriate, a regional partnership with an eligible  
2 partner described in paragraph (2).

3 “(2) ELIGIBLE PARTNERS.—An organization or  
4 institution of higher education with expertise in  
5 landslide mapping, research, and monitoring shall be  
6 eligible for a regional partnership under paragraph  
7 (1).

8 “(3) PURPOSES AND DUTIES.—A regional part-  
9 nership established under paragraph (1) shall—

10 “(A) allow the Secretary to leverage appli-  
11 cable expertise in regional organizations;

12 “(B) coordinate long-term landslide re-  
13 search specific to the applicable region; and

14 “(C) align interagency landslide moni-  
15 toring efforts.”.

16 (11) GRANT PROGRAMS.—Section 3 of the Na-  
17 tional Landslide Preparedness Act (43 U.S.C. 3102)  
18 is amended, in paragraph (1) of subsection (f) (as  
19 so redesignated)—

20 (A) in subparagraph (A)(i), by striking  
21 “local, and Tribal governments to research,  
22 map, assess” and inserting “and local govern-  
23 ments, Indian tribes, Tribal organizations, and  
24 Native Hawaiian organizations to research,  
25 map, assess, monitor”;

1 (B) in subparagraph (B)—

2 (i) in clause (i), by inserting “institu-  
3 tions of higher education described in sub-  
4 section (d)(2)(B)(iv),” before “and Indian  
5 tribes”; and

6 (ii) in clause (ii)—

7 (I) by redesignating subclauses  
8 (II) through (IV) as subclauses (III)  
9 through (V), respectively; and

10 (II) by inserting after subclause  
11 (I) the following:

12 “(II) in regions that have re-  
13 cently experienced loss of life due to  
14 landslides;” and

15 (C) in subparagraph (C)—

16 (i) in clause (i), by inserting “award-  
17 ed” after “grants”; and

18 (ii) in clause (ii), by striking “made”  
19 and inserting “or other accomplishments  
20 resulting”.

21 (12) SIGNIFICANT EVENTS.—Section 3 of the  
22 National Landslide Preparedness Act (43 U.S.C.  
23 3102) is amended, in subsection (h)(3) (as so reded-  
24 icated), by striking “local, and Tribal partners”  
25 and inserting “and local partners, Indian tribes,

1 Tribal organizations, and Native Hawaiian organiza-  
 2 tions”.

3 (13) FUNDING.—Section 3 of the National  
 4 Landslide Preparedness Act (43 U.S.C. 3102) is  
 5 amended, in subsection (i) (as so redesignated)—

6 (A) in the matter preceding paragraph (1),  
 7 by striking “2024” and inserting “2029”; and

8 (B) in paragraph (1), by striking “there is  
 9 authorized to be appropriated to the United  
 10 States Geological Survey, \$25,000,000 to carry  
 11 out this section” and inserting “from amounts  
 12 appropriated or otherwise made available to the  
 13 United States Geological Survey, \$35,000,000  
 14 shall be used to carry out this section, of which  
 15 not less than \$10,000,000 shall be used for the  
 16 purchase, deployment, and repair of landslide  
 17 early warning systems in high risk areas”.

18 (c) 3D ELEVATION PROGRAM.—

19 (1) ESTABLISHMENT.—Section 5(a) of the Na-  
 20 tional Landslide Preparedness Act (43 U.S.C.  
 21 3104(a)) is amended—

22 (A) in paragraph (1)(A), by inserting “and  
 23 derivative” after “3D elevation”; and

24 (B) in paragraph (2)(B)(i), by inserting “,  
 25 process, and integrate” after “acquire”.

(2) 3D ELEVATION FEDERAL INTERAGENCY COORDINATING COMMITTEE.—Section 5(b)(3) of the National Landslide Preparedness Act (43 U.S.C. 3104(b)(3)) is amended—

(A) by redesignating subparagraphs (D) and (E) as subparagraphs (E) and (F), respectively; and

(B) by inserting after subparagraph (C) the following:

“(D) the 3D Hydrography Program Working Group;”.

(3) GRANTS AND COOPERATIVE AGREEMENTS.—Section 5(d)(3) of the National Landslide Preparedness Act (43 U.S.C. 3104(d)(3)) is amended by striking “publically” and inserting “publicly”.

(4) FUNDING.—Section 5(e) of the National Landslide Preparedness Act (43 U.S.C. 3104(e)) is amended by striking “2024” and inserting “2029”.

## **TITLE IX—ILLEGAL RED SNAPPER ENFORCEMENT ACT**

### **SEC. 901. SHORT TITLE.**

This title may be cited as the “Illegal Red Snapper Enforcement Act”.

1 **SEC. 902. METHODOLOGY FOR IDENTIFYING THE COUNTRY**  
2 **OF ORIGIN OF RED SNAPPER IMPORTED**  
3 **INTO THE UNITED STATES.**

4 (a) DEFINITIONS.—In this section:

5 (1) ADMINISTRATOR.—The term “Adminis-  
6 trator” means the Administrator of the National  
7 Oceanic and Atmospheric Administration.

8 (2) APPROPRIATE COMMITTEES OF CON-  
9 GRESS.—The term “appropriate committees of Con-  
10 gress” means—

11 (A) the Committee on Commerce, Science,  
12 and Transportation of the Senate; and

13 (B) the Committee on Science, Space, and  
14 Technology of the House of Representatives.

15 (3) UNDER SECRETARY.—The term “Under  
16 Secretary” means the Under Secretary of Commerce  
17 for Standards and Technology and the Director of  
18 the National Institute of Standards and Technology.

19 (b) STANDARD METHODOLOGY FOR IDENTIFICA-  
20 TION.—The Under Secretary and the Administrator, in  
21 consultation with the Commissioner of U.S. Customs and  
22 Border Protection and the Commandant of the Coast  
23 Guard, shall jointly develop a standard methodology based  
24 on chemical analysis for identifying the country of origin  
25 of red snapper imported into the United States that—

1           (1) is consistent with the needs of Federal and  
2       State law enforcement agencies in combating illegal,  
3       unreported, and unregulated fishing;

4           (2) minimizes processing time; and

5           (3) involves the use of a field kit that can be  
6       easily carried by one individual.

7       (c) REPORT.—Not later 2 years after the date of the  
8       enactment of this Act, the Under Secretary shall submit  
9       to the appropriate committees of Congress a report that  
10      includes the following:

11           (1) A summary of the methodology developed  
12      under subsection (b).

13           (2) A plan for operationalizing the methodology  
14      developed under subsection (b).

15           (3) Recommendations for further research on  
16      identification methods, including other potential ap-  
17      plications of the methodology.

1 **TITLE X—ACCELERATING NET-**  
2 **WORKING,**  
3 **CYBERINFRASTRUCTURE,**  
4 **AND HARDWARE FOR OCE-**  
5 **ANIC RESEARCH ACT**

6 **SEC. 1001. SHORT TITLE.**

7 This title may be cited as the “Accelerating Net-  
8 working, Cyberinfrastructure, and Hardware for Oceanic  
9 Research Act” or the “ANCHOR Act”.

10 **SEC. 1002. DEFINITIONS.**

11 In this title:

12 (1) U.S. ACADEMIC RESEARCH FLEET.—The  
13 term “U.S. Academic Research Fleet” means the  
14 United States-flagged vessels that—

15 (A) have been accepted into, and are active  
16 participants administered within, the Univer-  
17 sity-National Oceanographic Laboratory Sys-  
18 tem;

19 (B) are operated as oceanographic research  
20 vessels by research universities and laboratories;

21 (C) receive funding from the National  
22 Science Foundation; and

23 (D) have achieved designation as a mem-  
24 ber vessel through a standard evaluation proc-  
25 ess.

1           (2) DIRECTOR.—The term “Director” means  
2           the Director of the National Science Foundation.

3           (3) OCEANOGRAPHIC RESEARCH VESSEL.—The  
4           term “oceanographic research vessel” has the mean-  
5           ing given the term in section 2101 of title 46,  
6           United States Code.

7   **SEC. 1003. PLAN TO IMPROVE CYBERSECURITY AND TELE-**  
8                           **COMMUNICATIONS OF U.S. ACADEMIC RE-**  
9                           **SEARCH FLEET.**

10          (a) IN GENERAL.—Not later than 1 year after the  
11          date of enactment of this Act, the Director shall, in con-  
12          sultation with the head of any Federal agency, university,  
13          or laboratory that owns or operates a vessel of the U.S.  
14          Academic Research Fleet, submit to the Committee on  
15          Commerce, Science, and Transportation of the Senate and  
16          the Committee on Space, Science, and Technology of the  
17          House of Representatives a plan to improve the cybersecu-  
18          rity and telecommunications of the U.S. Academic Re-  
19          search Fleet.

20          (b) ELEMENTS.—The plan required by subsection (a)  
21          shall include—

22                (1) an assessment of the telecommunications  
23                and networking needs of the U.S. Academic Re-  
24                search Fleet, consistent with the typical scientific  
25                mission of that vessel;



1           (2) in accordance with guidance issued by the  
2       Cybersecurity and Infrastructure Security Agency  
3       and the National Institute for Standards and Tech-  
4       nology, an assessment of cybersecurity needs appro-  
5       priate for—

6           (A) the ownership of vessels within the  
7       U.S. Academic Research Fleet; and

8           (B) the typical research functions and top-  
9       ics of such vessels;

10       (3) an assessment of the costs necessary to  
11       meet the needs described in paragraphs (1) and (2),  
12       including—

13           (A) any necessary equipment, such as sat-  
14       ellite communications equipment, software,  
15       high-performance computing clusters shipboard  
16       and shoreside, or enterprise hardware; and

17           (B) estimated personnel costs in excess of  
18       current expenditures, including any necessary  
19       training, support, or logistics;

20       (4) an assessment of the time required to im-  
21       plement any upgrades required to meet the needs  
22       described in paragraphs (1) and (2) under varying  
23       budgets and funding scenarios;

24       (5) the adoption of common solutions or  
25       consortial licensing agreements, or by centralizing

1 elements of fleet cybersecurity, telecommunications  
2 or data management at a single facility; and

3 (6) in consultation with any non-Federal owners  
4 of a vessel of the U.S. Academic Research Fleet, a  
5 spending plan for the National Science Foundation,  
6 the Office of Naval Research, non-Federal owners of  
7 vessels of the U.S. Academic Research Fleet, users  
8 of the U.S. Academic Research Fleet, or any com-  
9 bination thereof, to provide funding to cover the  
10 costs described in paragraph (3).

11 (c) CONSIDERATIONS.—The Director shall, in pre-  
12 paring the plan required by subsection (a), consider—

13 (1) the network capabilities, including speed  
14 and bandwidth targets, necessary to meet the sci-  
15 entific mission needs of each class of vessel within  
16 the U.S. Academic Research Fleet for such purposes  
17 as—

18 (A) executing the critical functions and  
19 communications of the vessel;

20 (B) providing network access for the  
21 health and well-being of deployed personnel, in-  
22 cluding communications to conduct telemedicine  
23 (including mental health care), counseling,  
24 interviews with crisis response providers, and  
25 other remote individual care and services;

1           (C) as necessary to meet operations,  
2           uploading any scientific data to a shoreside  
3           server, including the copying of data off ship  
4           for disaster recovery or risk mitigation pur-  
5           poses;

6           (D) as appropriate, conducting real-time  
7           streaming to enable shore-based observers to  
8           participate in ship-based maintenance or re-  
9           search activities;

10          (E) real-time coordinated viewing of—

11               (i) scientific instrumentation so that it  
12               is possible to conduct scientific surveys and  
13               seafloor mapping with fully remote subject-  
14               matter experts; and

15               (ii) critical operational technology by  
16               manufacturers and vendors so that it is  
17               possible to carry out maintenance and re-  
18               pairs to systems with limited expertise on  
19               the vessel, with fully remote subject-matter  
20               experts advising; and

21          (F) as appropriate, enabling video commu-  
22          nications to allow improved outreach to, and  
23          other educational services for, K–12 students,  
24          including occasional remote classroom teaching

1           for instructors at sea to improve oceanographic  
2           access for students; and

3           (2) in consultation with the Director of the Cy-  
4           bersecurity and Infrastructure Security Agency, the  
5           Director of the National Institute for Standards and  
6           Technology, and the heads of other Federal agen-  
7           cies, as appropriate—

8                   (A) the cybersecurity recommendations in  
9                   the report of the private scientific advisory  
10                  group known as JASON entitled “Cybersecurity  
11                  at NSF Major Facilities” (JSR–21–10E) and  
12                  dated October 2021 as applied to the U.S. Aca-  
13                  demic Research Fleet;

14                  (B) aligning with international standards  
15                  and guidance for information security, including  
16                  the use of encryption for sensitive information,  
17                  the detection and handling of security incidents,  
18                  and other areas determined relevant by the Di-  
19                  rector;

20                  (C) facilitating access to cybersecurity per-  
21                  sonnel and training of research and support  
22                  personnel; and

23                  (D) the requirements for controlled unclas-  
24                  sified or classified information.

1   **TITLE XI—OTHER AUTHORITIES**

2   **SEC. 1101. METEOROLOGICAL OBSERVATIONS IN THE ARC-**  
3                   **TIC REGION.**

4           (a) ESTABLISHMENT OF METEOROLOGICAL OBSER-  
5   VATION STATIONS IN THE ARCTIC REGION.—The Under  
6   Secretary may take such action as may be necessary in  
7   the development of an international basic meteorological  
8   observation network in the Arctic region of the Western  
9   Hemisphere, including the establishment, operation, and  
10  maintenance of observation stations in cooperation with—

11           (1) the Department of State and other Federal  
12   agencies;

13           (2) the meteorological services and space-based  
14   assets of the United States and foreign countries;

15           (3) the commercial sector;

16           (4) local communities and Indian Tribes in the  
17   Arctic region; and

18           (5) persons engaged in air and marine com-  
19   merce.

20       (b) APPOINTMENT AND COMPENSATION OF EMPLOY-  
21   EES FOR CONDUCT OF METEOROLOGICAL INVESTIGA-  
22   TIONS IN ARCTIC REGION.—The Secretary of Commerce,  
23   acting through the Under Secretary, may—

24           (1) appoint employees for the conduct of mete-  
25   orological investigations in the Arctic region without

1        regard to the civil service laws and fix their com-  
2        pensation without regard to chapter 51 and sub-  
3        chapter III of chapter 53 of title 5, United States  
4        Code, and sections 5542, 5543, 5545, and 5546 of  
5        that title, at base rates not to exceed the maximum  
6        scheduled rate for GS-12 of the General Schedule  
7        under section 5332 of that title; and

8            (2) grant extra compensation to employees of  
9        other Federal agencies for taking and transmitting  
10       meteorological observations without regard to section  
11       5533 of title 5, United States Code.

12       (c) TRANSFER FROM OTHER GOVERNMENT DEPART-  
13       MENTS OF SURPLUS EQUIPMENT AND SUPPLIES FOR  
14       ARCTIC STATIONS.—Subject to approval of the President,  
15       and without charge to the National Oceanic and Atmos-  
16       pheric Administration, the Secretary of the Army, the Sec-  
17       retary of the Air Force, and the Secretary of the Navy  
18       may transfer to the National Weather Service equipment  
19       and supplies that are surplus to the needs of their respec-  
20       tive Departments and necessary for the establishment,  
21       maintenance, and operation of Arctic observation stations  
22       in the United States.

23       (d) SENSE OF CONGRESS.—It is the sense of Con-  
24       gress that observations in polar regions and remote areas  
25       are important for weather and environmental monitoring.

1 (e) REPEAL.—The first section of the Act of Feb-  
2 ruary 12, 1946 (60 Stat. 4, chapter 4; 15 U.S.C. 313a)  
3 is hereby repealed.

4 **SEC. 1102. UNFUNDED PRIORITIES LIST, REPORTS, AND**  
5 **PLANS.**

6 (a) DEFINITIONS.—In this section:

7 (1) ADMINISTRATION.—The term “Administra-  
8 tion” means the National Oceanic and Atmospheric  
9 Administration.

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

13 (3) APPROPRIATE COMMITTEES OF CON-  
14 GRESS.—The term “appropriate committees of Con-  
15 gress” means—

16 (A) the Committee on Commerce, Science,  
17 and Transportation of the Senate;

18 (B) the Committee on Appropriations of  
19 the Senate;

20 (C) the Committee on Natural Resources  
21 of the House of Representatives;

22 (D) the Committee on Science, Space, and  
23 Technology of the House of Representatives;  
24 and

1 (E) the Committee on Appropriations of  
2 the House of Representatives.

3 (4) CAPITAL BUDGETARY LINE ITEM.—The  
4 term “capital budgetary line item” means a line  
5 item in the budget justification materials submitted  
6 to Congress in support of the budget of the Presi-  
7 dent for a fiscal year pursuant to section 1105 of  
8 title 31, United States Code, for any aircraft or ves-  
9 sel for the Administration valued at more than  
10 \$3,000,000.

11 (5) INFRASTRUCTURE AND ASSETS.—The term  
12 “infrastructure and assets” means—

13 (A) repair and construction of infrastruc-  
14 ture, facilities, and laboratories;

15 (B) instrumentation;

16 (C) resources for data storage and anal-  
17 ysis, including options for cloud-based and  
18 supercomputing services; and

19 (D) with respect to the Office of Marine  
20 and Aviation Operations, aircraft, vessels, and  
21 uncrewed systems, associated facility construc-  
22 tion and repair needs, instrumentation, and re-  
23 quirements to operate new and existing assets  
24 to reliably meet the mission needs of the Ad-  
25 ministration.



1           (6) UNFUNDED PRIORITY.—The term “un-  
2 funded priority” means a program or mission re-  
3 quirement that—

4                   (A) has not been selected for funding in  
5 the applicable proposed budget;

6                   (B) is necessary to fulfill a statutory or  
7 mission requirement; and

8                   (C) the Administrator would have rec-  
9 ommended for inclusion in the applicable pro-  
10 posed budget had additional resources been  
11 available or had the requirement emerged be-  
12 fore the budget was submitted.

13       (b) UNFUNDED PRIORITIES LIST.—

14           (1) IN GENERAL.—Not later than 15 days after  
15 the date on which the President submits to Congress  
16 the budget of the President for a fiscal year pursu-  
17 ant to section 1105 of title 31, United States Code,  
18 the Administrator, in consultation with the Assistant  
19 Administrator for each line office of the Administra-  
20 tion, shall submit to the appropriate committees of  
21 Congress a report that includes a list of unfunded  
22 priorities of the Administration.

23           (2) INCLUSIONS.—The list required by para-  
24 graph (1) shall include unfunded priorities related to  
25 the needs of the Administration—

1 (A) to meet statutory and mission require-  
2 ments to—

3 (i) protect human life, property, and  
4 the economy from the impacts of weather,  
5 water, and space weather;

6 (ii) manage the Nation’s fisheries and  
7 ocean, coastal, and Great Lakes resources;  
8 and

9 (iii) manage, steward, and make im-  
10 provements to data storage, accessibility,  
11 interoperability, and utilization;

12 (B) with respect to infrastructure and as-  
13 sets to meet statutory and mission require-  
14 ments, including—

15 (i) needs with respect to—

16 (I) repair and construction of in-  
17 frastructure, facilities, and labora-  
18 tories;

19 (II) scientific support equipment  
20 and instrumentation; and

21 (III) resources for data storage  
22 and analysis, including options for  
23 cloud-based and supercomputing serv-  
24 ices; and

1 (ii) with respect to the Office of Ma-  
2 rine and Aviation Operations, in coordina-  
3 tion with the Assistant Administrator for  
4 Marine and Aviation Operations, needs  
5 with respect to aircraft and vessels, associ-  
6 ated facility construction and repair needs,  
7 and resources required to operate new and  
8 existing assets;

9 (C) with respect to operational shortfalls  
10 that compromise the ability of the Administra-  
11 tion to meet the statutory and mission require-  
12 ments described in subparagraph (A), including  
13 by compromising the ability of the Administra-  
14 tion to meet those requirements in a timely  
15 manner;

16 (D) with respect to mitigating fishery dis-  
17 asters, including in accordance with the require-  
18 ments under the heading “FISHERIES DISASTER  
19 ASSISTANCE” in title II of the Disaster Relief  
20 Supplemental Appropriations Act, 2023 (divi-  
21 sion N of Public Law 117–328); and

22 (E) with respect to transitioning successful  
23 experimental programs under the Office of Oce-  
24 anic and Atmospheric Research as of the date  
25 of the enactment of this Act into an operational

1 capacity under another office of the Administra-  
2 tion.

3 (3) PRIORITIZATION.—The list required by  
4 paragraph (1) shall—

5 (A) present the unfunded priorities of the  
6 Administration in order from highest to lowest  
7 priority, as determined by the Administrator;  
8 and

9 (B) with respect to each unfunded priority,  
10 include—

11 (i) a brief description of the unfunded  
12 priority and its relationship to the statu-  
13 tory and mission requirements of the Ad-  
14 ministration;

15 (ii) an estimate of the funding level  
16 required; and

17 (iii) an assessment of the status of the  
18 design or acquisition program, if applica-  
19 ble.

20 (c) STOCK ASSESSMENTS AND SURVEYS.—

21 (1) PLANNED STOCK ASSESSMENTS AND SUR-  
22 VEYS.—Not later than February 1 of each year, the  
23 Administrator, in consultation with the Assistant  
24 Administrator for Marine and Aviation Operations  
25 and the Assistant Administrator for the National

1 Marine Fisheries Service, shall make available on a  
2 publicly accessible website a list of planned stock as-  
3 sessments and surveys for the upcoming fiscal year.

4 (2) PRIORITY STOCK ASSESSMENTS IN UN-  
5 FUNDED PRIORITIES LIST.—The list required by  
6 subsection (b)(1) shall include such priority stock as-  
7 sessments described in subparagraph (B)(ii) of sec-  
8 tion 304(e)(1) of the Magnuson-Stevens Fishery  
9 Conservation and Management Act (16 U.S.C.  
10 1854(e)(1)), as added by paragraph (3), that are  
11 unfunded priorities.

12 (3) DATA POOR STOCKS.—Section 304(e)(1) of  
13 the Magnuson-Stevens Fishery Conservation and  
14 Management Act (16 U.S.C. 1854(e)(1)) is amend-  
15 ed—

16 (A) by inserting “(A)” after “(1)”; and

17 (B) by adding at the end the following:

18 “(B) The report required by subparagraph (A)  
19 shall include—

20 “(i) an assessment of whether stock survey  
21 data is adequately available, not available, or  
22 not sufficiently available;

23 “(ii) priority stock assessments and sur-  
24 veys conducted for the purpose of—

1 “(I) significantly decreasing uncer-  
2 tainty in stock assessments;

3 “(II) maintaining continuity of data  
4 for species management; or

5 “(III) increasing the ability of the Na-  
6 tional Oceanic and Atmospheric Adminis-  
7 tration to meet the statutory and mission  
8 requirements described in section  
9 1102(b)(2)(A) of the Weather Act Reau-  
10 thorization Act of 2024; and

11 “(iii) for the priority stock assessments  
12 under clause (ii), a description of the type, re-  
13 source needs, and estimated cost of increased  
14 survey efforts to meet the goals under that  
15 clause.”.

16 (d) CAPITAL INVESTMENT PLAN.—

17 (1) IN GENERAL.—Not later than 60 days after  
18 the date on which the President submits to Congress  
19 the budget of the President for a fiscal year pursu-  
20 ant to section 1105 of title 31, United States Code,  
21 the Administrator, in consultation with the Assistant  
22 Administrator for Marine and Aviation Operations  
23 and the Assistant Administrators for the line offices  
24 of the Administration, as appropriate, shall submit

1 to the appropriate committees of Congress a future-  
2 years capital investment plan.

3 (2) INCLUSIONS.—The plan required by para-  
4 graph (1) shall include—

5 (A) the fleet replacement and moderniza-  
6 tion plan required by section 604 of the NOAA  
7 Fleet Modernization Act (33 U.S.C. 891b);

8 (B) the NOAA Aircraft Recapitalization  
9 Plan and any plan developed to carry out sec-  
10 tion 11708 of the Don Young Coast Guard Au-  
11 thorization Act of 2022 (33 U.S.C. 851 note  
12 prec.); and

13 (C) any other plan the Administrator con-  
14 siders appropriate.

15 (3) ELEMENTS.—The plan required by para-  
16 graph (1) shall identify, for each capital budgetary  
17 line item—

18 (A) the proposed funding level included in  
19 the applicable proposed budget;

20 (B) the total estimated cost of completion;

21 (C) projected funding levels for each fiscal  
22 year for the next 5 fiscal years or until comple-  
23 tion, whichever is earlier;

24 (D) an estimated completion date at the  
25 projected funding levels; and

1           (E) changes, if any, in the total estimated  
2           cost of completion or estimated completion date  
3           from previous future-years capital investment  
4           plans submitted under this subsection.

5 **SEC. 1103. MISCELLANEOUS AUTHORITIES.**

6       (a) TECHNICAL ASSISTANCE IN THE PACIFIC.—

7           (1) IN GENERAL.—Subject to the availability of  
8           appropriations, and at the discretion of the Sec-  
9           retary of Commerce, in consultation with the Sec-  
10          retary of State, the Under Secretary may provide to  
11          Pacific Island parties technical assistance and serv-  
12          ices in line with the mission of the National Oceanic  
13          and Atmospheric Administration.

14       (2) REGIONAL CAPACITY.—

15           (A) USE OF EXISTING PROGRAMS, OF-  
16           FICES, AND SITES.—To implement this sub-  
17           section, the Under Secretary shall primarily use  
18           existing programs, offices, and sites of the Na-  
19           tional Oceanic and Atmospheric Administration  
20           in the Pacific Islands region.

21           (B) COOPERATIVE INSTITUTE.—In order  
22           to further augment existing regional capacity in  
23           the Pacific Islands region, the Under Secretary  
24           may consider the formation of a cooperative in-



1           stitute to focus and advise on the unique needs  
2           of that region.

3           (3) PACIFIC ISLAND PARTIES DEFINED.—In  
4           this subsection, the term “Pacific Island parties”  
5           means—

6                   (A) the Trust Territories of the Pacific Is-  
7                   lands;

8                   (B) the Republic of Palau, the Republic of  
9                   the Marshall Islands, and the Federated States  
10                  of Micronesia, which have each entered into a  
11                  Compact of Free Association with the United  
12                  States; and

13                  (C) such other parties as the Under Sec-  
14                  retary considers appropriate.

15          (b) STATE ASSISTANCE.—The Under Secretary may  
16          provide technical assistance, data, and operational prod-  
17          ucts or services in support of State governments, or enti-  
18          ties and institutions partnering or collaborating with State  
19          governments, in the voluntary production of State climate  
20          or weather assessments.

21          (c) INTERNATIONAL COLLABORATION.—

22                  (1) IN GENERAL.—The Under Secretary, acting  
23                  through the Director of the National Weather Serv-  
24                  ice, may establish and maintain partnerships and  
25                  other relationships with national and regional weath-

1 er services around the world to support the co-devel-  
2 opment and deployment of weather and climate in-  
3 formation and instrumentation.

4 (2) EXISTING AGREEMENTS AND PARTNER-  
5 SHIPS.—Partnerships and other relationships estab-  
6 lished and maintained under paragraph (1), includ-  
7 ing those provided by the international desks of the  
8 National Centers for Environmental Prediction, shall  
9 build upon existing agreements and partnerships  
10 with the Department of State, the United States  
11 Agency for International Development, and the  
12 World Meteorological Organization.

13 (d) APP- OR WEB-BASED TOOLS.—The Under Sec-  
14 retary may, in alignment with the 21st Century Integrated  
15 Digital Experience Act (Public Law 115–336; 44 U.S.C.  
16 3501 note) and the memorandum of the Director of the  
17 Office of Management and Budget dated September 22,  
18 2023, and entitled “Delivering a Digital-First Public Ex-  
19 perience” (M–23–22), develop and implement mobile ap-  
20 plications, modern application programming interfaces, or  
21 web-based tools to increase the utility of and access to  
22 data, services, and products of the Administration.

23 (e) BRIEFING.—Not later than 1 year after the date  
24 of the enactment of this Act, the Under Secretary, shall  
25 provide the Committee on Commerce, Science, and Trans-

1 portation of the Senate and the Committee on Science,  
2 Space, and Technology of the House of Representatives  
3 a briefing on the number and time commitment of intra-  
4 agency and interagency meetings, councils, boards, and  
5 summits attended by each line office Assistant Adminis-  
6 trator and Deputy Administrator of the National Oceanic  
7 and Atmospheric Administration.

