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(Original Signature of Member)

114TH CONGRESS
1ST SESSION

H. R. _____

To improve the National Oceanic and Atmospheric Administration's weather research through a focused program of investment on affordable and attainable advances in observational, computing, and modeling capabilities to support substantial improvement in weather forecasting and prediction of high impact weather events, to expand commercial opportunities for the provision of weather data, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

Mr. LUCAS (for himself and Ms. BONAMICI) introduced the following bill; which was referred to the Committee on _____

A BILL

To improve the National Oceanic and Atmospheric Administration's weather research through a focused program of investment on affordable and attainable advances in observational, computing, and modeling capabilities to support substantial improvement in weather forecasting and prediction of high impact weather events, to 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,*

1 **SECTION 1. SHORT TITLE.**

2 This Act may be cited as the “Weather Research and
3 Forecasting Innovation Act of 2015”.

4 **SEC. 2. PUBLIC SAFETY PRIORITY.**

5 In accordance with NOAA’s critical mission to pro-
6 vide science, service, and stewardship, the Under Sec-
7 retary shall prioritize weather research, across all weather
8 programs, to improve weather data, forecasts, and warn-
9 ings for the protection of life and property and the en-
10 hancement of the national economy.

11 **SEC. 3. WEATHER RESEARCH AND FORECASTING INNOVA-
12 TION.**

13 (a) PROGRAM.—The Assistant Administrator for
14 OAR shall conduct a program to develop improved under-
15 standing of and forecast capabilities for atmospheric
16 events and their impacts, placing priority on developing
17 more accurate, timely, and effective warnings and fore-
18 casts of high impact weather events that endanger life and
19 property.

20 (b) PROGRAM ELEMENTS.—The program described
21 in subsection (a) shall focus on the following activities:

22 (1) Improving the fundamental understanding
23 of weather consistent with section 2, including the
24 boundary layer and other atmospheric processes af-
25 fecting high impact weather events.

1 (2) Improving the understanding of how the
2 public receives, interprets, and responds to warnings
3 and forecasts of high impact weather events that en-
4 danger life and property.

5 (3) Research and development, and transfer of
6 knowledge, technologies, and applications to the
7 NWS and other appropriate agencies and entities,
8 including the American weather industry and aca-
9 demic partners, related to—

10 (A) advanced radar, radar networking
11 technologies, and other ground-based tech-
12 nologies, including those emphasizing rapid,
13 fine-scale sensing of the boundary layer and
14 lower troposphere, and the use of innovative,
15 dual-polarization, phased array technologies;

16 (B) aerial weather observing systems;

17 (C) high performance computing and infor-
18 mation technology and wireless communication
19 networks;

20 (D) advanced numerical weather prediction
21 systems and forecasting tools and techniques
22 that improve the forecasting of timing, track,
23 intensity, and severity of high impact weather,
24 including through—

1 (i) the development of more effective
2 mesoscale models;

3 (ii) more effective use of existing, and
4 the development of new, regional and na-
5 tional cloud-resolving models;

6 (iii) enhanced global weather models;

7 and

8 (iv) integrated assessment models;

9 (E) quantitative assessment tools for meas-
10 uring the impact and value of data and observ-
11 ing systems, including OSSEs (as described in
12 section 8), OSEs, and AOAs;

13 (F) atmospheric chemistry and interactions
14 essential to accurately characterizing atmos-
15 pheric composition and predicting meteorolog-
16 ical processes, including cloud microphysical,
17 precipitation, and atmospheric electrification
18 processes, to more effectively understand their
19 role in severe weather; and

20 (G) additional sources of weather data and
21 information, including commercial observing
22 systems.

23 (4) A technology transfer initiative, carried out
24 jointly and in coordination with the Assistant Ad-
25 ministrator for NWS, and in cooperation with the

1 American weather industry and academic partners,
2 to ensure continuous development and transition of
3 the latest scientific and technological advances into
4 NWS operations and to establish a process to sunset
5 outdated and expensive operational methods and
6 tools to enable cost-effective transfer of new methods
7 and tools into operations.

8 (c) EXTRAMURAL RESEARCH.—

9 (1) IN GENERAL.—In carrying out the program
10 under this section, the Assistant Administrator for
11 OAR shall collaborate with and support the non-
12 Federal weather research community, which includes
13 institutions of higher education, private entities, and
14 nongovernmental organizations, by making funds
15 available through competitive grants, contracts, and
16 cooperative agreements.

17 (2) SENSE OF CONGRESS.—It is the sense of
18 Congress that not less than 30 percent of the funds
19 for weather research and development at OAR
20 should be made available for the purpose described
21 in paragraph (1).

22 (d) REPORT.—The Under Secretary shall transmit to
23 Congress annually, concurrently with NOAA's budget re-
24 quest, a description of current and planned activities
25 under this section.

1 **SEC. 4. TORNADO WARNING IMPROVEMENT AND EXTEN-**
2 **SION PROGRAM.**

3 (a) **IN GENERAL.**—The Under Secretary, in collabo-
4 ration with the American weather industry and academic
5 partners, shall establish a tornado warning improvement
6 and extension program.

7 (b) **GOAL.**—The goal of such program shall be to re-
8 duce the loss of life and economic losses from tornadoes
9 through the development and extension of accurate, effec-
10 tive, and timely tornado forecasts, predictions, and warn-
11 ings, including the prediction of tornadoes beyond one
12 hour in advance.

13 (c) **PROGRAM PLAN.**—Not later than 6 months after
14 the date of enactment of this Act, the Assistant Adminis-
15 trator for OAR, in coordination with the Assistant Admin-
16 istrator for NWS, shall develop a program plan that de-
17 tails the specific research, development, and technology
18 transfer activities, as well as corresponding resources and
19 timelines, necessary to achieve the program goal.

20 (d) **BUDGET FOR PLAN.**—Following completion of
21 the plan, the Assistant Administrator for OAR, in coordi-
22 nation with the Assistant Administrator for NWS, shall
23 transmit annually to Congress a proposed budget cor-
24 responding to the activities identified in the plan.

1 **SEC. 5. HURRICANE WARNING IMPROVEMENT PROGRAM.**

2 (a) IN GENERAL.—The Under Secretary, in collabo-
3 ration with the American weather industry and academic
4 partners, shall maintain a hurricane warning improvement
5 program, and continue to provide support for the Hurri-
6 cane Forecast Improvement Project (HFIP).

7 (b) GOAL.—The goal of such program shall be to de-
8 velop and extend accurate hurricane forecasts and warn-
9 ings in order to reduce loss of life, injury, and damage
10 to the economy.

11 (c) PROGRAM PLAN.—Not later than 6 months after
12 the date of enactment of this Act, the Assistant Adminis-
13 trator for OAR, in consultation with the Assistant Admin-
14 istrator for NWS, shall develop a program plan that de-
15 tails the specific research, development, and technology
16 transfer activities, as well as corresponding resources and
17 timelines, necessary to achieve the program goal.

18 (d) BUDGET FOR PLAN.—Following completion of
19 the plan, the Assistant Administrator for OAR, in con-
20 sultation with the Assistant Administrator for NWS, shall
21 transmit annually to Congress a proposed budget cor-
22 responding to the activities identified in the plan.

23 **SEC. 6. WEATHER RESEARCH AND DEVELOPMENT PLAN-**
24 **NING.**

25 Not later than 6 months after the date of enactment
26 of this Act, and annually thereafter, the Assistant Admin-

1 istrator for OAR, in coordination with the Assistant Ad-
2 ministrators for NWS and NESDIS, shall issue a research
3 and development and research to operations plan to re-
4 store and maintain United States leadership in numerical
5 weather prediction and forecasting that—

6 (1) describes the forecasting skill and tech-
7 nology goals, objectives, and progress of NOAA in
8 carrying out the program conducted under section 3;

9 (2) identifies and prioritizes specific research
10 and development activities, and performance metrics,
11 weighted to meet the operational weather mission of
12 NWS to achieve a weather-ready Nation;

13 (3) describes how the program will collaborate
14 with stakeholders, including the American weather
15 industry and academic partners; and

16 (4) identifies, through consultation with the Na-
17 tional Science Foundation, American weather indus-
18 try, and academic partners, research necessary to
19 enhance the integration of social science knowledge
20 into weather forecast and warning processes, includ-
21 ing to improve the communication of threat informa-
22 tion necessary to enable improved severe weather
23 planning and decisionmaking on the part of individ-
24 uals and communities.

1 **SEC. 7. OBSERVING SYSTEM PLANNING.**

2 The Under Secretary shall—

3 (1) develop and maintain a prioritized list of
4 observation data requirements necessary to ensure
5 weather forecasting capabilities to protect life and
6 property to the maximum extent practicable;

7 (2) undertake, using OSSEs, OSEs, AOAs, and
8 other appropriate assessment tools, ongoing system-
9 atic evaluations of the combination of observing sys-
10 tems, data, and information needed to meet the re-
11 quirements listed under paragraph (1), assessing
12 various options to maximize observational capabili-
13 ties and their cost-effectiveness;

14 (3) identify current and potential future data
15 gaps in observing capabilities related to the require-
16 ments listed under paragraph (1); and

17 (4) determine a range of options to address
18 gaps identified under paragraph (3).

19 **SEC. 8. OBSERVING SYSTEM SIMULATION EXPERIMENTS.**

20 (a) IN GENERAL.—In support of the requirements of
21 section 7, the Assistant Administrator for OAR shall un-
22 dertake OSSEs to quantitatively assess the relative value
23 and benefits of observing capabilities and systems. Tech-
24 nical and scientific OSSE evaluations—

25 (1) may include assessments of the impact of
26 observing capabilities on—

1 (A) global weather prediction;

2 (B) hurricane track and intensity fore-
3 casting;

4 (C) tornado warning lead times and accu-
5 racy;

6 (D) prediction of mid-latitude severe local
7 storm outbreaks; and

8 (E) prediction of storms that have the po-
9 tential to cause extreme precipitation and flood-
10 ing lasting from 6 hours to 1 week; and

11 (2) shall be conducted in cooperation with other
12 appropriate entities within NOAA, other Federal
13 agencies, the American weather industry, and aca-
14 demic partners to ensure the technical and scientific
15 merit of OSSE results.

16 (b) REQUIREMENTS.—OSSEs shall quantitatively—

17 (1) determine the potential impact of proposed
18 space-based, suborbital, and in situ observing sys-
19 tems on analyses and forecasts, including potential
20 impacts on extreme weather events across all parts
21 of the Nation;

22 (2) evaluate and compare observing system de-
23 sign options; and

24 (3) assess the relative capabilities and costs of
25 various observing systems and combinations of ob-

1 serving systems in providing data necessary to pro-
2 tect life and property.

3 (c) IMPLEMENTATION.—OSSEs—

4 (1) shall be conducted prior to the acquisition
5 of major Government-owned or Government-leased
6 operational observing systems, including polar-orbit-
7 ing and geostationary satellite systems, with a
8 lifecycle cost of more than \$500,000,000; and

9 (2) shall be conducted prior to the purchase of
10 any major new commercially provided data with a
11 lifecycle cost of more than \$500,000,000.

12 (d) PRIORITY OSSEs.—

13 (1) GLOBAL NAVIGATION SATELLITE SYSTEM
14 RADIO OCCULTATION.—Not later than December 31,
15 2015, the Assistant Administrator for OAR shall
16 complete an OSSE to assess the value of data from
17 Global Navigation Satellite System Radio Occulta-
18 tion.

19 (2) GEOSTATIONARY HYPERSPECTRAL SOUND-
20 ER GLOBAL CONSTELLATION.—Not later than De-
21 cember 31, 2016, the Assistant Administrator for
22 OAR shall complete an OSSE to assess the value of
23 data from a geostationary hyperspectral sounder
24 global constellation.

1 (e) RESULTS.—Upon completion of all OSSEs, re-
2 sults shall be publicly released and accompanied by an as-
3 sessment of related private and public sector weather data
4 sourcing options, including their availability, affordability,
5 and cost effectiveness. Such assessments shall be devel-
6 oped in accordance with section 50503 of title 51, United
7 States Code.

8 **SEC. 9. COMPUTING RESOURCES PRIORITIZATION REPORT.**

9 Not later than 12 months after the date of enactment
10 of this Act, and annually thereafter, the NOAA Chief In-
11 formation Officer, in coordination with the Assistant Ad-
12 ministrator for OAR and the Assistant Administrator for
13 NWS, shall produce and make publicly available a report
14 that explains how NOAA intends to—

15 (1) continually support upgrades to pursue the
16 fastest, most powerful, and cost effective high per-
17 formance computing technologies in support of its
18 weather prediction mission;

19 (2) ensure a balance between the research to
20 operations requirements to develop the next genera-
21 tion of regional and global models as well as highly
22 reliable operational models;

23 (3) take advantage of advanced development
24 concepts to, as appropriate, make next generation
25 weather prediction models available in beta-test

1 mode to operational forecasters, the American
2 weather industry, and partners in academic and gov-
3 ernment research; and

4 (4) use existing computing resources to improve
5 advanced research and operational weather pre-
6 diction.

7 **SEC. 10. COMMERCIAL WEATHER DATA.**

8 (a) AMENDMENT.—Section 60161 of title 51, United
9 States Code, is amended by adding at the end the fol-
10 lowing: “This prohibition shall not extend to—

11 “(1) the purchase of weather data through con-
12 tracts with commercial providers; or

13 “(2) the placement of weather satellite instru-
14 ments on cohosted government or private payloads.”.

15 (b) STRATEGY.—

16 (1) IN GENERAL.—Not later than 6 months
17 after the date of enactment of this Act, the Sec-
18 retary of Commerce, in consultation with the Under
19 Secretary, shall transmit to the Committee on
20 Science, Space, and Technology of the House of
21 Representatives and the Committee on Commerce,
22 Science, and Transportation of the Senate a strategy
23 to enable the procurement of quality commercial
24 weather data. The strategy shall assess the range of
25 commercial opportunities, including public-private

1 partnerships, for obtaining surface-based, aviation-
2 based, and space-based weather observations. The
3 strategy shall include the expected cost effectiveness
4 of these opportunities as well as provide a plan for
5 procuring data, including an expected implementa-
6 tion timeline, from these nongovernmental sources,
7 as appropriate.

8 (2) REQUIREMENTS.—The strategy shall in-
9 clude—

10 (A) an analysis of financial or other bene-
11 fits to, and risks associated with, acquiring
12 commercial weather data or services, including
13 through multiyear acquisition approaches;

14 (B) an identification of methods to address
15 planning, programming, budgeting, and execu-
16 tion challenges to such approaches, including—

17 (i) how standards will be set to ensure
18 that data is reliable and effective;

19 (ii) how data may be acquired through
20 commercial experimental or innovative
21 techniques and then evaluated for integra-
22 tion into operational use;

23 (iii) how to guarantee public access to
24 all forecast-critical data to ensure that the
25 American weather industry and the public

1 continue to have access to information crit-
2 ical to their work; and

3 (iv) in accordance with section 50503
4 of title 51, United States Code, methods to
5 address potential termination liability or
6 cancellation costs associated with weather
7 data or service contracts; and

8 (C) an identification of any changes needed
9 in the requirements development and approval
10 processes of the Department of Commerce to
11 facilitate effective and efficient implementation
12 of such strategy.

13 (3) AUTHORITY FOR AGREEMENTS.—The As-
14 sistant Administrator for NESDIS may enter into
15 multiyear agreements necessary to carry out the
16 strategy developed under this subsection.

17 (c) PILOT PROGRAM.—

18 (1) CRITERIA.—Not later than December 31,
19 2015, NOAA shall publish data standards and speci-
20 fications for space-based commercial weather data.

21 (2) PILOT CONTRACT.—

22 (A) CONTRACT.—Not later than October
23 1, 2016, NOAA shall, through an open competi-
24 tion, enter into at least one pilot contract with
25 a private sector entity capable of providing data

1 that meet the standards and specifications set
2 by NOAA to provide commercial weather data
3 in a manner that allows NOAA to calibrate and
4 evaluate the data.

5 (B) ASSESSMENT OF DATA VIABILITY.—
6 Not later than October 1, 2019, NOAA shall
7 transmit to Congress the results of a deter-
8 mination of the extent to which data provided
9 under the contract entered into under subpara-
10 graph (A) meet the criteria published under
11 paragraph (1).

12 (3) OBTAINING FUTURE DATA.—NOAA shall,
13 to the extent feasible, obtain commercial weather
14 data from private sector providers.

15 (4) AUTHORIZATION OF APPROPRIATIONS.—
16 There are authorized to be appropriated out of funds
17 made available for procurement, acquisition, and
18 construction at NESDIS, \$9,000,000 for carrying
19 out this subsection.

20 **SEC. 11. ENVIRONMENTAL INFORMATION SERVICES WORK-**
21 **ING GROUP.**

22 (a) ESTABLISHMENT.—The NOAA Science Advisory
23 Board shall continue to maintain a standing working
24 group named the Environmental Information Services

1 Working Group (in this section referred to as the “Work-
2 ing Group”) to—

3 (1) provide advice for prioritizing weather re-
4 search initiatives at NOAA to produce real improve-
5 ment in weather forecasting;

6 (2) provide advice on existing or emerging tech-
7 nologies or techniques that can be found in private
8 industry or the research community that could be in-
9 corporated into forecasting at NWS to improve fore-
10 casting skill;

11 (3) identify opportunities to improve commu-
12 nications between weather forecasters, emergency
13 management personnel, and the public; and to im-
14 prove communications and partnerships among
15 NOAA and the private and academic sectors; and

16 (4) address such other matters as the Science
17 Advisory Board requests of the Working Group.

18 (b) COMPOSITION.—

19 (1) IN GENERAL.—The Working Group shall be
20 composed of leading experts and innovators from all
21 relevant fields of science and engineering including
22 atmospheric chemistry, atmospheric physics, meteor-
23 ology, hydrology, social science, risk communica-
24 tions, electrical engineering, and computer sciences.

1 In carrying out this section, the Working Group may
2 organize into subpanels.

3 (2) NUMBER.—The Working Group shall be
4 composed of no fewer than 15 members. Nominees
5 for the Working Group may be forwarded by the
6 Working Group for approval by the Science Advisory
7 Board. Members of the Working Group may choose
8 a chair (or co-chairs) from among their number with
9 approval by the Science Advisory Board.

10 (c) ANNUAL REPORT.—The Working Group shall
11 transmit annually to the Science Advisory Board for sub-
12 mission to the Under Secretary a report on progress made
13 by NOAA in adopting the Working Group’s recommenda-
14 tions. The Science Advisory Board shall transmit this re-
15 port to the Under Secretary. Within 30 days of receipt
16 of such report, the Under Secretary shall transmit it to
17 the Committee on Science, Space, and Technology of the
18 House of Representatives and the Committee on Com-
19 merce, Science, and Transportation of the Senate.

20 **SEC. 12. INTERAGENCY WEATHER RESEARCH AND INNOVA-**
21 **TION COORDINATION.**

22 (a) ESTABLISHMENT.—The Director of the Office of
23 Science and Technology Policy shall establish an Inter-
24 agency Committee for Advancing Weather Services to im-
25 prove coordination of relevant weather research and fore-

1 cast innovation activities across the Federal Government.

2 The Interagency Committee shall—

3 (1) include participation by the National Aero-
4 nautics and Space Administration, the Federal Avia-
5 tion Administration, NOAA and its constituent ele-
6 ments, the National Science Foundation, and such
7 other agencies involved in weather forecasting re-
8 search as the President determines are appropriate;

9 (2) identify and prioritize top forecast needs
10 and coordinate those needs against budget requests
11 and program initiatives across participating offices
12 and agencies; and

13 (3) share information regarding operational
14 needs and forecasting improvements across relevant
15 agencies.

16 (b) CO-CHAIR.—The Federal Coordinator for Meteor-
17 ology shall serve as a co-chair of this panel.

18 (c) FURTHER COORDINATION.—The Director shall
19 take such other steps as are necessary to coordinate the
20 activities of the Federal Government with those of the
21 American weather industry, State governments, emer-
22 gency managers, and academic researchers.

23 **SEC. 13. OAR AND NWS EXCHANGE PROGRAM.**

24 (a) IN GENERAL.—The Assistant Administrator for
25 OAR and the Assistant Administrator for NWS may es-

1 tablish a program to detail OAR personnel to the NWS
2 and NWS personnel to OAR.

3 (b) GOAL.—The goal of this program is to enhance
4 forecasting innovation through regular, direct interaction
5 between OAR’s world-class scientists and NWS’s oper-
6 ational staff.

7 (c) ELEMENTS.—The program shall allow up to 10
8 OAR staff and NWS staff to spend up to 1 year on detail.
9 Candidates shall be jointly selected by the Assistant Ad-
10 ministrator for OAR and the Assistant Administrator for
11 NWS.

12 (d) REPORT.—The Under Secretary shall report an-
13 nually to the Committee on Science, Space, and Tech-
14 nology of the House of Representatives and to the Com-
15 mittee on Commerce, Science, and Transportation of the
16 Senate on participation in such program and shall high-
17 light any innovations that come from this interaction.

18 **SEC. 14. VISITING FELLOWS AT NWS.**

19 (a) IN GENERAL.—The Assistant Administrator for
20 NWS may establish a program to host postdoctoral fellows
21 and academic researchers at any of the National Centers
22 for Environmental Prediction.

23 (b) GOAL.—This program shall be designed to pro-
24 vide direct interaction between forecasters and talented
25 academic and private sector researchers in an effort to

1 bring innovation to forecasting tools and techniques avail-
2 able to the NWS.

3 (c) SELECTION AND APPOINTMENT.—Such fellows
4 shall be competitively selected and appointed for a term
5 not to exceed 1 year.

6 **SEC. 15. NOAA WEATHER RADIO ALL HAZARDS “MARK**
7 **TRAIL” AWARD PROGRAM.**

8 (a) PROGRAM.—The Assistant Administrator for
9 NWS is authorized to establish the NOAA Weather Radio
10 All Hazards “Mark Trail” Award Program. This award
11 program shall provide annual awards to honor individuals
12 or organizations that use or provide NOAA Weather Radio
13 All Hazards receivers or transmitters to save lives and
14 protect property. Individuals or organizations that utilize
15 other early warning tools or applications also qualify for
16 this award.

17 (b) GOAL.—This award program draws attention to
18 the life-saving work of the NOAA Weather Radio All Haz-
19 ards program, as well as emerging tools and applications,
20 that provide real-time warning to individuals and commu-
21 nities of severe weather or other hazardous conditions.

22 (c) PROGRAM ELEMENTS.—

23 (1) NOMINATIONS.—Nominations for this
24 award shall be made annually by the Weather Field
25 Offices to the Assistant Administrator for NWS.

1 Broadcast meteorologists, weather radio manufactur-
2 ers and weather warning tool and application devel-
3 opers, emergency managers and public safety offi-
4 cials may nominate individuals and/or organizations
5 to their local Weather Field Offices, but the final list
6 of award nominees must come from the Weather
7 Field Offices.

8 (2) SELECTION OF AWARDEES.—Annually, the
9 Assistant Administrator for NWS shall choose win-
10 ners of this award whose timely actions, based on
11 NOAA weather radio all hazards receivers or trans-
12 mitters or other early warning tools and applica-
13 tions, saved lives and/or property or demonstrated
14 public service in support of weather or all hazard
15 warnings.

16 (3) AWARD CEREMONY.—The Assistant Admin-
17 istrator for NWS shall establish a means of making
18 these awards to provide maximum public awareness
19 of the important Weather Radio All Hazards pro-
20 gram, and such other warning tools and applications
21 as are represented in the awards.

22 **SEC. 16. DEFINITIONS.**

23 In this Act:

24 (1) AOA.—The term “AOA” means an Anal-
25 ysis of Alternatives.

1 (2) NESDIS.—The term “NESDIS” means
2 the National Environmental Satellite, Data, and In-
3 formation Service.

4 (3) NOAA.—The term “NOAA” means the Na-
5 tional Oceanic and Atmospheric Administration.

6 (4) NWS.—The term “NWS” means the Na-
7 tional Weather Service.

8 (5) OAR.—The term “OAR” means the Office
9 of Oceanic and Atmospheric Research.

10 (6) OSE.—The term “OSE” means an Observ-
11 ing System Experiment.

12 (7) OSSE.—The term “OSSE” means an Ob-
13 serving System Simulation Experiment.

14 (8) UNDER SECRETARY.—The term “Under
15 Secretary” means the Under Secretary of Commerce
16 for Oceans and Atmosphere.

17 **SEC. 17. AUTHORIZATION OF APPROPRIATIONS.**

18 (a) FISCAL YEAR 2015.—There are authorized to be
19 appropriated for fiscal year 2015—

20 (1) \$90,800,000 to OAR to carry out this Act,
21 of which—

22 (A) \$70,000,000 is authorized for weather
23 laboratories and cooperative institutes; and

24 (B) \$20,800,000 is authorized for weather
25 and air chemistry research programs; and

1 (2) out of funds made available for research
2 and development at NOAA, an additional amount of
3 \$16,000,000 for OAR to carry out the joint tech-
4 nology transfer initiative described in section
5 3(b)(4).

6 (b) FISCAL YEARS 2016 AND 2017.—For each of fis-
7 cal years 2016 and 2017, there are authorized to be ap-
8 propriated to OAR—

9 (1) \$100,000,000 to carry out this Act, of
10 which—

11 (A) \$80,000,000 is authorized for weather
12 laboratories and cooperative institutes; and

13 (B) \$20,000,000 is authorized for weather
14 and air chemistry research programs; and

15 (2) an additional amount of \$20,000,000 for
16 the joint technology transfer initiative described in
17 section 3(b)(4).

18 (c) LIMITATION.—No additional funds are authorized
19 to carry out this Act, and the amendments made by this
20 Act.