

INLAND FLOOD FORECASTING AND WARNING SYSTEM ACT
OF 2002

JUNE 5, 2002.—Committed to the Committee of the Whole House on the State of
the Union and ordered to be printed

Mr. BOEHLERT, from the Committee on Science,
submitted the following

R E P O R T

[To accompany H.R. 2486]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science, to whom was referred the bill (H.R. 2486) to authorize the National Weather Service to conduct research and development, training, and outreach activities relating to tropical cyclone inland forecasting improvement, and for other purposes, having considered the same, report favorably thereon with amendments and recommend that the bill as amended do pass.

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I. AMENDMENT

The amendments are as follows:

Strike all after the enacting clause and insert the following:

SECTION 1. SHORT TITLE.

This Act may be cited as the “Inland Flood Forecasting and Warning System Act of 2002”.

SEC. 2. AUTHORIZED ACTIVITIES.

The National Oceanic and Atmospheric Administration, through the United States Weather Research Program, shall—

(1) improve the capability to accurately forecast inland flooding (including inland flooding influenced by coastal and ocean storms) through research and modeling;

(2) develop, test, and deploy a new flood warning index that will give the public and emergency management officials fuller, clearer, and more accurate information about the risks and dangers posed by expected floods;

(3) train emergency management officials, National Weather Service personnel, meteorologists, and others as appropriate regarding improved forecasting techniques for inland flooding, risk management techniques, and use of the inland flood warning index developed under paragraph (2); and

(4) conduct outreach and education activities for local meteorologists and the public regarding the dangers and risks associated with inland flooding and the use and understanding of the inland flood warning index developed under paragraph (2).

SEC. 3. AUTHORIZATION OF APPROPRIATIONS.

There are authorized to be appropriated to the National Oceanic and Atmospheric Administration for carrying out this Act \$1,150,000 for each of the fiscal years 2003 through 2007. Of the amounts authorized under this section, \$250,000 for each fiscal year shall be available for competitive merit-reviewed grants to institutions of higher education (as defined in section 101 of the Higher Education Act of 1965 (20 U.S.C. 1001)) to develop models that can improve the ability to forecast the coastal and estuary-inland flooding that is influenced by tropical cyclones. The models should incorporate the interaction of such factors as storm surges, soil saturation, and other relevant phenomena.

SEC. 4. REPORT.

Not later than 90 days after the date of the enactment of this Act, and annually thereafter through fiscal year 2007, the National Oceanic and Atmospheric Administration shall transmit to the Committee on Science of the House of Representatives and the Committee on Commerce, Science, and Transportation of the Senate a report on its activities under this Act and the success and acceptance of the inland flood warning index developed under section 2(2) by the public and emergency management professionals.

Amend the title so as to read:

A bill to authorize the National Oceanic and Atmospheric Administration, through the United States Weather Research Program, to conduct research and development, training, and outreach activities relating to inland flood forecasting improvement, and for other purposes.

II. PURPOSE OF THE BILL

The purpose of H.R. 2486 is to authorize the National Oceanic and Atmospheric Administration (NOAA), through the United States Weather Research Program (USWRP), to improve the capability to forecast inland flooding through research and modeling, and to develop, test, and deploy a new flood warning index.

III. BACKGROUND AND NEED FOR THE LEGISLATION

In 1999, Hurricane Floyd killed 48 people and caused nearly \$3 billion in property damage, primarily through the flooding of inland communities. In 2000, Tropical Storm Allison unexpectedly dumped more than 35 inches of rain in Texas and traveled from Texas eastward through much of the Southeast United States resulting in

more than 50 deaths, again primarily as a result of inland flooding. While the National Weather Service has the ability to accurately predict most flood events, it has difficulty in forecasting coastal and estuary-inland flooding events that are caused by tropical cyclones. In addition, the flood warning index (or scale) currently used by the National Weather Service does not include enough information about the potential risks and dangers posed by expected floods.

The USWRP is a \$9 million multi-agency collaborative effort of research communities, academia, and government. The focus of the program is to integrate weather-related research and new developments in technology with current operational weather products. The government participants include NOAA, which houses USWRP, the National Science Foundation, the National Aeronautic and Space Administration (NASA), and the Department of Defense.

IV. SUMMARY OF HEARING

Weatherproofing the U.S.: Are We Prepared for Severe Storms?

October 11, 2001, Hearing Volume No. 107–31

The purpose of the hearing was to receive testimony about research efforts into the prediction of severe storms, with emphasis on hurricanes, flooding, and wind-related damage. The hearing addressed the needs of emergency management officials to ensure the public is adequately warned about storms and their effects. In addition, the hearing examined three related legislative issues: H.R. 2486, the Tropical Cyclone Inland Forecasting Improvement and Warning System Development Act, introduced by Representative Etheridge; draft legislation by Representative Moore on research related to severe wind damage and its amelioration; and reauthorization of the U.S. Weather Research Program (USWRP).

The Subcommittee heard testimony from: (1) Dr. Chris Landsea, Hurricane Research Division, Atlantic Oceanographic and Meteorological Laboratory, NOAA; (2) Dr. Len Pietrafesa, Director of External Affairs, College of Mathematical Sciences, North Carolina State University; (3) Dr. Steven L. McCabe, Professor and Department Chair, Department of Civil and Environmental Engineering, University of Kansas; (4) John L. Hayes, Director, Office of Science and Technology, National Weather Service; Co-chair, U.S. Weather Research Program; (5) Doug Hill, Chief Meteorologist, WJLA—Channel 7 News, Washington, D.C.; and (6) Robert Shea, Acting Administrator for Federal Insurance and Mitigation, Federal Emergency Management Agency (FEMA).

Dr. Landsea presented his research regarding hurricanes and the likelihood of increased hurricane activity in the coming decades. He noted that:

- The formation of hurricanes requires a specific combination of environmental factors, such as warm sea surface temperatures, which provide energy for hurricane formation, and the lack of wind shears, which can inhibit hurricane formation.
- Hurricane activity seems to be cyclical: the 1940s through the 1960s were quite active, while the 1970s through the early 1990s were relatively quiet.
- It appears the Atlantic Ocean is beginning to enter another active period, posing more danger to the East Coast than the pre-

vious period of activity because of increased population and economic development.

Dr. Pietrafesa discussed the need for an interdisciplinary approach to improving the prediction of severe storms through research and management. He emphasized that:

- The root of the difficulty in improving predictions lies in the interactions between the environmental physical system, which is not well understood, and the human system, with its social and demographic characteristics. For example, communities along the shores of the East Coast have dramatically increased development in the past 20 years, despite the knowledge that a hurricane or large tropical storm could cause significant damage to property and life.

- In North Carolina, Category 2 Hurricanes (as opposed to those much stronger) are responsible for 42 percent of all damage. Category 2 Hurricanes generally have a high moisture content and cause severe rain and inland flooding, the latter of which is hard to predict because of the complex interaction of estuarian, coastal, and inland waterways.

- Adequate funding of the USWRP will increase our ability to improve prediction and preparation for severe storm events.

- He supports the legislation put forth by Congressman Etheridge to develop a new flood warning index.

Dr. Hayes discussed the importance of the USWRP. He stated that:

- Hazardous weather, such as tornadoes, hurricanes, and winter storms each year cause thousands of fatalities, even more injuries, and tens of billions of dollars in property damage.

- The USWRP can improve warning and forecast accuracies and lead times by more fully exploiting our advanced technologies and improving the scientific basis for weather prediction.

Mr. Hill presented his perspective as a television meteorologist about communicating information on severe storms to the public. He testified that:

- Most people have become desensitized to emergency weather warnings.

- More research is needed into how meteorologists present information and how the public receives that weather information.

Mr. Shea discussed the need to ensure that research into natural hazards is translated into effective practice for emergency managers and the public. He stated that:

- FEMA has been developing multi-hazard risk-assessment and loss-estimation tools called HAZUS or Hazards U.S. The first tool developed covered earthquakes, the next one will evaluate flooding, and a prototype is being developed for wind issues.

- The HAZUS tools are designed to provide people at the federal, state and local level with information to understand the risks involved with specific natural hazards, and how to address them.

- Congressman Etheridge's legislation to create a new flood warning system, would educate local officials and the public about the new system, and help save lives.

- FEMA and the National Weather Service are working together to develop enhanced flood maps and flood modeling capabilities, but more collaboration is needed.

V. COMMITTEE ACTIONS

Congressman Robert Etheridge introduced H.R. 2486 on July 12, 2001. On October 11, 2001, the Environment, Technology, and Standards Subcommittee held a hearing on the legislation. On December 12, 2001, the Subcommittee met to consider H.R. 2486. Subcommittee Chairman Ehlers offered an amendment in the nature of a substitute, which was adopted by a voice vote. The amendment (1) designated NOAA, acting through the U.S. Weather Research Program, as the entity designed to carry out the activities associated with creating a new inland flood index, rather than the National Weather Service; (2) deleted references to tropical cyclones to broaden the scope of the new flood index to include all inland flooding, not just that caused by tropical cyclones; and (3) changed the date associated with the legislation from the fiscal years 2002 through 2006 to fiscal years 2003 through 2007 to reflect the end of the fiscal year 2002 appropriations process for the Department of Commerce. The Subcommittee favorably reported the bill, H.R. 2486, as amended, by a voice vote.

On May 22, 2002, the Committee on Science considered H.R. 2486. No amendments were offered and the Committee favorably reported the bill, as amended by the subcommittee, by a voice vote.

VI. SUMMARY OF THE MAJOR PROVISIONS

The legislation, as reported by the Committee, has two major provisions:

- The legislation requires NOAA to develop, test, and deploy a new flood warning index and provides a total of \$5,750,000 for fiscal years 2003 through 2007 to carry out those activities.
- Of the amounts authorized, up to \$250,000 for each fiscal year is designated for universities through competitive merit-reviewed grants to develop models that can improve the ability to forecast coastal and estuary-inland flooding influenced by tropical cyclones.

VII. SECTION-BY-SECTION ANALYSIS

Sec. 1.—Short title

“Inland Flood Forecasting and Warning System Act of 2001”.

Sec. 2.—Authorized activities

NOAA, through the United States Weather Research Program, is authorized to develop, test and deploy an inland flood warning index for use by public and emergency management officials. After developing the index, NOAA shall also train emergency management officials, National Weather Service personnel, meteorologists, and others as appropriate in the use of the new inland flood warning index, and conduct outreach and education activities for the public.

Sec. 3.—Authorization of appropriations

Authorizes NOAA to be appropriated \$1,150,000 each year of fiscal years 2003 through 2007, for a total of \$5,750,000. Of this amount, up to \$250,000 each fiscal year is available for competitive merit reviewed grants to institutions of higher education to improve the ability to forecast coastal and estuary-inland flooding associated with tropical cyclones.

Sec. 4.—Report

Not later than 90 days after the bill is enacted and annually through fiscal year 2007, NOAA shall report to the House Science and Senate Commerce, Science, and Transportation Committees on the success and acceptance of the inland flood warning index.

VIII. COMMITTEE VIEWS

Sec. 2.—Authorized activities

The National Weather Service currently uses a flood warning index that categorizes floods as minor, moderate, major, or flood of record. However, the Committee believes that this system does not provide enough practical information to the public about the risks and potential dangers posed by expected floods.

After consultation with NOAA officials, the Committee determined that the U.S. Weather Research Program, a part of NOAA's research division, rather than the National Weather Service, would be more appropriate to develop a new index.

Sec. 3.—Authorization of appropriations

The Committee has designated a portion of the funds that would be authorized under this act to improve the prediction of inland flooding caused by coastal and estuary overflow during severe storms. The National Weather Service has made improvements in its overall flood prediction capabilities through the Advanced Hydrological Prediction Service (AHPS), a modeling effort that incorporates more data at higher resolutions. However, this modeling effort is unable to accurately predict inland flooding events caused by water from coastal and estuary overflows during severe storms. Inland flooding has replaced coastal storm surges as the primary cause of deaths during recent tropical cyclones.

Much of the research into modeling these coastal and estuary overflow events and the subsequent inland flooding has come from the university community. Therefore, the Committee has authorized funding for competitive, merit-reviewed grants to researchers for the development of models that would better incorporate the interaction of such factors as storm surges, soil saturation, and other relevant phenomena. The Committee expects that NOAA will use these models to improve forecasts, predictions, and warnings for inland flooding during tropical cyclones. The Committee believes that NOAA should develop a plan to have one modeling system that would be able to predict all flooding events instead of trying to use several different models.

Sec. 4.—Reports

The legislation requires the NOAA report on its activities and the success and acceptance of the inland flood warning index by emergency management professionals and the public. The Committee expects that NOAA will successfully provide the necessary outreach and education activities to local meteorologists and the public regarding this new index to ensure its most effective use.

IX. COST ESTIMATE

A cost estimate and comparison prepared by the Director of the Congressional Budget Office under section 402 of the Congressional

Budget Act of 1974 has been timely submitted to the Committee on Science prior to the filing of this report and is included in section X of this report pursuant to House Rule XIII, clause 3(c)(3).

H.R. 2486 does not contain new budget authority, credit authority, or changes in revenues or tax expenditures. Assuming that the sums authorized under this bill are appropriated, H.R. 2486 does authorize additional discretionary spending, as described in the Congressional Budget Office report on the bill, which is contained in section X of this report.

X. CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, DC, May 31, 2002.

Hon. SHERWOOD L. BOEHLERT,
*Chairman, Committee on Science,
House of Representatives, Washington, DC.*

DEAR MR. CHAIRMAN: The Congressional Budget Office has prepared the enclosed cost estimate for H.R. 2486, the Inland Flood Forecasting and Warning System Act of 2001.

If you wish further details on this estimate, we will be pleased to provide them. The CBO staff contact is Deborah Reis.

Sincerely,

STEVEN M. LIEBERMAN
(For Dan L. Crippen, Director).

Enclosure.

CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

H.R. 2486—Inland Flood Forecasting and Warning System Act of 2001

Summary: H.R. 2486 would require the National Oceanic and Atmospheric Administration to improve its ability to forecast inland flooding through research and modeling. The bill would direct the agency to create and implement a flood warning index, train government and other personnel to use new forecasting methodologies, and conduct outreach and education. Finally, the bill would authorize the appropriation of \$1.15 million for each of fiscal years 2003 through 2007 for grants to develop forecasting models.

Assuming appropriation of the authorized amounts, CBO estimates that implementing the bill would cost \$5 million over the 2003–2007 period. The legislation would not affect direct spending or receipts; therefore, pay-as-you-go procedures would not apply.

H.R. 2486 contains no intergovernmental or private-sector mandates as defined in the Unfunded Mandates Reform Act (UMRA) and would impose no costs on state, local, or tribal governments.

Estimated cost to the Federal Government: The estimated budgetary impact of H.R. 2486 is shown in the following table. The costs of this legislation fall within budget function 300 (natural resources and environment).

For this estimate, CBO assumes that the amounts authorized by H.R. 2486 will be appropriated by the beginning of each fiscal year and that outlays will follow historical spending patterns for similar grant programs.

	By fiscal year, in millions of dollars—				
	2003	2004	2005	2006	2007
SPENDING SUBJECT TO APPROPRIATION					
Inland flood forecasting and warning:					
Authorization level	1	1	1	1	1
Estimated outlays	1	1	1	1	1

Note.—NOAA's National Weather Service received \$642 million in operating funds from fiscal year 2002 appropriations, about \$1.5 million of which was for advanced hydrological forecasting activities similar to those authorized by H.R. 2486.

Pay-as-you-go considerations: None.

Estimated impact on state, local, and tribal governments: H.R. 2486 contains no mandates as defined in UMRA and would impose no costs on state, local, or tribal governments. The bill would benefit public universities by authorizing a total of \$1.25 million in grant funding over the 2003–2007 period to institutions of higher education, including public universities, for developing models for improved flood forecasts. Any costs incurred by states would be voluntary.

Estimated impact on the private sector: H.R. 2486 would impose no new private-sector mandates as defined in UMRA.

Estimate prepared by: Federal cost: Deborah Reis; impact on state, local, and tribal governments: Elyse Goldman; impact on the private sector: Patrice Gordon.

Estimate approved by: Peter H. Fontaine, Deputy Assistant Director for Budget Analysis.

XI. COMPLIANCE WITH PUBLIC LAW 104–4 (UNFUNDED MANDATES)

H.R. 2486 contains no unfunded mandates.

XII. COMMITTEE OVERSIGHT FINDINGS AND RECOMMENDATIONS

The Committee on Science's oversight findings and recommendations are reflected in the body of this report.

XIII. STATEMENT ON GENERAL PERFORMANCE GOALS AND OBJECTIVES

Pursuant to clause (3)(c)(4) of House Rule XIII, the goal or objective of the bill is to authorize the National Oceanic and Atmospheric Administration, through the United States Weather Research Program, to improve the capability to forecast inland flooding through research and modeling, and to develop, test, and deploy a new flood warning index.

XIV. CONSTITUTIONAL AUTHORITY STATEMENT

Article I, section 8 of the Constitution of the United States grants Congress the authority to enact H.R. 2486.

XV. FEDERAL ADVISORY COMMITTEE STATEMENT

H.R. 2486 does not establish nor authorize the establishment of any advisory committee.

XVI. CONGRESSIONAL ACCOUNTABILITY ACT

The Committee finds that H.R. 2486 does not relate to the terms and conditions of employment or access to public services or accommodations within the meaning of section 102(b)(3) of the Congressional Accountability Act (Public Law 104–1).

XVII. STATEMENT ON PREEMPTION OF STATE, LOCAL, OR TRIBAL LAW

This bill is not intended to preempt any state, local, or tribal law.

XVIII. CHANGES IN EXISTING LAW MADE BY THE BILL, AS REPORTED

There are no changes to existing law.

XIX. COMMITTEE RECOMMENDATIONS

On May 22, 2002, a quorum being present, the Committee on Science favorably reported H.R. 2486 by a voice vote, and recommended its enactment.

