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Role of the National Weather Service and Selected Legislation in the 114th Congress

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Summary

The mission of the National Weather Service (NWS) is to provide weather forecasts and warnings for the protection of life and property. Apart from the budget for procuring weather satellites, NWS received the most funding (about $1.1 billion) of any office or program within the FY2016 budget for the National Oceanic and Atmospheric Administration (NOAA). The largest fraction of the NWS budget has been devoted to local forecasts and warnings, suggesting that short-term weather prediction and warning is a high priority for NWS and for NOAA, in accord with NOAA's statutory authority.

Starting in FY2015, NWS restructured its programs, spreading out the local warning and forecast activities among five separate subprograms. The restructuring makes it difficult to compare funding for local warning and forecast activities prior to FY2015 with funding for forecast and warning activities after FY2014. According to NOAA, the restructuring was "part of a broader effort to align the NWS budget to function and link to performance."

Several bills introduced in the 114th Congress would directly or indirectly affect NWS if enacted. Some of the bills focus on single topics, such as increasing the number of NWS-operated Doppler radar stations across the country (e.g., H.R. 3538, H.R. 5089, S. 2058). Other bills would address a broader array of programs within NOAA and NWS (e.g., H.R. 1561, S. 1331, S. 1573). Several bills may affect NWS only indirectly, such as those that would authorize strategies to improve resilience to extreme weather events (e.g., H.R., 2227, H.R. 2804, H.R. 3190). Other bills relate to NOAA weather satellites, which are critical components of NWS's mission to provide weather forecasts and warnings (e.g., S. 1331). Congress has been concerned about possible gaps in coverage and the future of the weather satellite programs.

The 114th Congress has expressed its interest in improving forecasts and warnings to protect life and property in the United States from severe weather events through its role in oversight, appropriations, and the authorization of language regarding NWS. To date, none of the bills introduced in the 114th Congress has been enacted. However, Congress likely will continue to introduce legislation in the future that would shape NWS operations, directly or indirectly, in an effort to improve forecasts and warnings.

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Background

The National Weather Service (NWS), at the discretion of the Secretary of Commerce, has statutory authority for weather forecasting and for issuing storm warnings (15 U.S.C. §313). The NWS provides weather, water, and climate forecasts and warnings for the United States, its territories, adjacent waters, and ocean areas.[1] The 114th Congress has expressed its interest in improving forecasts and warnings to protect life and property in the United States from severe weather events through its role in oversight, appropriations, and the authorization of language regarding NWS.

NWS is one of several line offices within the National Oceanic and Atmospheric Administration (NOAA).[2] In 2014, NWS restructured its organization structure, which is reflected in its annual congressional budget justifications since then.

This report includes tables that summarize appropriated funding for NWS, and the programs within NWS that generate forecasts and warnings, and the funding for NWS in its restructured accounts since FY2014. The report also includes a table with a brief summary and analysis of various bills introduced in the 114th Congress that would have some bearing, directly or indirectly, on NWS operations. To date, none of the bills has been enacted.

Forecasts and Warnings: NWS's Core Mission

NWS's core mission is to provide weather forecasts and warnings for protection of life and property.[3] Apart from the budget for procuring weather satellites, NWS received the most funding of any agency or program within the FY2016 budget for NOAA.

Prior to FY2015, NWS's Local Warnings and Forecasts (LW&F) program received approximately 70% of NWS funding each year (from FY2009 through FY2014, see **Table 1**), suggesting that short-term weather prediction and warning is a high priority for NWS and for NOAA, in accord with NOAA's statutory authority.[4] The 122 NWS weather forecast offices distributed throughout the United States provide the forecasts and warnings familiar to most people (see box below).

[1] For more details on the organization of the National Weather Service (NWS), see NWS, "Organization: NWS Organizational Structure," at http://www.weather.gov/organization/#local.

[2] Other line offices include National Environmental Satellite, Data, and Information Services; National Marine Fisheries Service; National Ocean Service; Office of Marine and Aviation Operations; and Office of Oceanic and Atmospheric Research. See http://www.noaa.gov/about/organization for more information about how NOAA is structured.

[3] National Oceanic and Atmospheric Administration (NOAA), *Budget Estimates: Fiscal Year 2015*, p. NWS-17, at http://www.corporateservices.noaa.gov/nbo/fy15_bluebook/NOAA_FY15_CJ_508%20compliant.pdf.

[4] 15 U.S.C. §313.

NWS Weather Forecast Offices

NWS weather forecast offices are responsible for issuing advisories, warnings, statements, and short-term forecasts for their warning areas. According to NWS, the forecast area of responsibility for each weather forecast office typically consists of 20 to 50 counties. The weather offices are staffed with local forecasters familiar with the warning area and its likely weather nuances.

Each NWS weather forecast office is equipped with technologies for observing, forecasting, and warning of severe weather. These technologies include Weather Surveillance Radar (WSR-88D, also known as NEXRAD, a network of 160 Doppler radars); Automated Surface Observing Systems (ASOS) at more than 1,200 sites; access to data from two Geostationary Operational Environmental Satellites (GOES 13 and 15); polar-orbiting satellites (Suomi-NPP); and the Automated Weather Interactive Processing System (AWIPS).

Sources: NWS, Radar Operations Center, "NEXRAD WSR-88D: NEXRAD Doc Network Sites," at https://www.roc.noaa.gov/wsr88d/Program/NetworkSites.aspx; NWS, "ASOS & Climate Observations: What Is ASOS?" November 2012, at http://www.weather.gov/media/lmk/pdf/educational_pages/ASOSandClimateObservations__What_Is_ASOS.pdf; NOAA Satellite and Information Service, Satellite Missions, "Geostationary Operational Environmental Satellites (GOES)," at http://www.nesdis.noaa.gov/about_satellites.html; NOAA Satellite and Information Service, Satellite Missions, "Joint Polar Satellite System (JPSS)," at http://www.nesdis.noaa.gov/about_satellites.html; NOAA, NWS, "Advanced Weather Interactive Processing System (AWIPS) Hardware," at http://www.nws.noaa.gov/ops2/ops24/awips.htm.

Notes: ASOS is a climatological observing network that generates weather reports at hourly intervals, except when weather conditions are changing rapidly. AWIPS is an interactive computer system that integrates meteorological and hydrological data from an array of meteorological sensors—radar, satellites, surface instruments—and enables the forecaster to prepare and issue more accurate and timely forecasts and warnings.

Program Restructuring

Starting in FY2015, NWS restructured its programs, spreading out the LW&F activities among five separate subprograms.[5] The restructuring makes it difficult to compare funding for LW&F activities prior to FY2015 with funding for forecast and warning activities after FY2014. According to NOAA, the restructuring was "part of a broader effort to align the NWS budget to function and link to performance."[6] Also, NOAA cited two reports that included recommendations for realigning and restructuring its operations.[7] NOAA stated that its commitment to forecasts and warnings continues: "NWS is dedicated to serving the American public by providing a broad spectrum of weather, climate, and hydrological forecast guidance and decision support services. NWS strives to meet society's need for weather and hydrological forecast information."[8]

[5] These subprograms include Observations; Central Processing; Analyze, Forecast, & Support; Dissemination; and Science & Technology Integration.

[6] NOAA, *Budget Estimates: Fiscal Year 2015*, p. NWS-1, at http://www.corporateservices.noaa.gov/nbo/fy15_bluebook/NOAA_FY15_CJ_508%20compliant.pdf.

[7] National Academy of Sciences, *Weather Services for the Nation: Becoming Second to None*, 2012, pp. 39-48, at http://www.nap.edu/catalog/13429/weather-services-for-the-nation-becoming-second-to-none; and National Academy of Public Administration, *Forecast for the Future: Assuring the Capacity of the National Weather Service*, May 2013, pp. 15-18, at http://www.napawash.org/wp-content/uploads/2013/05/ForecastfortheFuture-AssuringtheCapacityoftheNationalWeatherService.pdf.

[8] Ibid.

Table 1. LW&F, NWS, and Total NOAA Funding from FY2009 to FY2014

(millions of nominal dollars)

	FY2009	FY2010	FY2011	FY2012	FY2013[a]	FY2014	Percentage of Total NOAA Funding (range)
LW&F	$682.3	$710.6	$698.3	$720.4	$734.5	$736.3	14-15%
Total NWS	$958.9	$999.8	$976.5	$991.9	$953.6	$1,067.0	20-22%
Total NOAA[b]	$4,373.9	$4,748.4	$4,596.9	$4,906.6	$4,747.8	$5,322.5	—

Source: National Oceanic and Atmospheric Administration (NOAA), budget justifications for FY2009 through FY2015.

Notes: LW&F is the Local Warnings and Forecasts program within the National Weather Service (NWS). Funding values used as reported in the "Control Tables" chapter of the budget summaries (not adjusted for inflation) for FY2009-FY2014. Table does not include $830 million provided to NOAA in P.L. 111-5, the American Recovery and Reinvestment Act (ARRA) in 2009.

a. Values represent FY2013 spend plan per NOAA, Control Table 5 in *Budget Estimates: Fiscal Year 2015*, at http://www.corporateservices.noaa.gov/nbo/fy15_bluebook/NOAA_FY15_CJ_508%20compliant.pdf.

b. FY2009-FY2014 values reflect the enacted appropriations, as reported in the "Control Tables" chapter of annual budget justifications.

Table 2 displays NWS funding in the restructured accounts for FY2014 through the FY2017 proposed budget. It also shows the percentage of total NOAA funding represented by each account within NWS. As stated above, the restructuring makes it difficult to compare LW&F funding prior to FY2015 with the restructured accounting; however, total NWS funding as a percentage of total NOAA funding appears to have dropped by a percentage point or two in the last few years. The proposed budget for NWS in FY2017 is nearly $5 million less than the enacted budget in FY2016, whereas total proposed spending for NOAA in FY2017 represents an increase of slightly more than 1% over the FY2016 enacted figure.

Table 2. NWS Funding in the Restructured Accounts, FY2014-FY2017

(millions of nominal dollars)

Account	FY2014	FY2015	FY2016	FY2017 Proposal	Percentage of Total NOAA Funding (range)	House Approps Bill FY2017 (H.R. 5393)	Senate Approps Bill FY2017 (S. 2837)
Observations	$205.0	$210.8	$216.4	$223.0	3.7-3.9%	$223.0	$217.4
Central Processing	$100.1	$96.6	$92.9	$88.4	1.5-1.9%	$98.4	$92.8
Analyze, Forecast, & Support	$474.7	$483.1	$496.0	$485.9	8.3-8.9%	$485.9	$497.8
Dissemination	$46.3	$40.1	$44.7	$47.2	<1.0%	$49.6	$46.7
Science & Technology Integration	$123.1	$123.6	$138.8	$132.0	2.1-2.4%	$132.0	$136.6
Subtotal	$949.1	$954.2	$988.8	$976.5	17-18%	$988.8	$991.3
Total NWS	$1,063.0	$1,087.5	$1,124.1	$1,119.3	19-20%	$1,131,6	$1,135.1
Total NOAA	$5,322.5	$5,448.9	$5,773.5	$5,850.6	—	$5,580.6	$5,691.0

Source: NOAA, budget justifications for FY2016 and FY2017.

Notes: Total NWS funding includes total funding for procurement, acquisitions, and construction in NWS. The five categories listed above indicate funding for operations, research, and facilities within the budget.

Selected NWS-Related Bills in the 114th Congress

Both the House and the Senate appropriations committees have reported FY2017 appropriations bills that would fund NOAA, including NWS, for FY2017.[9] Reports accompanying each appropriation bill contain language that may influence NWS operations in FY2017 and beyond.

In addition, several bills were introduced in the 114th Congress that, if enacted, could affect NWS. Some of the bills focus on single topics, such as increasing the number of Doppler radar stations across the country. Other bills would address a broader array of programs within NOAA and NWS. Several bills may affect NWS only indirectly, such as those that would authorize strategies to improve resilience to extreme weather events.

Table 3 lists legislation introduced in the 114th Congress that may affect NWS and briefly summarizes relevant provisions.

Conclusion

Many different components and programs within NOAA contribute to NWS's mission of providing weather forecasts and warnings. Several of the bills listed in **Table 3** indicate congressional interest in some of those components and programs, such as the research programs within the office of Oceans and Atmospheric Research at NOAA, and in the challenge of improving the integration of research results into operational weather forecasting (e.g., H.R. 1561, S. 1331). Several of the bills are more narrowly focused, such as those that would require additional Doppler radars to provide coverage for large population centers or state capitals (e.g., H.R. 3538, H.R. 5089, S. 2058) or those that would require additional personnel at NWS forecast offices (e.g., S. 1573). NOAA weather satellites are also critical components of the NWS's core mission, and Congress has been concerned about possible gaps in coverage and about the future of the weather satellite programs.[10] Congress has expressed concern about the future of the weather satellite program in annual appropriations bills and accompanying reports and will likely continue to do so for the foreseeable future, as the budget for satellite acquisitions continues to be a major component of overall NOAA annual spending. Furthermore, Congress likely will continue to introduce legislation that would shape NWS operations, directly or indirectly, in an overall effort to improve NWS's ability to provide forecasts and warnings for protection of life and property in the United States.

[9] H.R. 5393 is the House Commerce, Justice, Science, and Related Agencies Appropriations Act, 2017. S. 2837 is the Senate version of the bill.

[10] NOAA weather satellites are not discussed in detail in this report, but possible gaps in coverage and the satellite program's robustness versus fragility are discussed in CRS Report R44335, *Minding the Data Gap: NOAA's Polar-Orbiting Weather Satellites and Strategies for Data Continuity*, by (name redacted)

Table 3. Selected Bills Introduced in the 114th Congress That Would Affect the National Weather Service (NWS)

Bill No.	Name	Status	Brief Summary of Selected Aspects Affecting NWS	CRS Comments
H.R. 5393	Commerce, Justice, Science Appropriations (CJS) Act, 2017[a]	Reported June 7, 2016	Report accompanying bill (H.Rept. 114-605) calls for a study of gaps in NEXRAD coverage.[b] The study would identify areas with limited or no NEXRAD coverage below 6,000 feet elevation above ground level.	The issue of gaps in NEXRAD coverage is also addressed in H.R. 3538 and H.R. 5089.
H.R. 1561	Weather Research and Forecasting Innovation Act of 2015	House passed May 19, 2016. Referred to Senate Committee on Commerce, Science, and Transportation	H.R. 1561 would primarily focus on programs and priorities within OAR,[c] with the goal ultimately of improving forecasting operations. The bill would • prioritize research-to-operations; • authorize programs to improve tornado and hurricane forecasts; • require plans to improve weather research and research-to-operations and plans for developing and prioritizing observation data requirements; • implement observing system simulation requirements to assess values and benefits of different observing systems; • require a strategy for procurement of commercial weather data; and • authorize a pilot program for commercial data purchases.	Although the bill is focused on OAR and would authorize appropriations for OAR to carry out the bill requirements, the goal of improving weather forecasts would directly and indirectly affect NWS.[d] The research-to-operations focus primarily would mean that research results in OAR would be more efficiently incorporated into operations in NWS. Commercial data purchases could affect the way NWS incorporates and uses observational data for its forecasts and warnings. System simulation experiments likely would influence which observing systems are acquired in the future, a decision that could in turn affect the type and quality of data for use in weather forecasts and warnings.
H.R. 3538	Metropolitan Weather Hazards Protection Act of 2015	Introduced Sept. 17, 2015. Referred to House Committee on Science, Space and Technology	H.R. 3538 would require a Doppler radar site within 55 miles of every city with a population of more than 700,000.	H.R. 3538 and H.R. 5089 are virtually identical bills, except that H.R. 3538 would set a population threshold for cities mandated for Doppler radar coverage and H.R. 5089 would focus only on state capitals. See also S. 2058.
H.R. 5089	RADAR Act	Introduced Apr. 28, 2016. Referred to House Committee on Science, Space and Technology	H.R. 5089 would require a Doppler radar site within 55 miles of each U.S. state capital.	H.R. 3538 and H.R. 5089 are virtually identical bills, except that H.R. 3538 would set a population threshold for cities mandated for Doppler radar coverage and H.R. 5089 would focus only on state capitals.
H.R. 2227	STRONG Act	Introduced May 4,	H.R. 2227 would establish an Office of Science and	The bill likely would involve NOAA/NWS for

Bill No.	Name	Status	Brief Summary of Selected Aspects Affecting NWS	CRS Comments
		2015. Referred to House Committee on Transportation and Infrastructure	Technology Policy (OSTP)-led effort to improve resilience to extreme weather events.[e] The bill's overall purpose is to minimize the economic and social costs of extreme weather over the short and long terms.	participation, collaboration, and data sharing but probably not for a direct role.
H.R. 2804	SAFE Act	Introduced June 6, 2015. Referred to House Committee on Natural Resources	H.R. 2804 would establish a DOI-led effort to devise strategies to protect fish, wildlife, and plants from extreme weather and climate change.[f]	NWS may be involved on a multiagency joint implementation working group that would be established to coordinate, develop, and implement a national strategy to carry out the purposes of the bill. Nearly identical to S. 1601.
H.R. 3190	Prepare Act of 2015	Introduced July 24, 2015. Referred to House Committee on Transportation and Infrastructure	H.R. 3190 would establish an interagency council to devise strategies for federal agencies to increase resilience to extreme weather and climate change.	NWS may be involved on an interagency council that would establish goals and priorities for the federal government to achieve the purposes of the bill.
S. 2837	CJS Appropriations Act, 2017	Reported April 21, 2016	Report accompanying bill (S. Rept. 114-239) calls for a continuation and expansion of the National Mesonet Program, with expansion into high-risk areas. [g]	The report states that NOAA should require awardees to provide mesonet data in formats that NWS can use for forecasts and severe weather alerts. Further, the report notes that the committee considers the National Mesonet Program as an important component of a "weather-ready" nation.
S. 1331	Seasonal Forecasting Improvement Act	Reported May 9, 2016	The overall goal of S. 1331 is to improve seasonal forecasts, speed research-to-operations, and enhance weather satellite governance. Section 2 would require NWS to improve its seasonal forecasts with current programs but with more resources, coordination, and communication. Section 3 would reauthorize the Weather Research Program. Section 4 would establish weather satellite design management and procurement, with a focus on operations. Section 5 would designate a federal coordinator for meteorology at OSTP. Section 6 would establish a Weather Commission to	The bill is directed at a number of NOAA line offices, including NWS, and has an objective of improving intra-agency coordination to help achieve the goal of improving weather forecasts. The report accompanying the bill (S. Rept. 114-248) identifies the scientific challenge for NOAA, to be addressed by the bill, of improving sub-seasonal, seasonal, and interannual weather predictions, which forecast conditions for future weeks, months, and even years.

Bill No.	Name	Status	Brief Summary of Selected Aspects Affecting NWS	CRS Comments
			assess weather forecast and forecast products and advise the federal government on high priority forecasts needs. Sections 7 and 8 would require reports on NOAA research, products, and services that address the urban environment and on the U.S. Air Force divestiture from the U.S. weather research and forecasting model, respectively. Section 9 would require a baseline analysis of NWS operations and workforce. Section 10 would authorize the National Water Center at NOAA to facilitate collaboration across federal, state, academic, and private sector entities to improve understanding of water resources, among other things. Section 11 would authorize a project to improve hurricane forecasting.	
S. 1573	Weather Alerts for a Ready Nation Act of 2015	Reported Oct. 19, 2015	Section 2 of S. 1573 would require one warning coordination meteorologist at each weather forecast office of NWS. Section 3 would require NOAA to evaluate the agency's watch and warning communications. Section 4 would require a NOAA report on employees and contractors in response to a recent internal scandal.	The report accompanying S. 1573 (S. Rept. 114-154) cites a National Research Council report that noted improvement in NWS forecasts but acknowledged that NWS still struggles with communicating forecasts and warnings to users. The report further underscored the growing recognition of the role of social science in improving communication of forecasts and warnings. Section 2 of this legislation would further implement the initiative, begun by NOAA, to place warning coordination meteorologists in weather forecast offices. Section 3 would require NOAA to evaluate the agency's watch and warning communications. Section 4 would address a "revolving door" issue in which a former NWS employee was caught crafting a contract for consulting work with NWS after an investigation by the Office of Inspector General. NOAA terminated the contract after the report was issued.

Bill No.	Name	Status	Brief Summary of Selected Aspects Affecting NWS	CRS Comments
S. 2058	Metropolitan Weather Hazards Act of 2015	Introduced Sept. 17, 2015. Ordered to be reported Dec. 9, 2015	S. 2058 would require a Doppler radar site within 55 miles of every city with a population of more than 700,000.	Nearly identical to H.R. 3538.
S. 1343	Hurricane Forecast Improvement Project	Introduced May 14, 2015. Referred to Senate Committee on Commerce, Science, and Transportation	S. 1343 would require NWS to create a plan for improved hurricane forecasting within one year of enactment.	
S. 1601	SAFE Act	Introduced June 17, 2015. Referred to Senate Committee on Environment and Public Works	H.R. 2804 would establish a DOI-led effort to devise strategies to protect fish, wildlife, and plants from extreme weather and climate change.	NWS may be involved on a multiagency joint implementation working group that would be established to coordinate, develop, and implement a national strategy to carry out the purposes of the bill. Nearly identical to H.R. 2804.

Sources: CRS. U.S. Census Bureau (for estimates of population in U.S. cities estimated for 2015) at http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk; NOAA, Office of Inspector General Investigative Report OIG 12-0447, June 2015, at https://www.oig.doc.gov/OIGPublications/OIG-12-0447-I.pdf.

a. The CJS Appropriations Act is the Commerce, Justice, Science, and Related Agencies appropriations act.

b. NEXRAD stands for NEXt generation RADar, which is Doppler radar used by the NWS to measure precipitation and wind speed.

c. OAR is the NOAA line office Oceans and Atmospheric Research.

d. NWS is the National Oceanic and Atmospheric Administration (NOAA) line office National Weather Service.

e. OSTP is the Office of Science and Technology Policy.

f. DOI is the Department of the Interior.

g. *Mesonet* refers to a high-resolution network of surface-based hydrometeorological observing stations operated at a regional, state, or local scale. The National Mesonet Program is a NWS program that purchases data from existing, nonfederal networks.

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