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Restructuring the National Weather Service to Build a Weather-Ready Nation



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Synonyms

[Budget restructuring](#); [Governance](#); [Government reform](#); [Portfolio management](#); [Reorganization](#)

Definition

Restructuring the National Weather Service's budget, organization, and governance to improve service delivery and achieve the strategic outcome of Building a Weather-Ready Nation.

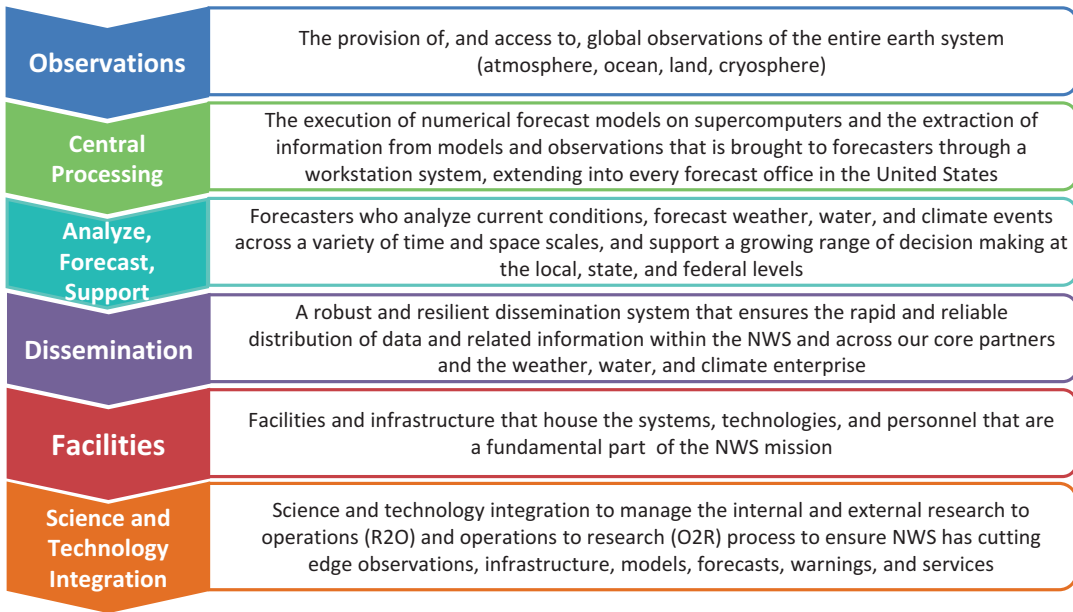
Introduction: Current Mission and the Need for Change

The National Weather Service (NWS) is a federal government agency with the mission to provide real-time observations, forecasts, and warnings of

weather, water, and short-term climate events to save lives, protect property, and enhance the Nation's economy. The NWS accomplishes its mission through a real-time, end-to-end forecast process, described in Fig. 1.

These functions support 24 h × 365 day forecast operations within a spectrum of 9 National Centers, 13 regional River Forecast Centers (RFCs), 21 Aviation Center Weather Service Units (CWSUs), and 122 Weather Forecast Offices (WFOs) geographically distributed throughout the United States (Fig. 2). The NWS also supports a growing weather, water, and climate industry that provides tailored products and services to a large spectrum of private and public interests from agriculture, energy, and manufacturing to public safety.

The NWS continues to work with the research community as well as with its partners and customers to improve the delivery of the best possible observations, forecasts, and warnings. Furthermore, the NWS has recognized through an expansive strategic planning activity that it must go beyond providing forecasts and warnings and connect this vital information to decision-makers within federal, state, tribal, and local governments to ensure that the information is translated into actions that saves lives. This bold vision has been captured within a strategic outcome of "Building a Weather-Ready Nation" and involves the provision of what has been termed "Impact-Based Decision Support Services" (National Oceanic and Atmospheric Administration 2011) to connect meteorological information to decision-makers to



Restructuring the National Weather Service to Build a Weather-Ready Nation, Fig. 1 End-to-end forecast process and value chain at the National Weather Service

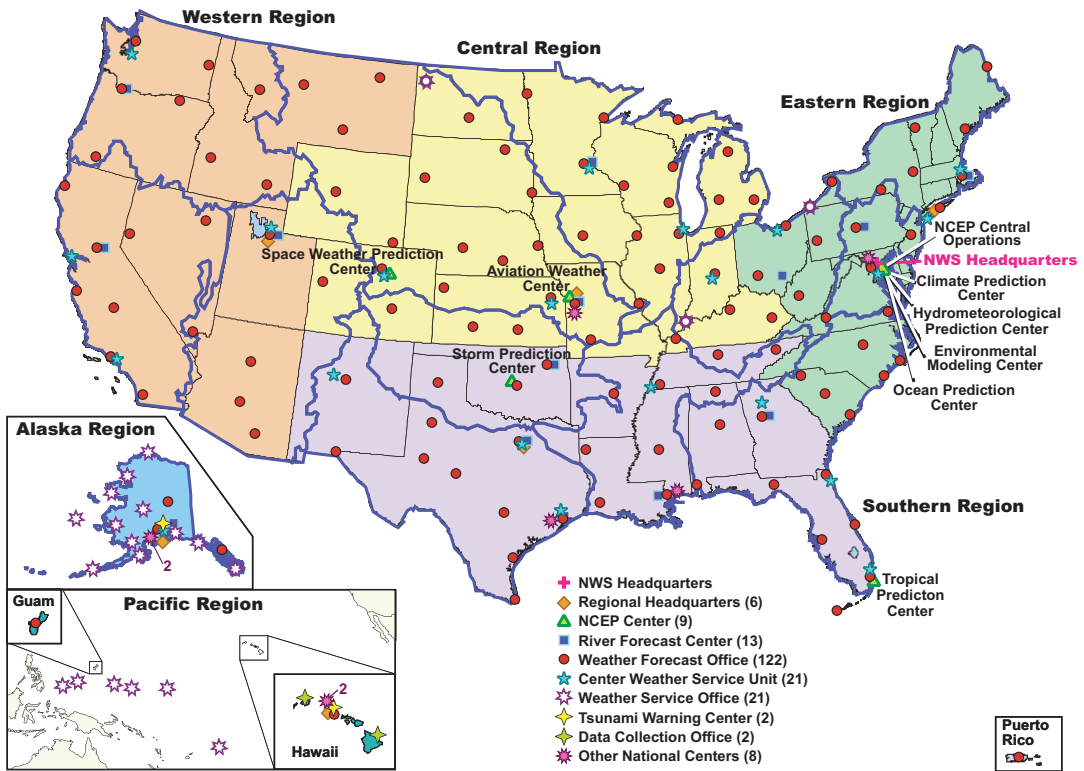
encourage proper action in the face of impending extreme, weather, water, and climate events.

After developing the NWS strategic plan to build a Weather-Ready Nation, the NWS contracted two National Academy reviews of the NWS: a 2012 study by the National Academy of Sciences (NRC 2012) and a 2013 study by the National Academy of Public Administration (NAPA 2013). Both studies validated the Weather-Ready Nation strategic outcome and strongly encouraged NWS to evolve to meet the changing weather, water, and climate needs of the Nation. The NAPA report specifically noted the best place to start in this evolution was to reform NWS's budget structure, Headquarters (HQ) organization, and business processes as essential building blocks to future change, as these had not changed appreciably since the 1990s. The decision to restructure the NWS budget made sense since budgets serve as an effective mechanism to provide the administrative coordination that serves as the basis for the change management envisioned (Brook 2012).

Changes to the HQ organization and associated business processes (governance) made logical sense to align with the restructured budget.

Ultimately, the NAS and NAPA reports proved critical in providing the independent, third-party support for the NWS to gain approval on these changes from NWS's parent agencies, the National Oceanic and Atmospheric Administration (NOAA), the Department of Commerce (DOC), the Office of Management and Budget (OMB), and Congress. In the last several years, NWS has briefed its progress to NAPA on multiple occasions, and members of NAPA continue to recognize NWS's noteworthy progress and provide support as NWS continues on its journey to build a Weather-Ready Nation.

The effort to restructure the budget, reorganize HQ, and establish a NWS Governance Document (required for a transparent and inclusive budgeting, planning and mission execution process across the entire agency) was initiated in 2013. The results and conclusions from this major undertaking, which was approved by Congress in 2014 and implemented by the NWS in 2015, will be described in this paper, along with the benefits that have already been realized and other reflections concerning the effort. The paper ends with a look forward as we now position the NWS to enhance the services required to address



Restructuring the National Weather Service to Build a Weather-Ready Nation, Fig. 2 Map of NWS HQ, regions, National Centers, and field offices

the Nation’s growing needs for weather, water, and climate prediction, especially for extreme weather and water events.

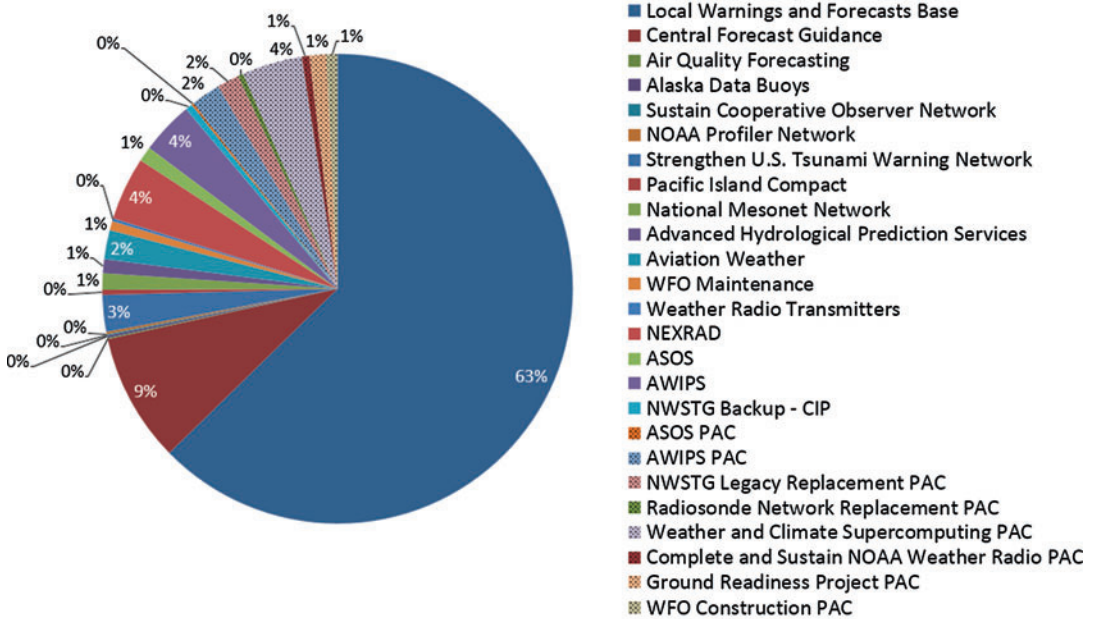
Budget Restructuring

Prior to 2015, the NWS Congressional budget was organized into 25 Program, Project, and Activity (PPA) budget lines across the Operations, Research, and Facilities (ORF) and Procurement, Acquisition, and Construction (PAC) PPAs and was largely categorized by program or operational system (Fig. 3, top panel). These PPAs were difficult to defend and manage, particularly within the Local Warnings and Forecast (LWF) and Central Forecast Guidance (CFG) PPAs, which contain many, but not all, of NWS’s forecast operations. Together, these two PPAs constituted 80% of the NWS ORF budget and 72% of the total

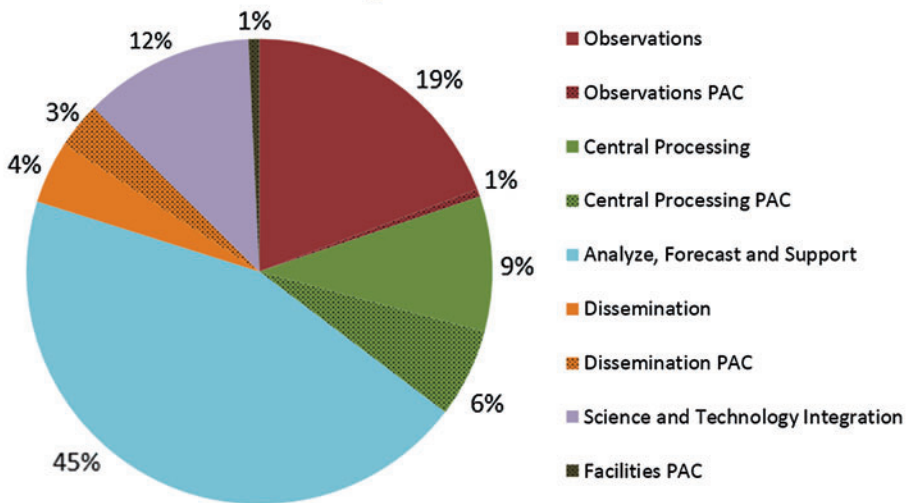
NWS budget. LWF alone contained an assortment of programs and projects at the local level including funding for labor, rents, utilities, and repairs at NWS’s facilities, as well as funding for the National Data Buoy Center and marine observations, other land-based observations, various dissemination, and IT systems in local and regional offices, among other local office expenses.

Since management authority was not aligned with budget authority in the NWS, particularly within these two broad PPAs that constituted a large majority of the NWS budget, the NWS Chief Financial Officer (CFO) was routinely asked to make trade-offs between dissimilar programs and projects when budget shortfalls occurred in the third and fourth quarters of the fiscal year, often with little notice and with little background or insight into the programmatic benefits and risks of those decisions to the NWS mission. For instance, the previous budget

Old Budget Structure



New Budget Structure



Restructuring the National Weather Service to Build a Weather-Ready Nation, Fig. 3 Comparison between the old budget structure (top) and the new budget structure (bottom) for the fiscal year 2014 enacted budget

structure allowed NWS management to trade off infrastructure for forecast operations, areas that are dissimilar yet both essential to the success of the NWS to accomplish its mission.

Furthermore, the old budget structure contained a number of unique observations and information technology programs that also were represented by separate PPAs, restricting the NWS from being able to efficiently and

effectively manage its resources across the suite of observational programs and technologies to deliver the best results for the NWS and the Nation. Perhaps one of the most egregious examples in the old budget structure was three distinct budget lines for the NOAA Weather Radio Program that focused on (1) transmitter upkeep and maintenance; (2) day-to-day operations and maintenance at field sites which predominantly consisted of leases, maintenance services, and telecommunications; and (3) construction, expansion, and upgrades. In this old structure, if resources for leases were expended in one budget line, funds from the other two budget lines could not be used to cover the additional costs without going through the required several-month process to reprogram the funds through Congress and reapportion them through OMB. Overall, this structure did not provide a transparent, logical view of how those decisions mapped into the forecast process noted in Fig. 1 and hindered NWS's ability to effectively select and manage the best mix of programs and projects within schedule and budget.

This budget structure eventually contributed to a mismanagement of funds and an Antideficiency Act violation in 2012. It was discovered that NWS illegally reprogrammed funds in 2010 and 2011 among the various PPAs without notifying Congress as required by law, thereby incurring obligations in excess of available appropriations. According to an analysis by the Government Accountability Office, as well as an internal NWS assessment by Grant Thornton LLC, systemic budgetary pressures, improper levying of common service assessments on the LWF and CFG budget lines, and lack of internal controls culminated in the inappropriate and illegal reprogrammings (Blank 2012).

While corrective action was taken on behalf of NOAA and the NWS to improve internal controls and financial management, independent assessments also suggested that the NWS Congressional budget structure should be reevaluated to increase transparency, flexibility, and accountability. The NAPA report stated, "The Panel finds that in reorganizing budget lines and the HQ structure, it should consolidate responsibility around

operational functions and service delivery...and work towards forecast consistency and sharing of information and policies across regions and offices" (NAPA 2013). The Grant Thornton report suggested several recommendations for improvement, including that NWS should develop standard definitions of budget lines and identify the types of costs that are appropriately charged to budget lines in addition to the programmatic costs (Grant Thornton 2013).

Based on these recommendations, a new NWS leadership team began discussions in 2013 with NOAA, DOC, OMB, and Congress to restructure the NWS budget to be more logical, simpler to understand, and more intuitive to manage. The NWS proposed to restructure the budget into a portfolio-based structure that followed the forecast process described earlier in Fig. 1: Observations, Central Processing (computer infrastructure), Analyze Forecast, and Support, (forecast operations), Dissemination (distribution of information), Facilities (buildings and sites that support the NWS), and Science and Technology Integration (forecast improvement and numerical weather prediction). By organizing the budget along functional portfolio lines, NWS can better identify, plan, and manage the organization's resources.

This new budget structure proposed that the 25 PPAs in the old budget structure be streamlined into 9 PPAs that reflect the individual components of the forecast process and map directly to the 6 portfolios described above. ORF and PAC budget lines were created for the Observations, Central Processing, Dissemination, and Facilities portfolios (Fig. 3, bottom panel). Science and Technology Integration has only an ORF budget line and Facilities has only a PAC budget line. Consolidating the number of PPAs in the budget aligns with best practices, including recommendations made two decades ago by the 1993 National Performance Review on federal government performance (Gore 1993). Budgeting by function also follows best practices. As an example, OMB similarly organizes its federal budget according to functional "categories," regardless of the agency that is responsible (Brook 2012).

This new budget structure provides the NWS with a number of benefits. First, the new structure is more transparent and understandable internally to NWS staff, particularly to those making budgetary decisions, reducing the chance of errors or mismanagement. The new budget structure allows NWS to more easily communicate and defend its budget proposals since the scope and contents of each portfolio are directly correlated to the forecast process that the NWS operates within every day. Furthermore, the new budget structure provides flexibility for trade space analysis within each budget portfolio containing a related set of similarly themed programs, projects, and activities, allowing NWS to more effectively and efficiently resource the suite of programs and technologies that meet the overall requirements of the portfolio. The more logical budget structure also aligns better with the intent of the appropriation process and makes it easier for the administration and Congressional appropriators to plan, appropriate, and track execution of NWS's budgets. Lastly, the budget structure helps drive consistency across the distributed organization of the NWS as all budget categories cut across both HQ and field offices, another recommendation by NAPA. Other government agencies have reported similar benefits from simplifying their budgets. One example is the US Forest Service, which saw an 18% increase in productivity in 2 years due to its experiment with budget simplification (Posner and Rothstein 1994).

In 2014, the NWS tracked obligations against the proposed portfolio budget structure while simultaneously executing against the old budget structure in which the budget was appropriated. This generated a detailed mapping and comparison between the two structures, which in turn helped illustrate the benefits of the new structure to stakeholders and helped prepare NWS's workforce for the upcoming changes. After multiple briefings with NOAA, DOC, OMB, and Congressional constituents illustrating the benefits described above, NWS received approval from Congressional appropriation and authorization committees in 2014. NWS officially began operating in the new budget structure on April 1, 2015.

Headquarters Reorganization

Before, during, and since the modernization of NWS in the 1990s, the continuous effort to sustain and improve the field office structure has challenged the administrative NWS HQ structure. Many functions, both new and evolving, were often placed within a HQ office jurisdiction due to skill sets of the employees rather than organizationally where the function made sense. Over time, several offices within HQ lost role clarity, and many lost budget authority over areas they were considered responsible for. The restructuring of the NWS budget provided an opportunity to explore changes to the NWS HQ organization that would improve role clarity, return budget authority to the appropriate leaders, and improve accountability and performance. In August 2013, NWS gathered feedback on functional needs, priorities, issues, and gaps to better support NWS field offices in providing observations, forecasts, warnings, and associated services necessary to build a Weather-Ready Nation. The process was inclusive of the NWS's employees' union, the National Weather Service Employees Organization (NWSEO). The feedback was consolidated into 27 major findings or gaps.

In September of 2013, the NWS Budget and Headquarters Restructuring Project was established by NWS leadership, who charged a HQ Transition Team with developing a new HQ organizational structure and associated NWS Governance Document, based on the 27 identified findings and gaps. From the onset of the project, NWS leadership consistently communicated that this effort was not about creating a smaller NWS, but about creating a smarter and more efficient NWS that aligns to the new budget structure and is able to work toward the strategic outcome of Building a Weather-Ready Nation. The team researched government-wide best practices from organizations such as the Government Accountability Office (2012) and The Bridgespan Group (2009) and other international meteorological agencies and organizations across the world including the World Meteorological Organization (WMO), the UK Met Office (UKMO), and the

Australian Bureau of Meteorology (BOM), as well as recommendations of past NWS teams.

In December 2013, the HQ Transition Team developed three options for the future NWS HQ organization structure with pros and cons. The first option was status quo, which primarily consisted of clarifying functional responsibilities. A second option was an organizational structure that assigned budget planning responsibility to “portfolio leads” largely outside of the primary HQ structure. A third option was an organizational structure that created six HQ Portfolio Offices directly aligned with the portfolio-based budget structure and responsible for budget planning, budget execution, and management of HQ functions for their respective budget portfolios.

The NWS Director chose the third option. The key factor driving this decision was a clear linkage between the HQ office structure and the new portfolio-based budget structure, described in detail below. Further, this organizational structure was very different than the current structure, which helped signal internally and externally that fundamental change was required to move forward.

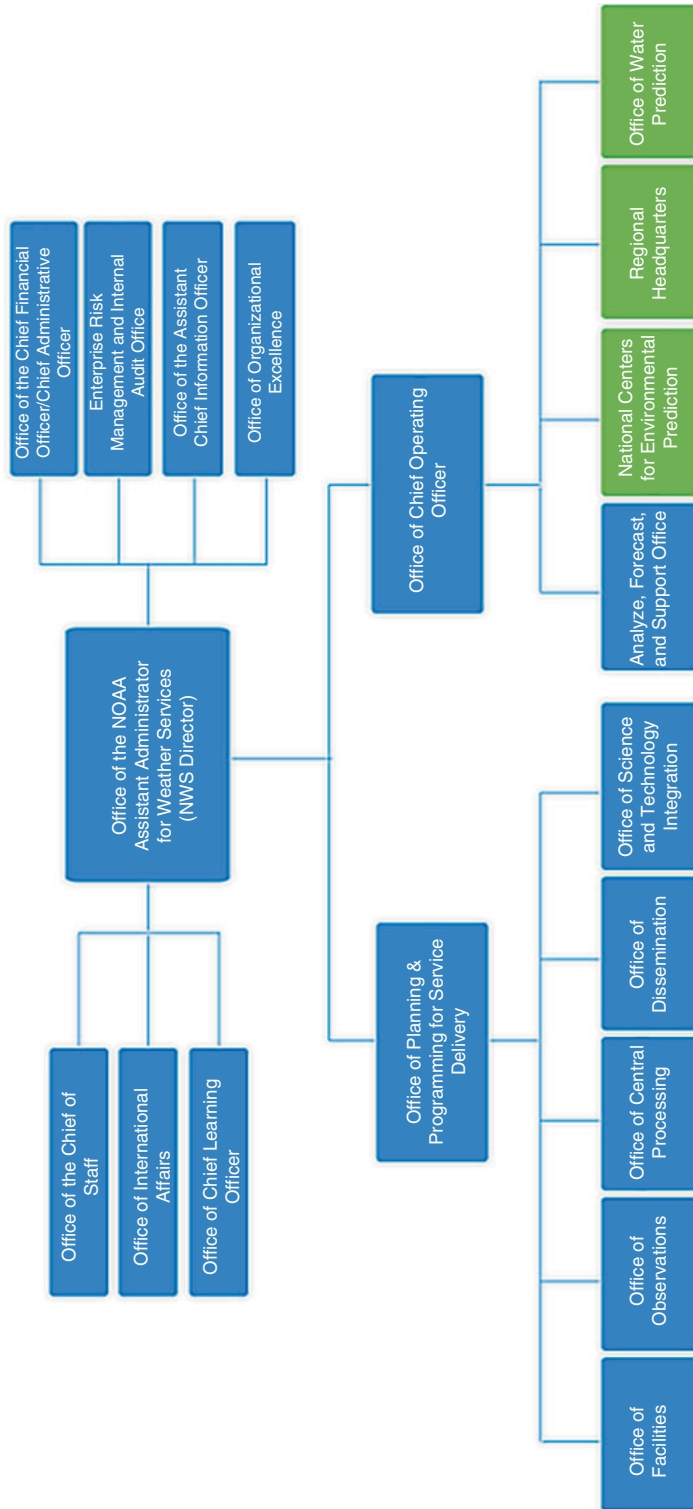
The new proposed HQ structure directly aligned budget and management authority in NWS HQ with one-to-one relationships between the six HQ Portfolio Offices and the six budget portfolios described in section “[Budget Restructuring](#)” to empower and establish clear lines of accountability for budget planning through execution (Fig. 4). Each Portfolio Office Director is responsible for end-to-end planning and budget execution across labor and nonlabor portions of the budget. The UKMO is similarly organized along the functional lines of the forecasting process, which served as an example for the NWS.

The reorganization also created the Office of the Chief Operating Officer (OCOO) and the Office of Planning and Programming for Service Delivery (OPPSD). The OCOO overseeing the “operations side” of the organization was created to enhance integration across the mission operations offices and the HQ “Analyze Forecast and Support Office” which supports the field. With the creation of the OCOO, the NWS, for the first time,

established one office that manages the requirement process and mission operations of the entire NWS field structure. Key roles of the OCOO are to ensure accurate, effective, and consistent delivery of operational products and services, prioritize operational requirements to meet the mission of the NWS, and enhance integration between field offices and HQ in coordination with the offices under OPPSD.

The OPPSD side of the organization was created to house the primary mission enabling functions of the NWS and to develop solutions to the requirements generated on the operations side of the organization. The main role of the OPPSD office is to connect strategic planning with annual planning, ensure the functional integration across all Portfolio Offices to select the best mix of programs and projects to meet field requirements and achieve NWS strategies, and enable corporate engineering standards across portfolios. This change also removed the programmatic planning function for current and out-year budgets from the Office of the Chief Financial Officer (OCFO), a substantial functional and cultural change for the OCFO which had morphed into an office that made both budget and programmatic decisions for the organization, usually with minimal input from HQ or field programmatic offices, as indicated in section “[Budget Restructuring](#).” The new HQ organization is designed to better align roles and responsibilities for programmatic and budget planning with leaders most qualified to develop these plans to meet field requirements, accomplish the mission, and evolve the NWS toward the science-based, service agency envisioned in the NWS strategic plan and the NAS and NAPA Academy reviews.

Additional new offices were created to streamline, add, or increase authority of vital functions. The Office of the Chief of Staff was created to create greater synergy across several corporate staffing functions including Congressional Affairs, Communications, and Equal Opportunity and Diversity Management. The Office of the Chief Learning Officer, reporting directly to the Deputy Assistant Administrator, was created to raise visibility of the importance of education and training for the entire workforce. Previously,



Restructuring the National Weather Service to Build a Weather-Ready Nation, Fig. 4 NWS organization chart after the reorganization. Blue boxes represent HQ offices after the reorganization. Green boxes represent field offices

this function was buried within a HQ office that could not obtain the support required to provide essential training for the organization, leading to major shortfalls in training and exclusion of training for nonoperational employees. Elevating training decisions ensured that NWS continues to invest in its workforce. The reorganization also created an Enterprise Risk Management and Internal Audit Office, bringing a much needed internal review process to enterprise-level risks and issues and largely modeled after the UKMO, and an Office of Organizational Excellence to focus on long-term strategy, external partnerships, organizational health and culture, and continued maintenance of the NWS Governance Document, described in section “[Governance](#).” The reorganization also created the National Water Center, now Office of Water Prediction, reporting to the Office of the Chief Operating Officer to develop and deliver state-of-the-art hydrology prediction and related decision-support services.

The HQ Transition Team spent the spring and summer of 2014 developing roles and responsibilities of each office, division, and branch based on the proposed HQ organizational structure, working extensively with all HQ managers. Over 700 HQ positions had to be mapped from the previous HQ structure to the new structure, along with 34 Senior Executive Service (SES) positions, contracts, and property while redefining NWS organizational coding. The NWS submitted a reprogramming package to notify Congress of the NWS’s intent to reorganize, and in the autumn of 2014, Congress acknowledged with no objections to the proposed HQ organization.

In November 2014, the final reorganization package was submitted to NOAA Workforce Management Office (WFMO) for review and eventual implementation. A HQ Implementation Team led by Steven G. Cooper, a senior manager from field operations and acting Southern Region Director at the time, was assembled to coordinate and lead implementation, ensuring all budget and administrative support systems (travel, human resources, etc.) were updated accordingly. Further, the Implementation Team’s ability to coordinate across NWS and NOAA were critical to its success. On April 1, 2015, both the budget

restructure and the HQ reorganization simultaneously went into effect, less than 2 years after the initial start of the effort. Office Directors accepted responsibility and were expected to assign resources to the functions defined in their respective offices.

Governance

Process to Develop the NWS Governance Document

In order to effectively operate within the restructured budget and reorganized HQ, NWS required a governance that defined the business-related roles, responsibilities, authorities, policies, and processes across the entire organization. Defined governance processes are essential to effectively and inclusively develop a resource management strategy, promote checks and balances and scientific decision-making, and improve strategy implementation and overall performance (Xue and Guo 2013). Prior to 2013, no comprehensive governance document existed in the NWS. While some budgeting and decision-making roles, responsibilities, and processes were defined, they were not connected, and individuals were often not held accountable to follow them. The primary senior-level corporate decision-making council at the NWS was the NWS Corporate Board. In 2012, in the wake of the 2012 Antideficiency Act violation, the Administrator of NOAA instructed the NWS Director to examine the membership, roles, and responsibilities of the Corporate Board.

The internal review found that the NWS Corporate Board should be terminated. The Corporate Board was large, with a majority of the NWS Senior Executive Service as members and with no clear process for setting priorities, establishing annual milestones and budget plans, and defining execution strategies, making it a difficult environment to make decisions. The culture of decision-making in the NWS at the time did not allow for decisions to be made at appropriate levels within the organization, resulting in a decision-making bottleneck and preventing NWS senior leadership from focusing on top priorities and issues. Further,

the meetings were often a mixture of strategic and tactical issues, hampering its ability to focus on strategic initiatives or an effective change management process.

To fix these issues, the NWS researched best practices and case studies from other agencies. The team learned from the UKMO's robust annual planning process, which was integrated into their strategic and budget planning processes and which was fully transparent and inclusive of all offices within the UKMO. To improve decision-making, the team learned from an effort at the Australian Bureau of Meteorology (BOM) to improve their decision-making process. At one time, the BOM suffered from similar issues as the NWS. The BOM organization structure was insufficient for engendering a sense of authority over priorities and decisions, and they had unwieldy corporate bodies that were ineffective in driving toward agency-wide priorities. To rectify this, BOM created a smaller body at the top of the organization that focused on a few key strategic issues but relied on several substructures that focus on operations and administration. The BOM example illustrated that establishing clear roles and responsibilities and pushing down day-to-day operational and business decisions when appropriate are key to a successful corporate decision-making process. Consider also the case of the US Department of Housing and Urban Development (HUD) under Former Secretary Henry Cisneros. Cisneros removed the regional office level and sent approximately 1000 employees to work within local offices. As a result, the agency reported greater decision-making and less resistance in implementing ideas (Posner and Rothstein 1994). Similar to these case studies, NWS has found that pushing decision-making to lower levels of the organization empowers the workforce and accelerates the incorporation of new ideas into the agency, improving morale and promoting more effective and efficient operations.

In early 2014, NWS instituted a transitional governance that guided NWS planning, budgeting, and decision-making as the NWS transformed its HQ and budget structure. The transitional governance helped shift the

governance culture of the organization by promoting transparency and inclusiveness in planning and budgeting across HQ and field offices.

Beginning in January 2014, the HQ Transition Team, also leading the HQ reorganization, began developing the long-term NWS Governance Document that would go into effect after the reorganization and budget restructure. The team was also supported by a small group of three contractors with experience in business process reengineering and project management. The HQ Transition Team established seven Integrated Working Teams (IWTs) associated with each of the proposed governance chapters, to research best practices and ensure the governance development process incorporated a broad set of perspectives from across the organization. Each team consisted of approximately a dozen middle- to senior-level managers from across NWS HQ and field offices and was led by a member of the HQ Transition Team. Table 1 provides a description of the seven chapters developed by these teams. It is worthwhile to note that while the term "governance" often only includes processes associated with decision-making, the NWS Governance Document includes a larger set of business processes spanning strategic and annual planning, budgeting, execution, decision-making, and risk management.

The draft chapters and a shorter Governance Overview Document were sent to all NWS senior executives and senior-level NWS Office Directors for their review. The HQ Implementation Team received and adjudicated 500+ comments. This review process, while time-consuming, was based on the tenets of transparency and inclusiveness that are manifested within governance itself. As a result, the governance gained broad support and was signed and adopted by all 38 senior leaders in April 2015, concurrent with the budget restructure and HQ reorganization. At this time, it was also decided that the governance would be reviewed on a yearly basis and updated based on lessons learned. Since then, the NWS developed and conducted governance-related communications and training and, a year later, performed a thorough review of NWS Governance v1.0, as intended. The review included feedback from

Restructuring the National Weather Service to Build a Weather-Ready Nation, Table 1 Title and description of each NWS Governance chapter

Chapter	Description
Strategic management	The strategic management governance chapter defines the process by which NWS develops strategic goals, objectives, and priorities and the process by which these strategies connect to and influence NWS programmatic and annual plans and budgets
Budget formulation	The budget formulation governance chapter provides direction on planning, preparing, formulating, and submitting the NWS budget to NOAA, DOC, and OMB for eventual inclusion into the President's budget to Congress
Portfolio management	The portfolio management governance chapter defines the disciplined and integrated approach to identify and prioritize NWS requirements and allocate resources to select the best mix of executable programs and projects to meet those requirements within the NWS portfolio budget structure
Annual planning	The annual planning governance chapter defines the annual process for developing organization-wide budgets, plans, and milestones rooted in portfolio management and driven by long-term strategic goals, objectives, and priorities articulated in corporate planning documents, including NWS strategic plans and the President's budget
Budget and program execution and evaluation	The budget and program execution and evaluation governance chapter details how the NWS budget is executed, the roles of OCFO, Portfolio Offices, Execution Offices, and the different types of internal and external budget and program evaluations. The process initiates at the start of the fiscal year with an appropriation and outlines all the steps required to execute budgets, programs, and projects, including quarterly program reviews of all NWS portfolios, crosscutting programs, and field activities
Corporate decision-making	The corporate decision-making governance chapter defines the process for making informed decisions on issues and plans that cut across multiple NWS offices, Portfolio Offices, and/or Execution Offices, requiring input from leaders with diverse expertise and perspectives to select the most appropriate course of action. The chapter defines four corporate councils that make these corporate decisions
Enterprise risk management	The enterprise risk management (ERM) governance chapter defines a framework by which the NWS identifies, assesses, controls, measures, and monitors various risks and opportunities for achieving the organization's strategic and financial objectives. Enterprise risk management within NWS is distinct from program or project risk analysis and assessment. ERM is a process effected by the NWS's leadership, management, and other personnel and is applied in strategy setting and across the whole agency

NWS senior executives, managers, and employees and resulted in a NWS Governance v2.0 which was finalized and signed in September of 2016. NWS is currently in the process of developing Governance v3.0. NWS has also begun developing and tracking governance performance metrics to quantitatively evaluate the effectiveness of the governance and has implemented a Governance Improvement Advisory Board of NWS council secretaries to identify and recommend areas of continuous improvement.

Aspects and Benefits of the NWS Governance Document

The NWS Governance Document addressed many long-standing organizational issues at the NWS. Table 2 describes the improvements made by the NWS Governance Document, the most notable of which include aligning budget authority with management authority in the newly reorganized HQ structure and institutionalizing a transparent and inclusive process for planning, programming, budgeting, and executing NWS's programs and projects rooted in portfolio management and which optimizes the agency's resources.

Restructuring the National Weather Service to Build a Weather-Ready Nation, Table 2 Benefits gained after the implementation of the NWS Governance Document

Before Governance Document	After Governance Document
Governance and HQ management structure not optimized or documented	Governance aligns budget authority with management authority in a reorganized HQ and is transparent internally and externally
Budget formulation not aligned with annual programmatic planning	The Portfolio Offices, with oversight by OPPSD, manage the entire 3-year budget cycle from budget formulation to budget execution
Limited visibility and understanding into strategic management, budget formulation, and annual planning	Entire agency, including the field, directly contributes to strategic management, requirement identification, budget formulation, and annual planning through an annual planning process, annual planning meeting, budget formulation process, and strategic planning meeting
Requirements management is not consistently practiced and is not connected with budgetary decision-making	Roles and responsibilities for the requirements process are defined, and the process is directly connected to the portfolio management process
Poor communication and relationship across HQ and field	Governance promotes a collaborative team culture and approach across HQ and field to plan and manage the mission critical programs and projects of the NWS and ensures communication, inclusiveness, and transparency in the process
Operations offices make their own programmatic decisions, leading to inconsistencies across offices and duplication of effort	Portfolio management process improves resource allocation, drives efficiency and effectiveness, and reduces duplication and inconsistencies across the NWS
Corporate decisions often made at HQ with limited visibility into how NWS decisions are reached	Establishment of four corporate decision-making councils with membership across HQ and field leadership ensuring inclusiveness and transparency and protecting against personality-driven management
No formalized process for enterprise risk management or performance management	Governance develops an Office of Enterprise Risk Management (ERM), an ERM Council, and ERM Governance chapter and provides a foundation for performance management and evaluation
Executing offices are not accountable for executing to agreed-to programmatic plans and budgets	Use of a spend plan agreement between OCFO, Portfolio Offices, and executing offices ensure all offices are accountable based on the agreed-to formulated plan and associated budget. Quarterly program reviews have led to more programs and projects executed on time and within budget

In the governance, Portfolio Directors with technical expertise are empowered to make most budgetary decisions across the entire multi-year budget cycle and across the matrixed NWS HQ and field structure, driving efficiency, consistency, and progress to deliver weather, water, and climate services to the Nation. Financial controls are still preserved within the OCFO. Since the federal government requires each agency to submit budget requests to Congress several years in advance, a robust planning process is required. Having a single Portfolio Director with subject matter

expertise in charge of the multi-year budget cycle for their portfolio supports effective and efficient planning and management of resources connected across the budget timeline. Further, as all HQ and field offices throughout the NWS receive their budgets from one or more of these portfolios, all offices are effectively matrixed into the portfolio structure during the budget planning process, driving consistency, collaboration, and collective planning.

Portfolio Directors identify investments based on validated field requirements, coordinate across

portfolios to include all impacted offices, quantitatively and transparently evaluate investments based on evaluation criteria, approve the investments (some of which may be raised to a corporate decision-making council, as described below), and then prioritize the investments based on other programs and projects, all for the purpose of moving the organization toward its mission, vision, goals, and priorities. This portfolio management process leads to better decision-making based on strategic prioritization and more effective and efficient use of resources.

The governance also defines an out-year budget formulation and planning process for delivering the budget request to Congress and an annual planning process for identifying annual programmatic plans and spend plans associated with NWS's annual appropriations. Both planning processes are transparent and inclusive of both HQ and field offices. In the budget planning and formulation process, Portfolio Directors identify ongoing and new program and project requirements and resource allocations coordinated by OPPSD and then work with OCFO, NOAA, and DOC to develop budget justifications. In the annual planning process, Portfolio Directors identify and prioritize programmatic plans based on validated operational needs and estimated budgets formulated in the previous budget cycle. Both planning processes contain planning meetings defined in governance, approximately 6 months offset from each other, which include all NWS HQ and field senior leadership to ensure the process is inclusive and transparent. These planning meetings also provide time for unique programs that crosscut multiple portfolios to identify and discuss interdependencies. The crosscuts are built into the governance and budget process and include social science, training, and international activities. As noted above, both planning processes require a set of validated, prioritized requirements to base their resource management decisions. Field offices with OCOO are responsible for collecting, identifying, analyzing, vetting, and prioritizing these requirements based on the strategic priorities of the NWS, and the Portfolio Directors are responsible for developing budget

and programmatic plans to address these requirements.

At the conclusion of the annual planning process, the Portfolio Directors, the OCFO, and each HQ and Field Office create a spend plan agreement that defines the milestones and associated budgets that will be executed over the subsequent year. This is an important attribute of the new process as the planning and execution of projects are facilitated by the knowledge that resources cannot be arbitrarily repurposed at the end of the fiscal year, as was occasionally done in the past. Since many of the executing offices are under the chain of command of the OCOO but are provided budgets by the Portfolio Directors under a different chain of command (Fig. 4), these spend plan agreements ensure that the annual plans are executed as intended. Annual programmatic and budget plans are then tracked throughout execution through a quarterly program review, which reviews the plans, budgets, and status over 250 NWS activities and/or projects.

The NWS Governance Document also contains chapters on corporate decision-making and enterprise risk management. Strong decision-making is a key aspect of strong leadership and is a critical component of well-functioning organizations. Corporate decision-making refers to those high-impact decisions that cut across multiple NWS offices and require input from a variety of managers to select the most appropriate course of action. Corporate decision-making councils bring transparency to the decision-making process, unify HQ and field leadership, and ensure opinions from across the organization are heard for key decisions.

There are four corporate decision-making councils in the NWS (Fig. 5). The Executive Council is a small, focused body responsible for making strategic decisions for the agency, with membership consisting of the Director, Deputy Director, COO, OPPSD Director, and CFO. The Mission Delivery Council, chaired by the COO, oversees the requirements process and approves operational and service delivery policies to ensure successful and consistent mission operations. The Portfolio Integration Council, chaired by the Director of OPPSD, is focused on cross-portfolio

Executive Council (EC)

Chair: Director

- Provides NWS strategic direction
- Approves NWS planning and budgeting documents
- Serves as decision maker for high impact, high visibility issues including NWS transformational changes

Mission Delivery Council (MDC)

Chair: Chief Operating Officer (COO)

- Transparently validates and prioritizes Field mission requirements
- Discusses and approves operational and service policies to ensure successful and consistent mission operations

Portfolio Integration Council (PIC)

Chair: Office of Planning and Programming for Service Delivery (OPPSD) Director

- Ensures cross-Portfolio integration to support needs of mission execution
- Ensures the collection of NWS activities align with NWS strategies

Enterprise Risk Council (ERC)

Chair: Deputy Director

- Identifies and monitors internal and external enterprise risks and issues
- Approves mitigation strategies for enterprise risks

Restructuring the National Weather Service to Build a Weather-Ready Nation, Fig. 5 The four NWS Corporate Decision-Making Councils as defined in the NWS Governance Document

integration to ensure that the budgets and timelines of NWS programs and projects across multiple portfolios and across the 3-year budget cycle are threaded together to achieve mission outcomes. Finally, the Enterprise Risk Council, chaired by the NWS Deputy Director, identifies and monitors enterprise risks and issues and approves mitigation strategies.

Reasons for Success and Lessons Learned

It took the NWS roughly 2 years to design, receive all approvals, and implement the budget restructure, HQ reorganization, and Governance Document and all within existing human and budgetary resources. The success of these efforts can be traced to a number of key factors:

1. **Strong vision** – NWS advocated for a strong and effective customer-centered strategic outcome, “Building a Weather-Ready Nation,” which was embraced by the NWS workforce and became a strategic priority by NWS’s parent organizations.
2. **Utilizing a challenge to move forward with the sense of urgency** – One of the key elements of successful change management is to

utilize a challenge to create a sense of urgency (Kotter 1996). NWS concurred with the NAPA review recommendation that NWS couldn’t continue to operate within the old HQ and budget structure to (1) effectively plan and budget for today’s operations and (2) work toward the future NWS vision of a Weather-Ready Nation. Furthermore, there was evidence that NWS employees felt frustrated by the old structure that left many HQ offices disenfranchised in the budget process. As a result, NWS used these recommendations to convince stakeholders and the workforce that NWS needed to change the budget structure and realign HQ support functions immediately to correct previous deficiencies and to transform NWS HQ into a more effective service-oriented organization responsive to NWS’s operational needs today and into the future.

3. **Engagement** – The NWS senior management team engaged in regular and timely communications at all levels of the government, including NOAA, DOC, OMB, Congress, the NWS’s employees’ union, industry partners, and most importantly NWS’s managers and employees. This outreach was critical for success.
4. **Involvement** – The budget restructure, HQ reorganization, and governance development effort directly involved nearly 150 employees,

leveraging a diversity of expertise from across the organization. This purposeful engagement and the associated culture of collaboration, transparency, and inclusiveness were critical to the successful rapid implementation and adoption of the effort by the workforce.

5. **Complementary activities** – By designing the budget structure, HQ organization, and Governance Document to all build on each other and by ensuring they were enacted simultaneously, it improved understanding of the effort, reduced conflicts between old and new processes, and increased the probability that the changes would take hold.
6. **Heavyweight teams** – Clayton Christensen in the book “The Innovator’s Dilemma” describes the use of small, motivated, agile teams attached to senior leadership in situations where the proposed change fits with the organization’s values but not with the organization’s existing processes (Christensen 2000). The budget restructure, reorganization, and governance activities fit these criteria. NWS empowered a small, agile, heavyweight team of leaders, many of who were in their early to mid-careers and motivated to make significant, lasting change for the NWS that would impact their careers. With top management support, these teams were empowered to leverage input from across the organization to create and implement the changes quickly and effectively.
7. **Understanding level of support** – The team, through continuous engagement, adjusted expectations based on what could and could not be accomplished given the sentiment of NWS’s workforce, its employees’ union, partners, and stakeholders. For instance, changing working conditions was an element of the reorganization that would have encountered strong opposition from NWS’s employees’ union, NWSEO. As a result, the NWS did not pursue changes that were negotiable at first, but instead focused on changes within management’s rights. It was then easier to negotiate changes in working conditions on a case-by-case basis after the reorganization.

8. **Continual leadership attention and feedback** – Through the heavyweight team structure, NWS leadership provided continual attention, guidance, and unwavering support throughout the entirety of these change efforts, removing roadblocks, making adjustments based on lessons learned, and paving the way to success.

NWS must remain vigilant to ensure that the organization continues to move forward. As with every change management effort, sliding backward is always a risk. Further, change in the federal government is often more difficult than in industry, as change and innovation are often at odds with conservative bureaucratic culture (Cels et al. 2012). Thus, it is even more important for NWS to battle these headwinds with a sustained effort to continually engage with stakeholders and employees, communicate, incorporate feedback, reassess, analyze, and improve.

Conclusions

From 2013 to 2015, the NWS planned and implemented an ambitious restructuring of its Congressional budget, reorganization of its Headquarters, and development of a new governance to define core business processes, all within existing resources, and completed within a short two year period. These actions were initiated in response to serious budgetary mismanagement issues and multiple National Academy reviews recommending that foundational reform of budgetary and management structures and processes were needed. In 2016, after the effort was completed, the NAPA Panel on Executive Organization and Management commended the NWS for:

- Adopting, tracking, and reporting on the NAPA recommendations provided in the study.
- Rebuilding basic competencies and orienting the NWS toward the outcomes it wants to achieve.
- Relating organizational units and resources to mission success.

- Engaging internal and external stakeholders in support of mutual goals.
- Addressing governance and change management as a shared responsibility of management and employees at all levels, and through the use of a carefully and inclusively developed NWS Governance Document, all NWS senior leaders are aligned in the support of the roles, responsibilities, and processes therein.
- Accomplishing the budget restructure, HQ reorganization, and governance development in roughly 2 years, greatly exceeding expectations.

Elements of the transformation instituted at the NWS are also in the process of being implemented at other line offices in NOAA, and a large component of the US Geological Survey has already used this framework to restructure their organization. In summary, this effort is a successful example of federal government reform that is improving NWS's service delivery to the Nation.

These changes to NWS's budget, organization, and governance have also provided a solid foundation from which to tackle future transformational changes to NWS's operating model that are ultimately needed to achieve the Weather-Ready Nation vision and create an NWS that is second to none. The ultimate goal of the NWS as embodied by its mission statement is not just to provide weather, water, and climate information but to do so "for the protection of life and property and the enhancement of the Nation's economy" (National Oceanic and Atmospheric Administration 2011). Overall, NWS employees are highly motivated and inspired by NWS's mission, as described in the book "Mission Mystique" (Goodsell 2011), which will help catalyze future change to fully realize this incredibly important mission.

To fully realize its mission, NWS will need to increasingly commit its resources toward understanding and prioritizing the needs of its core governmental partners working in emergency management, water management, disaster management, aviation, and other closely related fields as was recently codified in the Weather Research and Forecasting Innovation Act signed into law in

April 2017 (H.R. 353, 2017). NWS accomplishes its mission of protecting life and property in large part through these partners. Addressing partner requirements and needs will, with increasing agility, transparency, and effectiveness, flow through the budget and realigned NWS HQ described in this paper to produce an ever more responsive set of tools, products, and services delivered from the NWS to those partners.

Of course, this won't be easy. Getting there will require a robust requirements process, changing what and how the NWS measures itself and applying change management techniques. Notably, it will also require the NWS culture to become more customer-centric. Yet, by leveraging NWS's new budget, organization, and governance, NWS is poised to evolve its products and services and engage with its partners, customers, and stakeholders to advance the United States' weather, water, and climate enterprise and work together to build a Weather-Ready Nation.

Cross-References

- ▶ [Accounting, Budgeting and Financial Management](#)
- ▶ [Budgeting and Financial Management](#)
- ▶ [Bureaucracy](#)
- ▶ [Governance](#)
- ▶ [Governance and Public Administration](#)
- ▶ [Leadership and Public Management](#)
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