



H.R 2227 – Strengthening the Resiliency of Our Nation on the Ground Act

Legislative Analysis and Program Design

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The purpose of this report is to provide an implementation plan for H.R. 2227 the Strengthening the Resiliency of Our Nation on the Ground (STRONG) Act, and thereby assumes its passage and enactment. This report considers the goals of the STRONG Act and introduces a program design to ensure its successful implementation. As part of the program design, the report provides staffing, budgetary, and revenue plans, a timeline for completion, as well as evaluation criteria to measure the program's success. The report was prepared by a team of graduate students studying environmental science and policy at Columbia University's School of International and Public Affairs in New York City.



The STRONG Team with Faculty Advisor Lloyd Kass

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Executive Summary

Extreme weather is a nationwide problem with significant economic and social costs. Over the past 30 years, there have been more than 130 weather events in the United States causing at least \$1 billion in damages each (Peters, 2015). These weather events were responsible for more than \$880 billion in combined losses and over 16,000 deaths (National Weather Service, 2016).

Resilience is the ability to prepare for, recover from, and adapt to adverse events, such as extreme weather. Extreme weather events include hurricanes and floods, tornadoes, droughts, extreme heat and cold, and severe or unseasonable weather. Effective resilience-building in the United States is often hindered by a lack of coordination and communication between levels of government, across jurisdictions, and between decision-makers and the scientific community.

H.R. 2227, the Strengthening the Resiliency of Our Nation on the Ground (STRONG) Act (the Act) seeks to address these issues and establish a national resilience strategy. The Office of Science and Technology Policy (OSTP) in the Executive Office of the President will oversee the Act's implementation. They will lead a Gap and Overlap Analysis of federal policy to identify: existing tools and funding sources for resilience, practices that unintentionally hinder these efforts, and opportunities for increased collaboration between agencies. To assist with this effort, OSTP will establish an Interagency Working Group of relevant federal agencies, as well as an Advisory Group of state, local and tribal representatives to provide input on the ground resilience needs. The results of this analysis will be incorporated into a National Extreme Weather Resilience Action Plan (Action Plan). This Action Plan will provide a cohesive national strategic plan for extreme weather resilience. The Director of the Office of Science and Technology Policy will submit a draft of the Action Plan for public comment 14 months after the Act's enactment.

The Federal Emergency Management Agency (FEMA) will be responsible for designing and setting up an online, publicly-available Information Portal containing best practices, available funding opportunities, as well as other data that could provide useful for state and local resilience planning. FEMA will also oversee the implementation of the finalized Action Plan. Each member of the Interagency Working Group will appoint a Senior Resiliency Officer to oversee the agency's progress on its responsibilities outlined in the Action Plan and to serve as the agency lead in ongoing coordination efforts.

Current resilience planning efforts are often uncoordinated and disjointed, greatly hindering their effectiveness. A cohesive national framework that incorporates existing resilience initiatives and improves coordination between jurisdictions and levels of government is necessary to improve the nation's resilience to extreme weather events. The STRONG Act will optimize resources and identify new opportunities for mitigating the severe economic and social impacts of these events, with the goal of building a stronger, more resilient nation.

Section I: Introduction

The United States does not have a national strategy to prepare for and respond to extreme weather events. Federal agencies such as the Federal Emergency Management Agency (FEMA), the National Oceanic and Atmospheric Administration (NOAA), the US Department of Agriculture (USDA), and the Army Corps of Engineers have policies related to resilience-building, but such efforts are often uncoordinated and sometimes contradictory. Resilience efforts have not yet been integrated into a cohesive national framework. The U.S. Government Accountability Office has found that these and related factors has led to confusion at the local level over how to work with federal agencies and how to effectively use available funding (U.S. GAO 2015 Report).

Extreme Weather: Heavy precipitation, hurricanes, storm surges, tornadoes, other windstorms, extreme heat, extreme cold, and other severe or unseasonable weather events.

Resilience: The ability to prepare and plan for, recover from, and more successfully adapt to extreme weather events in a timely manner.

The Strengthening the Resiliency of Our Nation on the Ground (STRONG) Act aims to remedy these problems and to “minimize economic and social costs resulting from losses of life, property, well-being, business activity, and economic growth associated with extreme weather events by ensuring that the United States is more resilient to the impacts of extreme weather events in the short- and long-term” (Peters, 2015). The average cost-benefit ratio for mitigation activities is 4.0. In addition, communities typically experience multiple social benefits from resilience planning including increased community awareness, resident peace of mind, and heightened sense of community (National Institute of Building Sciences, 2015).

The STRONG Act proposes three key program deliverables to achieve its strategic vision for extreme weather resilience:

- **Conduct a Gap and Overlap Analysis** of current and planned federal agency activities to identify existing resources and funding for resilience efforts, policies that unintentionally hinder resilience, and opportunities for collaboration between agencies and with state and local stakeholders.
- **Establish an Information Portal** that will serve as an online, publicly available resource for use by federal, state, local and tribal stakeholders and direct them to key data, tools, and funding to inform resilience-enhancing efforts.
- **Create and implement a National Extreme Weather Resilience Action Plan** to communicate existing resources and programs and to promote federal coordination with existing regional entities, state and local governments, and private stakeholders.

South Carolina Floods and an Unprepared Nation

In October 2015, South Carolina experienced record-breaking rainfall from Hurricane Joaquin. The Midlands of South Carolina received 6 months' worth of rain within just 48 hours. The resulting floods led to the deaths of 19 individuals and caused \$1.5 billion in damages across the state. While some flooding was to be expected with this quantity of rain, a 2016 report from Northeastern University's Center for Resilience Studies identified several planning gaps and failures that exacerbated the impacts of the storm (Flynn, 2016).

South Carolina's ability to effectively prepare for and respond to the storm was hindered by the following factors:

- ***Uncoordinated and inconsistent flood management across jurisdictions.*** *No regional watershed management was in place. As a result, water diverted from one municipality often ended up pooling in another location unprepared for the additional influx of water. Furthermore, state officials did not effectively apply flood management practices to private lands, and failed to adequately enforce regulations on privately-owned dams.*
- ***Incomplete data and inadequate tools.*** *The available Hazus flood models did not meet the needs of emergency managers and state officials in preparing for the disaster. Hazus is a tool created by FEMA utilized across the nation to identify areas at risk of earthquakes, floods, and hurricanes. During the storm, Hazus models proved unreliable at estimating the amount water that would be pooling and how quickly it would accumulate. Additionally, officials had not adequately engaged the scientific and academic communities regarding resilience planning and disaster preparedness.*
- ***Confusion between different levels of government.*** *State and local officials misunderstood the timing and extent of federal assistance. FEMA relief funding aims to restore communities to pre-disaster conditions, but local decision-makers wanted the funding to help make communities more resilient to future flooding. Additionally, as is standard practice FEMA aid was disbursed immediately following the disaster, before state and local officials had a clear understanding of how recovery will progress. As a result, resilience and recovery funds were not allocated in an efficient or optimal manner and some areas in need of long-term support received little (Flynn, 2016).*

The failure to standardize planning efforts across jurisdictions, educate decision-makers and at-risk communities on available resources, and engage the scientific communities are problems endemic to resilience planning across the nation. These issues must be addressed in order to reduce the social and economic costs of all extreme weather events on American communities.

Section II: Political Background

The STRONG Act was first introduced by Senator John Kerry (D-MA) as S.3691 during the 112th Congress. It was cosponsored by Senators Kirsten Gillibrand (D-MA) and Frank Lautenberg (D-NJ), and was referred to the Committee on Commerce, Science, and Transportation where no further action was taken. The bill was reintroduced during the 113th Congress by Senator Gillibrand. A companion bill was introduced in the House of Representatives by Representative Scott Peters (CA-52). This companion legislation was referred to the Subcommittee on Economic Development, Public Buildings and Emergency Management, where no further action was taken.

Congressman Peters reintroduced the STRONG Act during the 114th Congress. There is no Senate companion bill. The STRONG Act currently has 21 cosponsors, and has been referred to the Subcommittee on Water Resources and Environment. No substantive changes have been made to the bill since it was first introduced in 2012 (Congress.Gov).



Congressman Scott Peters (CA-52)

Section III: Program Components



Source: PBS

Program Components

The Office of Science and Technology Policy will work with a diverse range of stakeholders to establish a cohesive national resilience strategy. Relevant federal agencies will report on their current policies and activities related to extreme weather resilience. Additionally, state, local, and non-governmental entities will provide input on their needs and concerns based on past experiences with federal agencies. Special consideration will be given for the concerns of tribal entities and other populations most vulnerable to extreme weather, but often most constrained in resilience planning by financial, legal or other structural limitations.

Interagency Working Group

The Director of OSTP, with support from the Department of Homeland Security, is responsible for establishing and chairing an Interagency Working Group (Working Group). This Working Group is composed of representatives from relevant federal agencies and offices within the Executive Office of the President. Included in the Working Group are agencies that:

- Received budget appropriations for weather- or climate-related activities in Fiscal Year 2016,
- Have policies or activities related to resilience or disaster planning, or
- Fulfill key sector requirements outlined in the STRONG Act.

Key sectors described in the STRONG Act:

Agriculture, forestry and natural resources management, water management, energy supply and transmission, infrastructure, communications, housing, national security, insurance and emergency preparedness.

Advisory Group

The Working Group will work closely with an Advisory Group made up of state, local, tribal and nongovernmental representatives. Under the requirements outlined in the Act, this group must include one representative from the National Emergency Management Association, seven representatives from states and state associations, and eight representatives from local entities and associations, including one tribal entity and one major metropolitan area (Peters, 2015). The Advisory Group was designed to include a diverse membership with a broad range of views and concerns. Efforts were made to ensure that all regions of the country are represented as each region experiences different weather threats and therefore has different needs.

Working Group and Advisory Group compositions are outlined in Appendix I.

Coordinating Entity

The Coordinating Entity is responsible for establishing and maintaining the Information Portal, as well as for coordinating and tracking progress on the implementation of the Action Plan. The Coordinating Entity must be a member of the Working Group. Due to its experience in disaster relief and resilience building, FEMA will be the program's Coordinating Entity.

Senior Resiliency Officers

Each member of the Working Group will appoint a Senior Resiliency Officer to aid the Coordinating Entity in implementing the Action Plan. The Senior Resiliency Officers will facilitate the implementation of their agency's responsibilities outlined

in the Action Plan, monitor progress and performance on these responsibilities, and report this information to FEMA. The Senior Resiliency Officer will also be the agency lead in ongoing resilience coordination efforts (Peters, 2015).

Gap and Overlap Analysis

To design an effective national resilience strategy, OSTP needs to first understand the current state of federal resilience planning. The Interagency Working Group will conduct a Gap and Overlap Analysis of existing federal policies, in consultation with the Advisory Group. This analysis will identify existing and planned federal resilience programs, areas of interagency collaboration and coordination, and gaps in federal policy. It will also look for policies that unintentionally hinder extreme weather resilience, as well as policy contradictions between agencies. The Working Group will recommend solutions to these issues as they are identified, including modifications of

existing programs, or requests for additional resources (Peters, 2015).

Ultimately, the Working Group will establish a Federal Government-wide working vision for extreme weather resilience in the short- and long-term. This vision will include specific goals for the key sectors outlined in the Act, and an overview of the interdependencies between these sectors (Peters, 2015). Advisory Group members will provide input throughout this process based on their experiences with current federal policies. It is important that their concerns are addressed at this stage, as the results of the Gap and Overlap Analysis will greatly influence the content of the Extreme Weather Resilience Action Plan. Figure 1 provides examples of existing federal resilience policies and related gaps that might be identified throughout the Gap and Overlap Analysis.

NOAA

Identified existing resilience program: The NOAA administered Coastal Zone Management Program improves coordination between federal and state entities in the management of the nation's coasts. The program acts as a check on the fragmented control of these regions, which could otherwise result in overdevelopment. It was designed to create a more integrated approach to coastal management that would protect federal interests, while preserving state autonomy.

Potential identified gap: NOAA updated the program in 2014 to incorporate greater consideration for climate change in coastal management, and has made \$1.5 million in competitive funding available to help states improve their coastal management programs. The biggest weakness of the program is that it is voluntary and does not mandate any particular set of elements, providing states and local governments with sufficient discretion to move ahead with flood-prone development (NOAA, 2016; Tarlock, 2016).

Army Corps of Engineers

Identified existing resilience program: Studies and research conducted by the Army Corps of Engineers, including the North Atlantic Coast Comprehensive Study and the Resilient Lands and Waters (RLW) Initiative, provide useful information on extreme weather resilience (US Army Corps of Engineers, 2016).

Potential identified gap: The Army Corps of Engineers' current funding structure discourages basin wide planning, maintaining its reliance on hard structures, and allowing levees to fall into disrepair, with the end result that the Corps has not achieved integrated and effective flood management yet (Tarlock, 2016).

Figure 1: Examples of gaps and overlaps in NOAA's and Army Corps of Engineers' resiliency efforts

Information Portal

Currently, information on resilience planning, funding opportunities and other relevant data for state and local officials is spread across individual federal agency websites, or may not be easily accessible. As Coordinating Entity, FEMA will be responsible for setting up and maintaining an online, publicly-available Information Portal for use by federal agencies, state and local governments, businesses, and ordinary citizens. The Information Portal will incorporate relevant data from the Gap and Overlap analysis, including reports, guidance documents, case studies, and sources of public funding. Additionally, the consulting firm will send out a request for information to companies, nonprofits and foundations seeking sources of private funding, existing initiatives, and technical knowledge for inclusion in the Information Portal.

The Information Portal will be a database to search for funding opportunities, planning tools, and other relevant information. It will direct users to salient data and tools that can inform and improve resilience-building initiatives (Peters, 2015). The portal will act as a complementary tool to existing federal open data efforts, such as data.gov.

National Extreme Weather Resilience Action Plan

Based on the results of the Gap and Overlap Analysis, the Office of Science and Technology Policy will draft a National Extreme Weather Resilience Action Plan (Action Plan). This Action Plan will codify the results of the Gap and Overlap Analysis and establish a cohesive national strategy

for extreme weather resilience.

Additionally, it will seek to improve federal support for state, regional and local resiliency efforts.

The Action Plan will include the following information:

- Existing and planned federal agency policies aimed at improving state and local extreme weather resilience
- Federal grant programs for resilience planning or recovery efforts
- Federal policies unintentionally hindering resilience that need to be remedied
- Explanations of expected changes in the severity and frequency of extreme weather events and the impacts of these changes at all geographic levels
- Existing federal tools and data that aid in the forecasting and modeling of extreme weather events
- Recommendations for strengthening the federal government's ability to provide reliable and accurate forecasts and models
- Opportunities for improved federal resilience planning such as updates to existing programs, suggestions for new programs or policies, and areas for collaboration and coordination between agencies.
- Opportunities for collaboration and coordination between federal agencies and state or local agencies, and private entities (Peters, 2015).

Lessons in Resiliency Planning from Australia



**Brigade in New South Wales, Australia training residents in preparing for bushfires.
Photo by Damien Ford, NSW Rural Fire Service**

The Australian Government developed their own nationwide resilience plan, the National Climate Resilience Adaptation Strategy, which describes a set of strategies and principles to promote effective resilience building. Importantly, the resilience plan recognizes extreme weather as one of the greatest pending risks to the health of Australia's citizens and outlines ways to maintain national well-being in the context of a changing climate. In addition to human health risk, the Australian Government recognizes the high economic cost of extreme weather events, finding that for every \$1 invested well in building resilience delivers at least \$10 in eventual savings. The strategy includes an identification of risks, relevant information for key sectors, resilience best practices, and recommendations for disaster risk management. The Australian Government also aims to ensure that its own policies and initiatives do not hinder the capacity of the private sector, states, and territories to independently manage their risks (Commonwealth of Australia, 2016).

Section IV: Program Design



Source: Paradoxoff Planet

Program Design

Staffing

The program will utilize existing Office of Science and Technology Policy staff to maximize efficiency and minimize cost. Personnel from the Director's Office, the Environment & Energy Division, the Office of the Chief Technology Officer, and the Budget & Administration Division have been selected based on their current scope of work. These staff will be assigned specific tasks required for the completion of the program deliverables, as detailed in Appendix II.

An external consulting firm will assist the Office of Science and Technology Policy in administering the STRONG Program. It is estimated that 5-7 individual consultants will be required to complete the program deliverables in 14 months. The consulting firm will be a turnkey solutions provider, able to provide three forms of program support:

- Strategic Advisory Services to assist the Senior Advisor to the Director of OSTP in developing a project roadmap and a timeline of intermediary tasks.
- Project Management Services including, but not limited to, organizing and facilitating meetings of the Working Group and Advisory Group, liaising with the detailees regarding the Gap and Overlap Analysis, and providing general administrative and logistical assistance.
- IT services for the creation and expansion of the Information Portal.

The roles and responsibilities of the consultants are outlined in Appendix II.

Timeline

There are two distinct phases of the program's implementation. Phase I, the program development period, refers to the first 14 months following the bill's enactment. The program's implementation period, or Phase II, begins once the final National Extreme Weather Resilience Action Plan is published in the Federal Register.

During Phase I, program staff must complete the Gap and Overlap Analysis and draft the National Extreme Weather Resilience Action Plan, as well as begin initial development of the Information Portal. A detailed chart outlining the key milestones, responsible individuals, and schedule for each of the program's components are detailed in Appendix IV.

Phase I activities will commence on January 1, 2017. As the Gap and Overlap Analysis serves as the foundation for both the Information Portal and the draft Action Plan, it will be the focus during the first six months of program activities. Work on the Action Plan will begin in July 2017 as work on the Gap and Overlap Analysis is winding down. However, the Gap and Overlap Analysis will continue at a decreased level during the rest of Phase I. Relevant information identified during the Gap and Overlap Analysis will be integrated into the Information Portal during the first 14 months. Appendix VI outlines key milestones for Phase I activities.

Budget

Funding will be attained through different means during the two phases of the Act's implementation. Congress will appropriate funding for the activities performed during Phase I, as well as for the long-term maintenance of the program. Funding for on the ground resilience activities during Phase II will come from new and existing federal, state, local and private grant programs and resilience initiatives.

Phase I

The Program budget for Phase I will cover expenses related to the completion of the Gap and Overlap Analysis, the drafting of the Action Plan, and the initial development of the Information Portal. The total cost for these activities is \$2,437,415.

A detailed program budget, broken out by deliverable and quarterly cash flow needs, can be found in Appendix V. To simplify budgeting for the 14-month timeline of

Phase I, the first two months of the following fiscal year are included in Q4. Cash flow needs will peak during the second quarter and then begin to taper, with the lowest anticipated needs in the first quarter of 2018.

The Gap and Overlap Analysis and the drafting of the Action Plan will each require 40% of Personal Services budget, while development of the Information Portal will utilize the remaining 20%. Conversely, 50% of OTPS expenditures will occur during the development of the Information Portal, with the remaining fifty percent divided equally between the Gap and Overlap Analysis and the Action Plan. OTPS costs are higher for the Information Portal as it is expected that the consultants will spend at least 50% of their total hours working on its development and integration (refer to Figure 2).

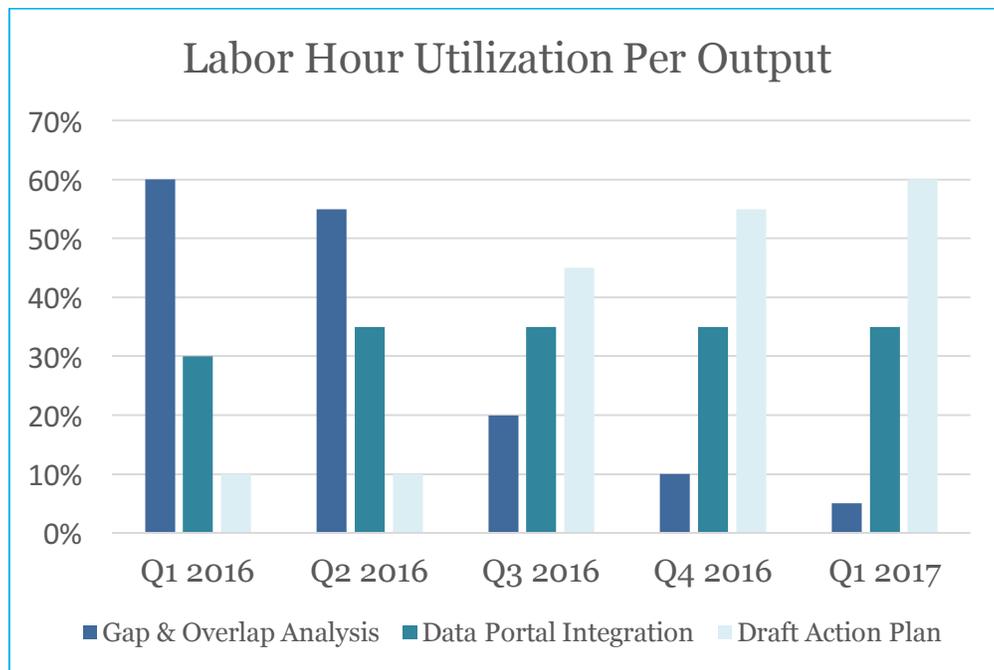


Figure 2: STRONG Act Labor-Hour Utilization per Program Component

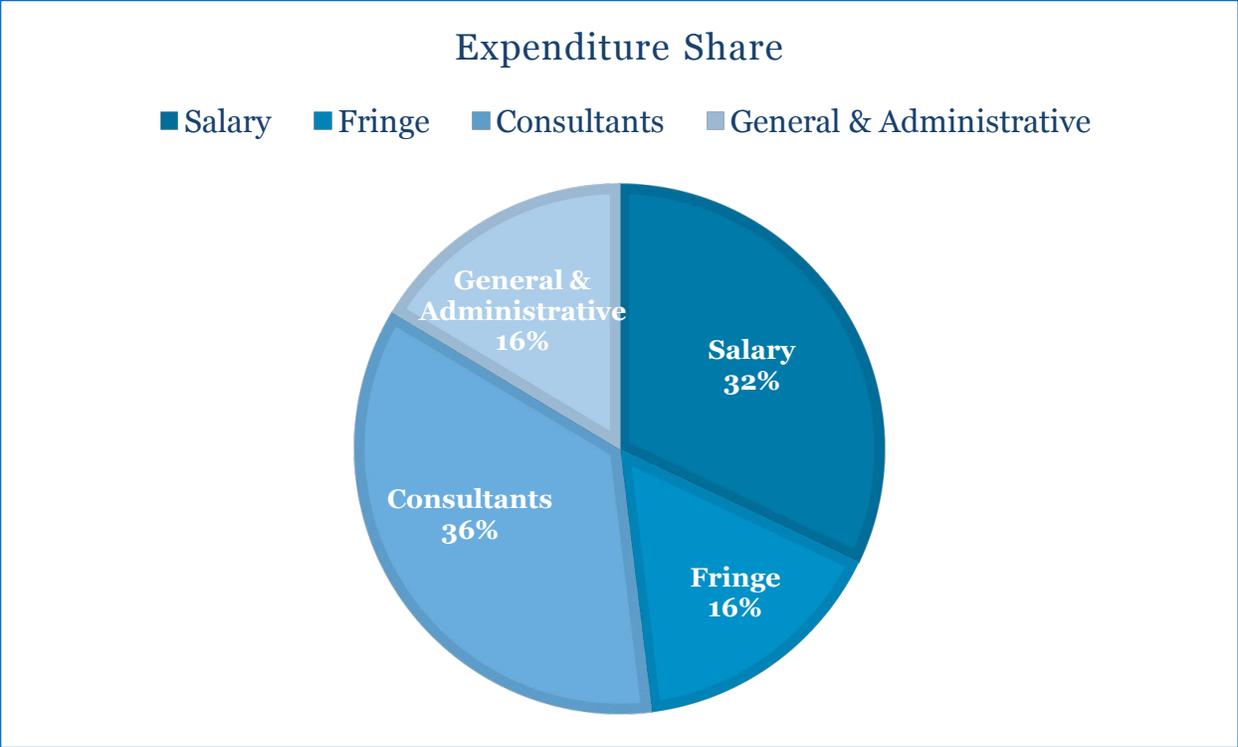


Figure 3: Expenditure Share Chart

Budget Elements

Salary – Total: \$781,254

Costs have been calculated using employee salary data from the Office of Science and Technology Policy extrapolated to the 14-month time period of Phase I. Each employee’s 14-month salary was multiplied by the fraction of time they’re expected to work on the project to obtain their total salary cost to the program.

Consultant – Total \$865,534

Consultant costs assume that there will be seven full-time individuals working a standard 2,080 work week per year, expanded to 2,434 for the 14-month timeline. These hours are derived from the annual salary limitations for consultants as outlined by the Federal Office of Personnel Management. Hourly consultant rates vary

based on level of service. The hourly consultant rate range used is \$60 - \$170.

Fringe – Total \$390,627

Fringe costs are calculated as 50% of salary costs and are comprised of FICA, unemployment, retirement, and health insurance costs.

General & Administrative –\$400,000

General & Administrative costs account for 16% of Phase I total program expenditures and include relevant allocations for equipment, medical supplies and expenses, space costs, liability/property insurance, meeting supplies, office supplies, internet and phone services, postage, and printing.

Phase II

In Phase II, funding is necessary to implement the resiliency solutions described in the Action Plan. These solutions could include, but are not limited to, building infrastructural resilience and improving forecasting methodologies. Federal agencies, private sector companies, and non-governmental organizations that are already supporting similar activities will be the main sources of funding for these activities. These opportunities will be integrated into the Information Portal so that state, regional, and local officials can obtain information on potential sources of funding assistance for their resilience initiatives. Congress-appropriated funding will support ongoing development and maintenance of the Information Portal.

Private sector funding will be leveraged through various mechanisms, including green bonds, catastrophe bonds and climate risk insurance. As an example, in the aftermath of Hurricane Sandy, the New York City Metropolitan Transit Authority (MTA) found that the traditional insurance avenues utilized for insurance contracted dramatically. Accordingly, the MTA worked to develop an innovative solution and secured \$200 millions of insurance protection in the form of catastrophe bonds issued by MetroCat Re Ltd., a special purpose insurer. Other private sector constituents assisted with the deal's transaction, including Raymond James and Associates, Inc. as financial advisor and Goldman Sachs and Co., as an underwriter (Metropolitan Transit Authority). Additionally, state and local governments will be encouraged to engage with the

private sector and to form public-private partnerships with companies working on post-disaster recovery and the development of resilient infrastructure. Additional examples of funding opportunities are outlined in Figure 4.

Private Funding

- **The Resilience Fund** – a recurring private equity fund managed by Resilience Capital Partners that recently raised \$300 million for investment in market solutions for climate resilience.

Public Funding

- **NOAA Grants** – NOAA's National Ocean Service and Fisheries Service are providing a combined \$9 million in competitive grant awards through the Regional Coastal Resilience Grant Program and Coastal Ecosystem Resilience Grant Programs.
- **NSF Prediction of and Resilience against Extreme Events (PREEVENTS)** – this program awards grants to research projects focused primarily on improving our ability to predict and model extreme weather events at various spatial and temporal scales.

Public-Private Partnership Funding

- **Resilience AmeriCorps** – grants provided to support community extreme weather and climate change resiliency planning and implementation efforts.

Figure 4: Funding Examples



**Kresge Foundation granted more than \$ 4 million for resiliency efforts across cities.
Photo by Ed Serecky/ Kresge Foundation**

Planning Ahead

The Kresge Foundation, an American philanthropic private foundation, has provided tens of millions of dollars in funding for local resilience initiatives in the form of planning grants and other investments (Kresge Foundation, 2016). In 2015, the foundation encouraged coastal resilience to extreme weather in Louisiana with two 2-year grants totaling \$440,000. A \$200,000 grant was awarded to the Baton Rouge Center for Planning Excellence to assist the organization in developing master plans for transportation and infrastructure in the face of climate change (Kresge Foundation Center for Planning Excellence, 2016). A \$240,000 grant was awarded to the Coalition to Restore Coastal Louisiana for the development of nonstructural flood-risk reduction measures including drainage improvement and community risk awareness (Kresge Foundation Coastal Louisiana, 2016).

Section V: Measuring Success



Source: Time Magazine

Measuring Success

During the program's first 14 months, success requires the completion of the Gap and Overlap Analysis and draft National Extreme Weather Resilience Action Plan, as well as initial development of the Information Portal. Key metrics and corresponding thresholds have been designed to ensure that each of these deliverables are successfully achieved (Appendix V). Throughout this first phase of implementation, it is critical that members of both the Advisory Group and Working Group are engaged and contributing to the design process. These two groups represent the diverse needs and experiences of state and local stakeholders and the federal-level expertise on extreme weather and resilience planning, respectively. Both of their viewpoints and bases of knowledge are necessary to ensure

a comprehensive and cohesive national strategy.

Long-term metrics make it possible to measure the program's progress on increasing national resilience to extreme weather events. Ideally, the Action Plan will encourage state, local and tribal officials to incorporate resilience into their regulations and planning processes. Individual local, state and tribal resilience initiatives will likely have project-specific metrics by which to track progress. Federal agencies will be responsible for ensuring that the issues identified during the Gap and Overlap Analysis are remedied and that interagency coordination improves. The Federal Emergency Management Agency will estimate the amount of economic losses prevented and the number of lives saved because of these efforts.

Revisiting South Carolina

Since the 2015 floods, South Carolina officials have begun to better coordinate resilience planning, and adopt goals similar to those in the STRONG Act. Charleston recently published a Sea Level Rise Strategy that seeks to align funding sources for resilience planning, coordinate its strategies with neighboring counties, and incorporate the input of leading academics. One local engineering firm has been tasked with revamping Charleston's seawalls using FEMA resilience guidelines. Similar efforts are underway throughout the state.

FEMA estimates that on average, every dollar spent on resilience planning correlates to \$4 in savings. Utilizing this ratio, South Carolina could have potentially saved over \$1.1 billion dollars if officials had worked collectively with the best available information. Additionally, the deaths of many of the flood's victims may have been prevented.



Section VI: Conclusion

Extreme weather events affect every region of the United States, causing significant damages to economic activity and human health. Evidence indicates that the frequency and intensity of extreme weather events will increase in the short- to medium-term (Intergovernmental Panel on Climate Change, 2016). Therefore, it is becoming increasingly imperative to the economic and social well-being of our nation that we address the issues of extreme weather and improve national resilience.

Unfortunately, the United States does not currently have a national strategy to prepare for and respond to extreme weather events. Current resilience planning efforts are uncoordinated and disjointed, greatly hindering their effectiveness. The program put in place by STRONG Act will serve as a coordinated effort to optimize existing resources and identify new opportunities for mitigating the severe economic and social impacts of extreme weather events, with the ultimate goal of building a more resilient nation.

What is at stake is the economic and social well-being of our communities. Over the past 30 years, there have been 130 weather events in the United States that caused \$1 billion in damages each. In total, these weather events have been responsible for more than \$880 billion in economic losses and over 16,000 deaths. Ensuring that our communities remain protected, vibrant, and strong is of critical importance and should not be left to a patchwork of disjointed, unorganized approaches and programs. A more resilient future is achievable if the proper plan is in place to collectively work towards it.

References

- Commonwealth of Australia. (2016) *National Climate Resilience and Adaptation Strategy 2015*. Retrieved from <https://www.environment.gov.au/system/files/resources/3b44e21e-2a78-4809-87c7-a1386e350c29/files/national-climate-resilience-and-adaptation-strategy.pdf>
- Congress.Gov. (2015, May 4). H.R.2227 - 114th Congress (2015-2016): STRONG Act. Retrieved December 11, 2016, from <https://www.congress.gov/bill/114th-congress/house-bill/2227>
- Flynn, S. E. (2016, August). *The South Carolina Deluge: Lessons from a Watershed Disaster* (Rep.). Retrieved from http://www.northeastern.edu/resilience/wp-content/uploads/2016/09/S_Flynn_South_Carolina_Deluge-Resilience_Lessons_from_a_Watershed_Disaster_Northeastern_Univ_Aug16.pdf
- Intergovernmental Panel on Climate Change. (2016). *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. New York: Cambridge University Press. Retrieved from https://www.ipcc.ch/pdf/special-reports/srex/SREX_Full_Report.pdf
- The Kresge Foundation. (2016). Environment. Retrieved from <http://kresge.org/programs/environment> [Kresge Foundation, 2016]
- The Kresge Foundation. (2016). Coalition to Restore Coastal Louisiana. Retrieved from <http://kresge.org/grant/coalition-restore-coastal-louisiana> [Kresge Foundation Coastal Louisiana, 2016]
- The Kresge Foundation. (2016). Center for Planning Excellence. Retrieved from <http://kresge.org/grant/center-planning-excellence-1> [Kresge Foundation Center for Planning Excellence, 2016]
- Metropolitan Transit Authority. (2016). *MTA Secures \$200 Million of Insurance Protection for Future Sandy-Like Storms*. Retrieved from <http://www.mta.info/press-release/mta-headquarters/mta-secures-200-million-insurance-protection-future-sandy-storms>
- Multihazard Mitigation Council (MMC). (2016). *Developing Pre-Disaster Resilience Based on Public and Private Incentivization*. National Institute of Building Sciences. Retrieved from http://c.ymcdn.com/sites/www.nibs.org/resource/resmgr/MMC/MMC_ResilienceIncentivesWP.pdf
- National Weather Service. (2016, April 6). *National Weather Service Office of Climate, Water, and Weather Services National Hazard Statistics*. Retrieved from <http://www.nws.noaa.gov/om/hazstats.shtml>

NOAA. (2016). *Coastal Zone Management Act*. Retrieved from <https://coast.noaa.gov/czm/act/>

Peters, S. (2015). H.R.2227 - STRONG Act. Retrieved from <https://www.congress.gov/bill/114th-congress/house-bill/2227/text>

Tarlock, A. D., & Chizewer, D. M. (2016). *Living with Water in a Climate-Changed World: Will Federal Flood Policy Sink or Swim*. *Envtl. L.*, 46, 491. Retrieved from <http://elawreview.org/articles/volume-46/living-with-water-in-a-climate-changed-world-will-federal-flood-policy-sink-or-swim/>

United States Government Accountability Office. (2015). *Limiting the Federal Government's Fiscal Exposure by Better Managing Climate Change Risks*. United States Government Accountability Office. Retrieved from <http://www.gao.gov/assets/670/668415.pdf>

US Army Corps of Engineers. (2016). *Climate Change Adaptation Plan*. Retrieved from http://www.corpsclimate.us/docs/USACE_Adaptation_Plan_12-NOV-2015_hires.pdf

Appendices

I. Interagency Working Group and Advisory Group Composition

Interagency Working Group

The Following federal agencies are mandatory participants in the Interagency Working Group:

- Office of Management and Budget
- National Security Staff
- Council of Economic Advisors
- Council on Environmental Policy
- Domestic Policy Council

The Director, in consultation with the Department of Homeland Security, will include of other relevant Federal agencies. The following agencies were selected for their diverse relevant expertise and prominent roles in the Federal Government's executive branch. Additionally, five of these federal agencies had climate-related budget appropriations in Fiscal Year 2016:

- Federal Emergency Management Agency
- National Aeronautics and Space Administration
- National Oceanic and Atmospheric Administration
- National Science Foundation
- United States Army Corps of Engineers
- United States Department of Agriculture
- United States Department of Energy
- United States Department of Housing and Urban Development
- United States Department of the Interior
- United States Department of Transportation
- United States Environmental Protection Agency
- United States Global Change Research Program

Advisory Group

The STRONG Act requires one Representative from the National Emergency Management Association (NEMA) to serve on the Advisory Group.

Further, the Act calls for seven representatives from states and state associations. The Interagency Working Group has discretion over these constituents and the following representatives were chosen for their diverse representation:

- National Resources Committee Chair, National Governors Association
- President, Environmental Council of States; Director of Environmental Programs, Colorado Department of Public Health and Environment
- Executive Director of Public Policy, American Farm Bureau Association

- President and Chief Executive Officer, American Insurance Association
- President, American Society of Civil Engineers
- President, Agricultural Council of California
- Director, Florida Division of Emergency Management

Additionally, the Act calls for eight representatives from local entities and associations, including representation from at least one tribal nation and major metropolitan area. Based on these criteria, the following representatives were chosen:

- Chairman and President, Alaska Native Tribal Health Consortium
- Senior Director, New York City Mayor's Office of Recovery and Resiliency
- Chairman, New Orleans Chamber of Commerce
- President, United States Conference of Mayors
- President, National Association of Towns and Townships
- President, National Congress of American Indians
- President and Chief Executive Officer, American Association of Chamber of Commerce Executives
- President, American Water Works Association

II. Staffing and Consultant Plan

OSTP Staff
<p>Chief of Staff, Director's Office</p> <ul style="list-style-type: none"> • Prepare staffing plan.
<p>Budget Analyst</p> <ul style="list-style-type: none"> • Reconcile budget with staffing plan and project roadmap.
<p>Senior Advisor to the Director</p> <ul style="list-style-type: none"> • Assist Director with project roadmap development. • Assist Director with synthesis of Gap & Overlap Analysis for Action Plan development.
<p>Assistant Director, Natural Disaster Resilience, Environment & Energy Division</p> <ul style="list-style-type: none"> • Convene Interagency Working Group. • Assist Director with project roadmap development. • Liaise with Interagency Working Group during Gap & Overlap Analysis and Action Plan development. • Assist Director with synthesis of Gap & Overlap analysis for Action Plan development.
<p>Senior Policy Advisor, Public Engagement, Director's Office</p> <ul style="list-style-type: none"> • Convene Advisory Group. • Assist Director with project roadmap development. • Liaise with Advisory Group during Gap & Overlap Analysis and Action Plan development. • Assist Director with synthesis of Gap & Overlap Analysis for Action Plan development.
<p>Assistant Director, Climate Resilience and Information, Environment & Energy Division</p> <ul style="list-style-type: none"> • Chart out information needed from each agency to facilitate Gap & Overlap Analysis. • Liaise with team of detailees to obtain this information. • Identify and collate relevant information to be included in the portal.
<p>Deputy Chief Technology Officer, Office of the Chief Technology Officer</p> <ul style="list-style-type: none"> • Specifications for Information Portal. • Liaison with External Consultant on data portal development. • Provide updates to Coordinating Entity on Data Portal.
<p>Administrative Officer</p> <ul style="list-style-type: none"> • Manage consulting contract, draft project roadmap, provide logistical and administrative support for meetings, mobilize detailees, provide consultants with information and support as needed. • Assist External Consultant to organize Interagency Working Group & Advisory Group meetings. • Draft & submit meeting reports internally.

Consultants

Advisory Team (1 senior consultant)

- Provide strategic advisory for project roadmap development.
- Provide strategic advisory and project management support for Action Plan development.

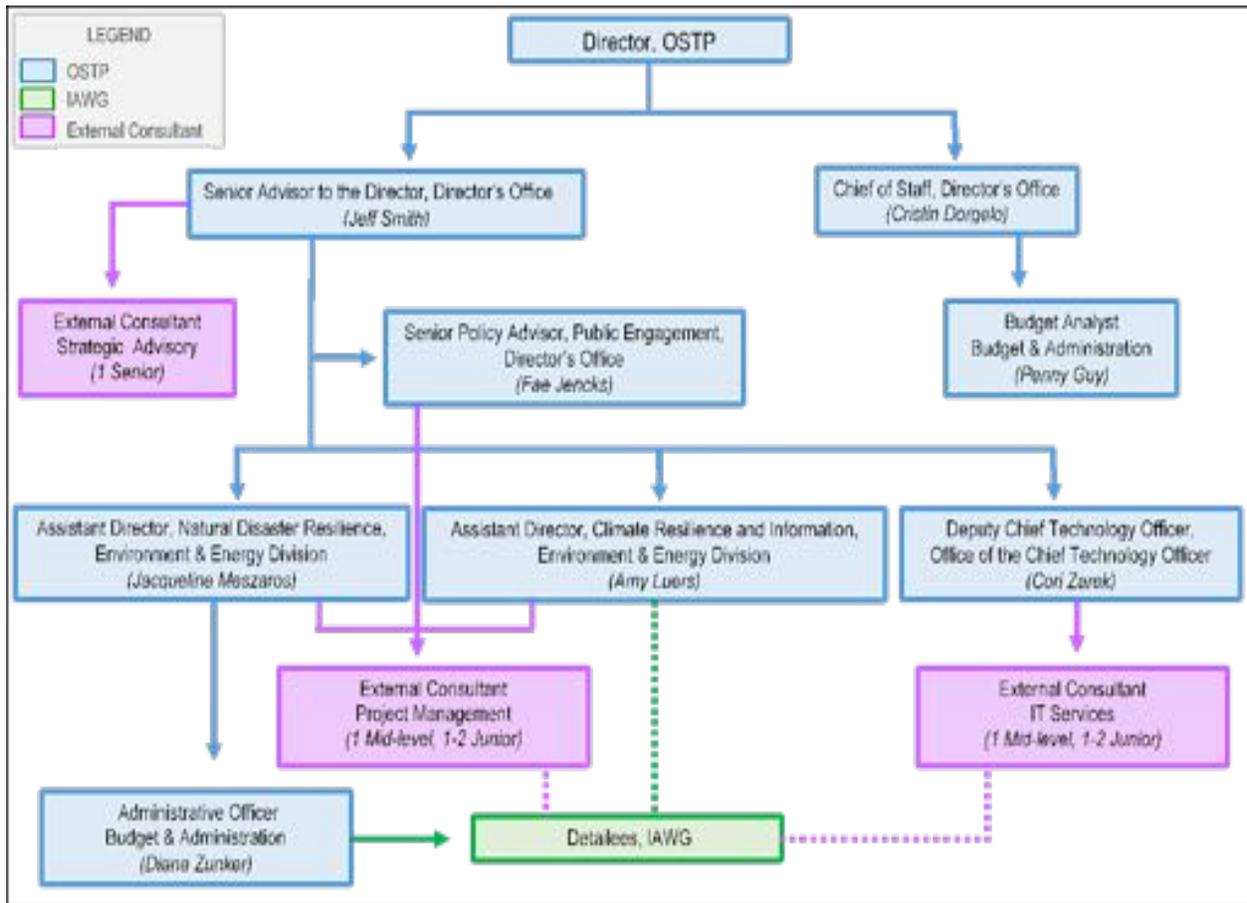
Project Management Team (1 mid-level and 1-2 junior consultants)

- Liaise with team of detailees for scheduling, logistics and administration of meetings.
- Facilitate Interagency Working Group & Advisory Group meetings to identify deliverables.
- Submit formal project meeting reports.

IT Team (1 mid-level and 1-2 junior consultants)

- Develop Information Portal in close coordination with Deputy Chief Technology Officer.

III. Organizational Chart



IV. Key Milestones

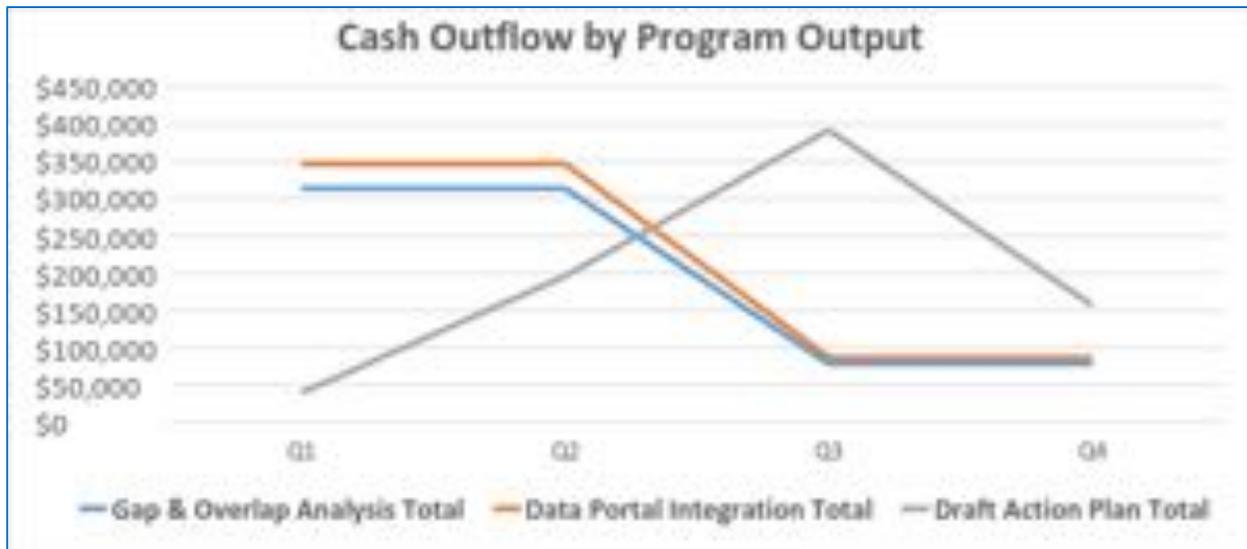
Gap And Overlap Analysis Key Milestones		
Milestone	Responsible Individual(s)	Schedule
Selection of Interagency Working Group	Director of the Office of Science and Technology Policy	Week 1
Selection of Advisory Group	Interagency Working Group	Weeks 2-4
Memo outlining responsibilities of Interagency Working Group and Advisory Group	Director	Week 4
Determination of information needed from each agency for analysis	Assistant Director of Climate Resilience and Information for Environment & Energy	Weeks 3-5
Preliminary completion of analysis	Consultants	Month 6
Editing and integration of results from Gap and Overlap Analysis	Consultants	Ongoing

Action Plan Key Milestones		
Milestone	Responsible Individual(s)	Schedule
Drafting of plan	Consultants & OSTP Staff	Ongoing
Synthesis of Gap and Overlap Analysis	Consultants, OSTP Director & Senior Advisor to the Director	Month 6
Finalization of draft plan	Consultants & OSTP Staff	14 months

Information Portal Key Milestones		
Milestone	Responsible Individual(s)	Schedule
Release of request for information	Consultants	Month 2
Specifications for information integration	Deputy Chief Technology Officer	Month 6
85% information integration	Consultants	Month 14

V. Budget

Program Deliverable	Q1	Q2	Q3	Q4	Total
Gap & Overlap Analysis Total	\$314,054	\$314,054	\$78,514	\$78,514	\$785,136
Personal Services	\$187,501	\$187,501	\$46,875	\$46,875	\$468,752
OTPS	\$126,553	\$126,553	\$31,638	\$31,638	\$316,384
Data Portal Integration Total	\$346,857	\$346,857	\$86,714	\$86,714	\$867,143
Personal Services	\$93,750	\$93,750	\$23,438	\$23,438	\$234,376
OTPS	\$253,107	\$253,107	\$63,277	\$63,277	\$632,767
Draft Action Plan Total	\$39,257	\$196,284	\$392,568	\$157,027	\$785,136
Personal Services	\$23,438	\$117,188	\$234,376	\$93,750	\$468,752
OTPS	\$15,819	\$79,096	\$158,192	\$63,277	\$316,384
Total Expenditure	\$700,168	\$857,195	\$557,796	\$322,255	\$2,437,415



VI. Metrics

Short-Term Metrics

Deliverable	Metric and Threshold	Collection	Reporting	Feedback
Gap and Overlap Analysis	Percentage of IAWG members providing data Threshold: 100% Response Rate	Consultants track responses as received	Reported to: Assistant Director of Climate Resilience and Information Frequency: Bi-weekly	Targeted outreach by Assistant Director to detailees
	Completeness of agency data Threshold: 4/6 required categories of data provided Threshold: 100% meets expectations	Assistant Director of Climate Resilience Information and consultants measure received data against requirements	Reported to: OSTP Director Frequency: Monthly	Assistant Director follows up with agencies Consultants provide assistance to detailee if necessary
	AG satisfaction with consideration of concerns Threshold: 80% satisfied 0% very dissatisfied	Consultants send surveys after monthly meetings	Reported to: Senior Policy Advisor for Public Engagement Frequency: Monthly	Discussions with dissatisfied members Potential change in scope of analysis

Deliverable	Metric and Threshold	Collection	Reporting	Feedback
Gap and Overlap Analysis	Quality of AG participation Threshold: 80% meets expectations	Consultants track AG meeting attendance, communication, and overall input into process	Reported to: Senior Policy Advisor for Public Engagement and OSTP Director Frequency: Bi-weekly	Outreach by Senior Policy Advisory to low-participation AG members
	IAWG and AG satisfaction with consultants (meeting facilitation, administration, detailee engagement) Threshold: 90% satisfied	Administrative Officer sends surveys to IAWG and AG members after monthly meetings	Reported to: Senior Advisor to the Director Frequency: Monthly	Make changes to meeting facilitation project management Request changes in consulting team staff
Information Portal	RFI Response Rate Threshold: 60% response rate	Administrative Officer collects weekly statistics	Reported to: Deputy Chief Technology Officer Frequency: Bi-weekly	Identify potential reasons for low response rate and remedy
	Percentage of relevant collected information integrated in Information Portal Threshold: 85% integration by end of 14 months	Calculated monthly by external consultants, in coordination with Deputy Chief Technology Officer	Reported to: OSTP Director Frequency: Monthly	Follow-up with consultants to ensure integration is on track Utilize detailees during and after gap & overlap analysis

Deliverable	Metric and Threshold	Collection	Reporting	Feedback
Action Plan	AG satisfaction with Action Plan content Threshold: 80% satisfied 0% very dissatisfied	External consultants send surveys to AG members after monthly meetings	Reported to: Senior Policy Advisor for Public Engagement Frequency: Monthly	Include additional content in plan
	Percentage of issues identified in G&A addressed in Action Plan Threshold: 100% addressed	Assistant Director, Natural Disaster Resilience tracks with assistance of consultants	Reported to: OSTP Director and Senior Advisor to the Director Frequency: Monthly, weekly during final two months	Rework Action Plan to remedy all issues
	Cohesiveness between Action Plan and information contained within the Information Portal Threshold: Meets expectations	Evaluated by the Deputy Chief Technology Officer, in conjunction with external consultants	Reported to: OSTP Director Frequency: At the beginning of months twelve and fourteen	Identify additional information needed for Information Portal

Long-Term Metrics

Metric	Measured by	Frequency	Reported to
Status of the implementation of the Action Plan across relevant federal agencies	Coordinating Entity	Monthly	Director
Percentage of issues identified in the gap & overlap analysis and Action Plan that have been remedied	Senior Resilience Officers	Semi-annually	Director
Percentage increase in number of State, Local, Tribal and Private resilience initiatives against the pre-Action Plan baseline	Assistant Director of Climate Resilience and Information	Annually	Director
Advisory Group satisfaction	Senior Policy Advisor for Public Engagement	Semi-annually	Director
Number of individual users visiting Information Portal per month and frequency of each user	Chief Technology Officer	Monthly	Coordinating Entity
Information Portal user satisfaction	OSTP staff	Monthly	Chief Technology Officer