Highlights from Federal Agency Adaptation Plans

Federal Strategies for Promoting and Removing Barriers to State, Local, and Tribal Adaptation

SUMMARY

Federal agencies released updated adaptation and sustainability plans on October 31, 2014. The updated plans build and improve upon the first phase of plans released in 2013. For the first time the plans include discussion of how agencies can leverage existing federal programs to better support and remove barriers to state, local, and tribal adaptation efforts.

Federal programs, policies, and decisions will be critical to ensuring the long-term resilience of states and communities. Federal agencies deliver billions of dollars in financial assistance; they develop the data, tools, and models that are critical to informed climate decisionmaking; and federal regulatory programs, such as the Clean Water Act and National Flood Insurance Program, greatly affect state and local decisionmaking.

Updated federal agency adaptation plans include important analysis of these downstream effects of federal programs on state and local decisionmakers. Plans discuss barriers and identify strategies for promoting resilience at the state, local and tribal level. This report provides a summary of the adaptation plans of key federal agencies: U.S. Department of Agriculture (USDA), Department of Defense (DOD), Department of Commerce (DOC) including the National Oceanic and Atmospheric Administration (NOAA), the Department of Energy (DOE), the Department of Homeland Security (DHS) including the Federal Emergency Management Agency (FEMA), the Department of Interior (DOI), the Environmental Protection Agency (EPA), the U.S. Department of Housing and Urban Development (HUD).

Department of Commerce

The Department of Commerce's Adaptation Plan, updated in June 2014, focuses on increasing resilience and addressing climate-related vulnerabilities within four core areas: economic growth; science and information; environmental stewardship; and infrastructure, facilities, and operations management. The plan sets five-year strategic goals for adaptation planning, and identifies priority adaptation actions for FY 2014 and 2015. DOC sub-agencies and offices that are responsible for implementing the priority actions outlined in the plan include: the National Oceanic and Atmospheric Administration (NOAA) and National Marine Fisheries Service (NMFS, or NOAA Fisheries), Economic Development Administration (EDA), International Trade Administration (ITA), U.S. Patent and Trademark Office (USPTO), and National Institute of Standards and Technology (NIST). These goals and priority actions are summarized below:

Five-year strategic goals for adaptation planning

- Develop advanced measurements, tools, and standards
- Enhance tools and services available for governmental and nongovernmental entities
- Promote green growth and market opportunities that increase resilience
- Work with private sector to develop climate-related areas of expertise and create economic opportunities
- Incorporate climate change into all resource management plans and policies
- Ensure that policies, plans, and decisions anticipate and respond to current and projected climate impacts

Examples of FY2014-2015 priority adaptation actions to take

- Economic growth: factor resiliency into economic development investments; help businesses capitalize on increased demand for green technologies; and improve the ability to process patent application filings for climate change adaptation-related technologies in a timely manner.

- Science and information: develop frameworks and tools to help coral reef managers incorporate climate information into decisionmaking; develop performance-based standards and tools for designing buildings to be resistant to climate extremes; continue to support decisions on water supply constraints through the National Drought Information System and by developing the Regional Drought Early Warning System for certain regions; and develop climate adaptation decision-support information for the Arctic.
- Environmental stewardship: continue or enhance research and monitoring efforts to assess climate-related impacts on various ecosystems, fish stocks, and fishing communities; provide training to coastal communities to build their capacity to adapt; advance the use of nature-based infrastructure for coastal resilience and ecosystem services valuation; and enhance resilience of endangered corals by developing a comprehensive management plan and using innovative propagation activities.

Opportunities to support climate resilient investments by states, local communities, and tribes

- Develop guidance for incorporating climate information into planning and implementation of Coastal Zone Management Act activities, e.g. Coastal and Estuarine Land Conservation (CELCP) projects and National Estuarine Research Reserve System (NERRS) Management Plans.
- Provide examples through the Sea Grant Community Climate Adaptation Initiative, which highlights demonstration projects and partnerships between Sea Grant programs and communities working on adaptation.
- Develop the Implementation Plan for the National Fish Wildlife and Plant Climate Adaptation Strategy.
- Help to implement Hurricane Sandy Rebuilding Strategy including efforts to integrate green infrastructure into investments.
- Implement recommendations in the National Ocean Policy, e.g. to helping with vulnerability assessment of coastal communities and ocean environments and developing and disseminating best practices and standards for assessing resiliency of resources, populations, and infrastructure.
- NOAA Fisheries should work with state agencies to improve availability of information to help manage fisheries to be resilient.
- Develop a web-based portal for easy access to best projections of future climate and ocean conditions for all U.S. marine regions.

Department of Energy

The 2014 Department of Energy's Climate Change Adaptation Plan outlines the vulnerabilities of the agency and serves as a guide to its response to climate change impacts. The DOE's vision for climate change adaptation is the integration of risk-based resiliency measures into all DOE programs and policies. DOE aims to incorporate resilience into existing operational and capital planning, and add to the larger body of applied research on climate change adaptation. This is the second iteration of the plan; DOE's first adaptation plan was published in 2012. The adaptation plan was designed in concert with mitigation activities outlined in DOE's annual Strategic Sustainability Performance Plan.

In 2012, the DOE performed a vulnerability assessment to determine the risks to climate change. Department locations are likely to experience direct acute events (e.g. extreme weather) and long-term impacts (e.g. changes in annual precipitation). The assessment identified risks to physical DOE assets, including: changes in energy demand and production due to the energy-water nexus; risks to generating capacity from changes in precipitation; risk facility and industrial operations due to prolonged drought, wildfires, and flooding due to extreme precipitation; stress on energy generation and changes in energy demand from increased temperatures; impacts to facilities that provide electricity from sea-level rise and extreme storm events. The assessment also identified programmatic risks, including: impacts to DOE's research, development, development and deployment mission as a result of drought, and impacts to nuclear-security and mission-critical sites from extreme weather and other environmental stressors. Transportation infrastructure that connects DOE facilities are also vulnerable.

DOE has taken steps to build resilience and adapt to climate change, many of which are ongoing actions. The Climate Change Adaptation Plan outlines the activities already completed or underway, as well as future activities to incorporate adaptation and resilience considerations into operations and planning.

Current Activities

- Performing site-level climate vulnerability assessment and incorporating climate change resiliency goals into site sustainability planning.
- Fostering local, regional, and inter-agency collaboration at all levels of climate change planning.
- Addressing energy-sector vulnerabilities. In 2014 DOE released its assessment of impacts to the energy sector, US Energy Sector Vulnerabilities to Climate Change and Extreme Weather. Next steps include better characterizing response measures to increase resilience, and assessing barriers to resilient investment decisions in the energy sector.
- Addressing the need for increased electricity grid resilience. In 2013 DOE issued a report examining the economic impact of increasing the resilience of the U.S. electric grid and offering strategies for grid modernization and increasing grid resilience.
- Increasing the scientific understanding of climate change through research activities that contribute to base of climate change modeling and support tools (e.g., community models focusing on system response to natural and man-made climate change forcing and science to more fully understand how the carbon cycle influences climate change).

Future Activities

- Update the Departmental Continuity of Operations (COOP) Plan to include climate change risks. The COOP Plan outlines actions for restoring normal operations after a disaster or disruption.
- Co-chair the Infrastructure Resilience Working Group (with DHS) within the Council on Climate Preparedness and Resilience established by President Obama. The Working Group will focus on infrastructure resilience solutions to climate change, including a high-level assessment of critical infrastructure vulnerability, and a deeper dive into energy sector vulnerabilities.
- Integrate climate adaptation and resilience into procurement and property decisions, possibly through DOE's Asset Management Plan.

Department of Homeland Security

The Department of Homeland Security's 2014 Climate Action Plan updates the agencies 2012 Climate Change Adaptation Roadmap to incorporate the guidance from the President's Executive Order calling on all federal agencies to consider the effects of their programs and policies on state and local adaptation efforts. The 2014 plan shifts the "focus from inward (i.e., Departmental programs) to outward (i.e., national preparedness).

The plan includes 36 implementation actions: 18 near-term actions (for FY 2014-2015) and 18 long-term actions (over next 10 years). Highlights of the actions that may affect state and local adaptation are detailed below.

Communication Actions:

- Establish a Strategic Communication Plan for work on climate change adaptation to help educate the public on the homeland security implications of climate change and extreme weather, and the need to mitigate.
- Launch a climate change adaptation section on the DHS website to serve as a clearinghouse of DHS information on climate change.
- Implement an agency wide Climate Change Education Plan to educate employees of the risks and impacts of climate change and extreme weather.
- Develop targeted training and information resources to help emergency management professionals understand the connections between climate change and emergency response. FEMA is developing a Comprehensive Preparedness Guide to help local officials understand how climate change will exacerbate risk of natural hazards and incorporate this understanding in the development of mitigation strategies.

External Outreach

- DHS hosted a Resilience Summit promoting the adoption of strong building codes. DHS is also conducting surveys of participants in the Resilience STAR pilot program, which is a DHS-led initiative to promote resilient building design practices and standards.
- DHS is considering the applicability of the Resilience STAR program for the design of major

infrastructure projects and guidelines from the Hurricane Sandy Rebuilding Task Force to see if these guidelines can be applied nationally.
- DHS is examining ways to host best practices and building code standards on its online portal
- DHS is also coordinating on processes to develop a federal flood risk management standard for federal investments to ensure that buildings and infrastructure are designed to account for future risks posed by climate change.
- DHS is working with state, local and tribal leaders to pilot place-based approached for addressing adaptation planning.

Health and International Outreach

- DHS is working with medical first responders to ensure that state, local and tribal have the capacity and training to provide appropriate medical response in the event of disasters.
- DHS is incorporating the changing geographic distribution of insect vectors to improve forecasting of vector-borne diseases.
- DHS is assessing the effect of climate change on mass migration across borders and impacts on its agencies: the US Coast Guard, Customs and Border Patrol, and Immigration and Customs Enforcement.

Analysis and Decision Support

- DHS is integrating climate change science into its complex risk analysis modeling for critical infrastructure to support accurate risk forecasting of hazards affected by climate change.
- DHS is working to integrate climate change into its mitigation and preparedness programs to ensure that state, local and tribal partners are including climate change in their hazards risk-based decisionmaking.

Policy, Strategy, and Planning Actions

- DHS is assessing the flood risk vulnerabilities of DHS facilities.
- DHS is incorporating climate change considerations in policies, programs, planning, and operations including the development of a Climate Change Adaptation Policy.
- DHS is ensuring implementation of actions by developing staff performance goals.

FEMA Actions in Response to EO 13653

- States and local communities lack needed pre-disaster mitigation resources to develop climate resilience plans and to implement projects and FEMA is looking at ways to leverage existing funding sources.
- FEMA is looking at ways to develop an economic case for resiliency investments.
- FEMA is helping with the development of federal flood risk management standard.
- FEMA is working to provide "uniform program delivery" of its disaster relief funding authorized under the Robert T. Stafford Act.
- FEMA is developing tools to assess the cost-effectiveness of hazard mitigation projects in light of projected sea-level rise.
- FEMA is working with other agencies to make it easier to access drought resources.
- FEMA is conducting a systematic evaluation of its programs to assess ways to remove barriers and promote opportunities for state, local and tribal adaptation actions.
- FEMA is beginning to modernize its HAZUS model for assess losses from hazards and its floodplain mapping program. FEMA is developing pilots to explore methodologies and applications for developing future risk mapping programs.
- FEMA is developing a preparedness guide to help emergency managers, local authorities, and the private sector translate how climate change will change specific hazard risks.
- FEMA is developing a best practices and lessons learned guide of successful examples of climate adaptation by state, local and tribal governments, the private sector, and voluntary organizations both pre- and post-disaster.

Department of Interior

The Department of the Interior's 2014 Climate Change Adaptation Plan (dated 2014) includes a statement of DOI's official Climate Change Adaptation Policy (523 DM 1), a discussion of DOI programs for managing

climate risks and building resilience, and proposals to reform policies and programs to support investments in climate resilience. DOI states that while the 2013 plan focused on assessing vulnerabilities, the 2014 plan "focuses more on the Department's work to address climate change through implementation." DOI's Climate Change Adaptation Policy includes steps such as considering climate change when making major investment decisions and avoiding investments that likely to be undermined by climate impacts.

The 2014 plan reports on progress implementing strategies identified in the 2013 plan, including:

- Incorporating climate science in the Bureau of Ocean Energy Management's environmental reviews (30% complete)
- Including sea-level rise in new and existing storm response plans for coastal parks in the Southeast and Northeast (30% complete)
- Installing new turbines that increase operational range and flexibility at the Hoover Dam (30% complete)

The 2014 plan identifies possible reforms, including:

- Reforming the Bureau of Reclamation's Drought Program
- Reducing incentives for development in fire-prone areas

The 2014 plan also identifies funding that can be used to support climate resilience, including:

- WaterSMART Grants (Reclamation) for water and energy efficiency
- Title XVI Water Reclamation and Reuse Program (Reclamation) funding to reclaim and reuse municipal, industrial, domestic or agricultural wastewater

DOI's 2014 plan includes nine strategies associated with its Climate Change Resilience Goal:

- Mainstream climate change adaptation into agency-wide and regional planning efforts
- Update agency emergency response procedures to account for climate change
- Ensure workforce protocols reflect impacts of climate change
- Update agency external programs and policies (e.g., grants, loans, technical assistance) to incent planning for impacts of climate change
- Ensure agency principals demonstrate commitment to adaptation efforts
- Identify vulnerable communities impacted by climate change and address vulnerabilities
- Ensure agency climate adaptation policies reflect best available science
- Design and construct new or modify existing facilities to account for the impacts of climate change
- Incorporate climate preparedness into planning and implementation of agency projects.

Each strategy is accompanied by a description and specific targets to be achieved in next 12 months.

Environmental Protection Agency

On October 31, 2014, EPA released the final versions of its agency-wide Climate Change Adaptation Plan and the 17 Climate Change Adaptation Implementation Plans produced by the Program and Regional Offices. EPA's agency-wide plan (dated June 2014 with preface from September 2014) presents ten priority actions that EPA will take to ensure that its programs, policies, rules, and operations will remain effective under future climatic conditions. The 2014 plan prioritizes mainstreaming climate adaptation within EPA. The plan also identifies the following agency-wide priorities:

- Fulfill strategic measures in FY 2011-2015 EPA Strategic Plan
- Protect agency facilities and operations
- Factor legal considerations into adaptation efforts
- Strengthen adaptive capacity of EPA staff and partners
- Develop decision-support tools
- Identify cross-EPA science needs
- Partner with tribes to increase adaptive capacity
- Focus on most vulnerable people and places
- Measure and evaluate performance
- Develop program and regional office implementation plans

The 2014 plan identifies areas where EPA has made progress incorporating climate adaptation into programs and Policies. It reports: "EPA is also making progress on integrating climate adaptation into its categorical funding mechanisms such as the Clean Water and Safe Drinking Water State Revolving Funds in the Water Program and Brownfields Restoration Grants in the Office of Solid Waste and Emergency Response."

The Implementation Plans (developed by each EPA National Program Office and all 10 Regional Offices) articulate how each EPA office will integrate climate adaptation into its planning and work. Program Implementation Plans were released for the following offices: Offices of Water, Air and Radiation, Solid Waste and Emergency Response, Chemical Safety and Pollution Prevention, International and Tribal Affairs, Research and Development, Administration and Resource Management. Regional Office Implementation Plans were released for the following regions: Regions 1, 2, 3, 4, 5 (plus Appendix), 6, 7, 8, 9, 10.

The Office of Water (OW) Climate Change Adaptation Implementation Plan (dated May 2014) identifies priority actions, including incorporating climate change considerations in the Clean Water and Drinking Water State Revolving Funds. The plan also identifies particular actions OW will take, including integrating climate change into five major rulemaking processes. The plan states that OW will support this objective through the development of a water program regulation prior to 2015 but that the specific regulation is not yet determined. The plan also proposes integrating climate change considerations into five major grant, loan, or technical assistance programs. The plan states that OW is meeting this objective through integrating climate change in the National Estuary Program grant program. The plan also notes that water program actions to respond to a changing climate have not faced significant legal issues. The Plan states that OW is interested in initiating a pilot project for collaboration with the EPA Office of Enforcement and Compliance Assurance addressing inclusion of climate change considerations in compliance and enforcement activities.

U.S. Department of Housing and Urban Development

The U.S. Department of Housing and Urban Development has released a comprehensive sustainability plan including an adaptation plan integrating climate change considerations and risks into many of its programs and responsibilities. HUD has focused in a number of major areas, including updating its program policies and rules, training its staff, providing materials and tools to grantees, and conducting research into areas of climate risk for its assets and constituencies. HUD's Resilience Council will work across program areas to improve resilience to climate risks department-wide. As consistent with its mandate to serve some of our nation's most vulnerable residents, HUD has also incorporated principles of equity and environmental justice.

HUD has provided detailed information on the climate risks posed by climate change, and the particular vulnerabilities those risks bring to its programs, staff, and assets. A wide-ranging appendix of identified risks takes an in-depth look the direct effects on HUD programs from different climate impacts: for example, the risk of delinquency on Ginnie Mae-purchased loans from extreme weather events, or increases in utility costs and usage among public housing projects.

HUD has detailed more than thirty actions that staff will take to better prepare staff, assets, grantees, and residents for climate change impacts. Many of these actions will require additional staff, resources, and/or new regulations. These actions are broken down into five categories, summarized below.

Update Program Policies and Regulations

- Integrate climate change into processes: HUD plans to incorporate climate considerations into already-required processes such as environmental assessments and environmental impact statements based on best practices from other agencies. Additionally, grantees in the Community Planning and Development Division will be encouraged to discuss climate-related risks and actions in their Consolidated Plans (plans grantees are required to create for the Community Development Block Grants and other programs, to set priorities for the community based on greatest needs) in order to protect their vulnerable populations.
- Building standards and utility allowances: HUD has already begun amending its floodplain regulations to require higher flood elevation for all projects involving new construction or substantial improvement, in anticipation of sea-level rise and more extreme weather events. HUD has also proposed to update its building standards to incorporate more sustainability and resilience measures in new construction and

substantial rehabilitation with HUD funding, and to assess its public housing utility allowance and utility surcharge formulas in anticipation of higher temperatures.

- Protect mortgage-related programs and assets: Several actions focus on HUD's mortgage-securitizing and mortgage insurance programs within Ginnie Mae to address the climate risks to the properties whose mortgages are being securitized. HUD plans to coordinate consistent disaster assistance and resilience policies for federally insured and guaranteed mortgages, as well as encouraging investment in resilient properties.

Develop Toolkits and Training Materials for Grantees

- Guidance and tools to incorporate data: HUD proposes to develop toolkits and guidance to help grantees consider and mitigate climate risks, including taking existing Hazard Mitigation Plans in their Consolidated Plans and coordinating with work being done with DHS' Resilience STAR group. HUD also proposes to expand its "CPD Maps" tool (a GIS-based mapping tool for grantees) to include climate hazard and vulnerability data and to develop guidance for HUD-assisted residential buildings on resilient building design, construction, and retrofits.
- Expansion of existing roles to consider climate: HUD plans to develop guidance for program staff on mold and mildew prevention and integrated pest management, as flooding and other conditions may result in moister conditions. HUD has also proposed to train lead hazard and Healthy Homes staff in adaptation techniques to make the homes better adapted to climate impacts.
- Disaster response capacity: HUD proposes to better train grantees in the potential physical hazards they might encounter in a disaster situation, as well as developing teams in Indian Country to prepare for and respond to disasters. HUD has also proposed to ensure that highly vulnerable residents protected by improving notifications of emergency conditions to public housing residents.
- Training on HUD disaster relief fund, and discrimination: HUD has begun to train state and local governments, pre-disaster, on the role that HUD disaster relief funds can play and how to develop partners to ensure effective planning and strong response and recovery. HUD also proposes training Fair Housing grantees on discrimination in the wake of climate disasters, and on how to address those civil rights issues.

Prepare and Train HUD Staff

- Assessments: HUD is assessing operational readiness for disasters, testing disaster response plans under climate scenarios, and working with GSA on increasing the resilience of HUD's leased space.
- Training and Staffing: HUD proposes to inventor staff expertise and train staff in disaster response, which has not traditionally been a core responsibility. HUD also plans to factor climate risk projections into staffing allocations for the future, to ensure capacity where it will be needed.
- Standardize disaster response and recovery tools: HUD plans to gather best practices from all programs and consolidate them into a single set of operating procedures and tools that all programs can use to respond to a disaster.

Conduct Research on Climate-Related Risk

- Assess impacts and vulnerable assets: HUD proposes to map climate hazards to assess what properties and residents are particularly at risk. HUD also proposes to survey residents in HUD-assisted properties to identify special needs and circumstances.
- Report on accessibility and resilient building measures: HUD proposes researching and reporting on incorporating accessibility into elevated structures

Other Activities

- Draft equitable and responsible principles for climate-related relocation: HUD proposes to establish principles for equity and justice in any climate relocation effort.
- Energy Efficiency and Clean Energy: HUD is already working to improve energy efficiency and clean energy in residential buildings.

U.S. Department of Agriculture

Climate change is a major challenge to the US Department of Agriculture's mission and objectives. The USDA's Climate Change Adaptation Plan details department strategic goals that will be affected by climate change. The plan recognizes that climate change will likely affect the department's overall functions, in particular the provision of disaster assistance and crop insurance. The Plan provides an overview of the anticipated effects of climate change on agricultural production and forest ecology, and describes the potential economic effects of climate change on US agriculture and forestry.

The Plan describes the adaptation and resiliency actions that are currently underway at USDA, including:

- USDA Regional Climate Hubs throughout the US provide "strategies and practical information to farmers, ranchers and forest landowners" to make decisions related to climate.
- *USDA Capacity Building* improves relationships between scientists and land managers and directs research and technology towards climate adaptation and resilience.
- USDA Departmental Regulations *implement* agency-wide adaptation and resilience planning and call for the establishment of the Climate Change Program Office.

USDA provides information, data, and tools in support of "federal, regional, state, local, tribal, private-sector, and nonprofit-sector efforts to prepare for the impacts of climate change." The report provides a list of programs and initiatives where the USDA has already identified and removed a barrier to actions or investments that promote climate resilience. The following are actions that will be most relevant to state and local decisionmakers:

- Better prepare farmers with adaptive responses to climate through USDA Climate Hubs.
- Develop new crop varieties that will be resilient to changing climate conditions.
- Work with rural communities to find ways to enhance tourism and outdoor recreation.
- Work with producers to diversity agricultural practices and promote resilience to environmental changes.
- Improve crop insurance.
- Develop advance biomass crops and methods for sustainable biofuel production.
- Work with public and private land managers to improve land conservation methods.
- Provide additional incentives to encourage efforts to improve soil health and water quality, while maintaining farmlands and preserving open space and wetlands.
- Deliver financial and technical assistance to landowners to implement conservation measures and management strategies that provide benefits to water quality and watershed health.
- Work with communities to improve fire prevention, preparedness, and response; reduce hazard fuel; and restore ecosystems.

The USDA's Climate Change Adaptation Plan summarizes and integrates the adaptation plans of the 11 sub-agencies within USDA: Animal and Plant Health Inspection Service, Agricultural Research Service, Farm Service Agency, Foreign Agricultural Service, Forest Service, Grain Inspection Packers and Stockyards Administration, National Agricultural Statistics Service, National Institute of Food and Agriculture, Natural Resources Conservation Service, Risk Management Agency, Rural Development.

Department of Defense

In its 2014 Climate Change Adaptation Roadmap, the Department of Defense identified three goals for climate adaptation: identify effects of climate change, integrate climate change considerations into decisionmaking, and collaborate with stakeholders. The DOD has initiated a large research and survey effort to determine installation-level climate vulnerabilities, beginning with coastal and tidal installations. DOD research organizations are completing studies of climate impacts in specific regions of the world.

The Department of Defense has already conducted a review of all its policies and documents to determine which ones require updating in light of climate change threats. Infrastructure managers are modifying new or rebuilt facilities to improve climate resilience by preparing for floods, high winds, and fires. The agency's 2012 Unified Facilities Criteria for Installation Master Planning document requires the consideration of climate change in

facility planning.

The DOD Plan discusses the efforts the agency has taken or will take to implement its three adaptation goals:

Identify effects of climate change

- Planning and Operations: Recognize that changing conditions like rising sea levels will affect mission planning, and that new climate effects (e.g., arctic melting) will require new monitoring efforts. Account for effects on populations, including mass migrations, scarcity of resources, and spreading disease. The negative effects of climate could weaken governments and provide an opening for extremism. Plan for increased need for Defense Support to Civil Authorities (DSCA) and humanitarian aid missions
- Training and Testing: Climate change will limit training by exacerbating fire risks, dust levels, and endangered species concerns. Climate change will increase need for equipment repairs or risk of damage due to new climate conditions
- Built and Natural Infrastructure: climate change will cause impacts to built infrastructure. DOD must assess climate-change effects on design, maintenance, and repair of buildings and transportation assets. Climate change will also present new challenges in managing ecosystems and species. DOD must prepare for changing distribution of disease vectors to protect personnel health
- Acquisition and Supply Chain: DOD must recognize changing parameters for current and planned weapons and equipment and determine if new equipment is required. DOD must prepare for additional maintenance requirements and interrupted delivery or storage of materials and equipment. DOD must prepare for shortages or limited availability of access to food and water, as well as manufacturing materials and industrial equipment.

Integrate climate change considerations into decisionmaking and manage risks:

- Built and Natural Infrastructure: Review natural resource and culture resource management plans and pest control plans. Review facility maintenance and emergency preparedness plans. Review stormwater and water resource management plans.
- Acquisition and Supply Chain: Review and modify strategies for procuring, storing, and maintaining weapons and supplies.

Collaborate with stakeholders:

- Planning and Operations: Ensure coordination between government agencies to coordinate response to extreme weather events in the United States. Work with partner nations and foreign militaries on climate resilience and to reduce vulnerabilities.
- Training and Testing: Collaborate with allied nations on training; work with maritime and land management agencies; collaborate with the medical community on health and disease surveillance.
- Built and Natural Infrastructure: Collaborate with all stakeholders and partner agencies on emergency preparedness and land and resource management.
- Acquisition and Supply Chain: Collaborate with the private sector, other agencies, and within the Department on best management practices for manufacturing, supply, and transportation.

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Please contact Jessica Grannis (grannis@law.georgetown.edu) with any questions about this summary.

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