

U.S. Department of Veterans Affairs

Climate Change Adaptation Plan

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Contents

Executive Summary	4
Introduction	8
Observed and Projected Changes	8
Federal Government Actions to Adapt to Climate Change	9
About the U.S. Department of Veterans Affairs.....	9
About VA Efforts to Build Resilience	10
Vulnerabilities to Climate Change	13
Threats to VA Facilities and Infrastructure	13
Human Health Impacts of Climate Change	14
Climate Adaptation Response Strategies.....	16
Infrastructure Resilience	16
Sustainable Design & Energy Reduction Manual	18
New Building Standards for VA Facilities.....	20
Strategic Capital Investment Planning – Process and Prioritization.....	21
SLR Impacts Study and Guidance.....	23
Deployment of Sustainable Design Guidelines through Grants	24
Climate Change and Human Health	24
VHA Public Health Preparedness Manual	25
Critical Supply Stockpiles	26
Healthcare-Acquired Infection and Influenza Surveillance System.....	27
Public Health Data-Sharing Initiatives.....	29
Interagency Participation and Climate Adaptation Coordination	30
Moving Forward	30
New Design Standards & Guidance	31
Bringing Resilience into Capital Prioritization	31
Fully Deploying Design Standards in VA State, Territorial, and Tribal Grants	31
Collecting and Sharing Data	31
Informing and Preparing Veterans.....	31
Examining Transportation and Communications Vulnerabilities	32

Training Staff 32
Addressing Climate Change in Emergency Response Planning 32
Appendix 1: High Level Analysis of Agency Vulnerabilities 33

EXECUTIVE SUMMARY

The U.S. Department of Veterans Affairs (VA) Climate Change Adaptation Plan represents the efforts of VA to assess and adapt to the projected impacts of climate change on its mission and infrastructure. This plan draws on VA's ongoing efforts and establishes a pathway for expanding climate adaptation imperatives across all agency missions and roles. The plan is based on an assessment of VA's identified vulnerabilities to climate change. It focuses on VA's physical infrastructure and the effects of climate change on the health of its staff and the Veterans it serves. This plan summarizes the actions VA has taken to address its highest-priority vulnerabilities, specifies the actions currently in development, and lays out potential future courses of action.

Climate Impacts and VA Vulnerabilities

Climate change is driving widespread changes to both natural and human systems. With a broad mission and geographical distribution of facilities, VA expects to be affected by these changes in a variety of ways. VA's primary vulnerabilities are the susceptibility of its infrastructure to damage and the burdens placed on its healthcare delivery systems. VA's built infrastructure – including buildings, installed capital equipment, and on-site facilities – is vulnerable to physical damage and to interruptions in the supply of energy and material resources upon which that infrastructure relies. Specific vulnerabilities include:

- **Physical Damage:** Damage to buildings and built infrastructure from water, extreme temperatures, wind, hail, or fire. Climate change increases the likelihood of intense storms, precipitation events, and sea-level rise. Sea-level rise increases the impact of coastal storms and storm surge. Climate change also increases the risk of hotter, drier summers and more frequent and/or intense wildfires.
- **Resource Dependence:** Damage to or interruption of the critical resource delivery systems on which VA facilities rely. Such damage might include electrical blackouts due to high temperatures causing excessive demand, power line failure, or thermoelectric power plant shutdowns. Water shortages may occur in some places due to hotter, drier summers and increased demand for agriculture and landscaping irrigation.

A large part of VA's mission centers on the delivery of healthcare to Veterans. Climate change could have widespread effects on Veterans' health, including long-lasting chronic effects, as well as effects on the need for emergency medicine. Climate change could also affect the health of VA staff. Health and healthcare vulnerabilities focus on:

- **Emergency Care:** Increased demand for emergency care and supplies during dangerous natural disasters, including floods, fires, intense storms, and heat waves, often simultaneous with greater stress on emergency care delivery systems (including physical infrastructure and staff).
- **Public Health:** Changing background health, including increased risk of heat stress, new and emerging disease risks (including Dengue and West Nile virus), deteriorated air quality, and increased allergen load.

Response Strategy

VA's strategy for adaptation balances the need for building its climate resilience with other federal policy imperatives and resource needs crucial to VA's mission. VA intends to achieve this balance by first taking common-sense steps to build resilience with a low cost and a high reward. VA will then incrementally expand these investments in conjunction with other institutional efforts. Currently, VA is working to ensure that long-term capital investments are designed to anticipate climate impacts; to inform staff and Veterans of important climate risks, and equip them to prepare and respond; and to build the capacity to monitor and track emerging threats such as new diseases and other public health risks. In the future, VA intends to expand its resilience-building actions along these lines, while implementing systems to prioritize investments in resilience alongside other needs. VA has taken the first steps toward implementing its climate change adaptation strategy, having already initiated several key actions, with several more in development.

Infrastructure Resilience-Building Actions

VA is undertaking actions to decrease vulnerability to both physical threats and interruptions to resource networks. To address physical threats, VA is designing new buildings to protect against significant climate impacts such as sea-level rise. To mitigate interruptions or shortages of critical resources, VA is increasing energy and water efficiency, building renewable and combined heat and power (CHP) generation on-site and, in some instances, combining these efforts to allow facilities to operate independently of the power grid.

Actions to build resilience against physical threats to VA infrastructure include the following:

- VA's Office of Construction & Facilities Management (CFM) has created a **Sea-Level Rise (SLR) Standard** requiring new and renovated building designers to ensure they are protected from future SLR and SLR-enhanced flooding. This action is currently in development.
- CFM intends to execute an **SLR Impact Study** to assess the vulnerability of VA infrastructure to SLR and SLR-enhanced storm surge on a facility-level basis. This action is currently in development.

- CFM intends to develop **SLR Guidance Material** for facility designers based on the results of the SLR impact study. This action is currently in development.
- The *VA Sustainable Design & Energy Reduction Manual (SDM)* now includes **Resilient Design Requirements**, which call for designers to include climate change adaptation considerations in the design of VA facilities.

Actions to protect VA infrastructure and systems from interruptions in resource networks include:

- **On-Site Energy Generation and Energy Efficiency Requirements** reduce a facility's reliance upon the power grid, as well as greenhouse gas (GHG) emissions. These requirements are found in the SDM.
- **Renewable Energy and Energy Efficiency Prioritization in the Strategic Capital Investment Planning (SCIP) Process** includes energy goals as criteria for prioritization. VA uses SCIP to prioritize capital investments, and the inclusion of energy goals allows VA to emphasize energy resilience in conjunction with other institutional goals.
- **Adaptive Climatology Design Standards** require that new and renovated facilities use the most recent available climate data when design decisions are made, preventing over- or under-design of building systems and reducing energy waste.

VA is considering incorporating other resilience goals into the SCIP process. This would allow VA to prioritize infrastructure resilience goals in conjunction with all other Departmental goals for future capital investments.

Health and Healthcare Resilience-Building Actions

VA is seeking to minimize the negative impacts of climate-driven health outcomes on both its staff and its patients. VA is preparing to cope with the potential for increased need for emergency care due to more frequent or more intense climate-enabled extreme events. Current responses focus on providing crucial knowledge to VA staff and Veterans and monitoring and responding to public health issues made more likely by climate change. This effort will use software to collect healthcare data for emerging disease and morbidity risks, as well as provide climate-related public health information to VA staff and local, state, and federal public health authorities.

Actions to prepare Veterans and VA staff for climate change-enabled health impacts include:

- **Veterans Health Administration (VHA) Public Health Preparedness Manual** provides critical information to VHA healthcare staff and patients on how to respond in a number of climate-relevant public health emergencies.

- **VA All-Hazard Emergency Caches** provide medical supplies and pharmaceuticals to ensure that VA medical services are not overloaded in mass casualty events, including climate-enabled natural disasters and epidemic outbreaks.

Actions to manage the public health impacts of climate change include:

- **Deployment of Biosurveillance Program and Activities** using the Healthcare Acquired Infection and Influenza Surveillance System (HAISS), which monitors VHA system-wide electronic medical and laboratory records for emergence of new diseases and health risks
- **Data-Sharing Arrangements** with other federal agencies, state and local public health authorities, and others to better understand and manage large-scale public health impacts of climate change

Moving Forward

VA is considering a range of new measures to undertake in addition to those which are already being developed:

- Continue to invest in greater infrastructure resilience through the development and use of new design standards and guidance.
- Consider formal inclusion of resilience attributes in the agency's SCIP process.
- Extend the reach of VA's infrastructure resilience efforts by requiring that grantees and contractors use the VA SDM guidelines and other design standards.
- Seek a greater understanding of VA's vulnerabilities to disruptions in transportation and communications networks.
- Increase agency efforts to monitor public health data through the development and expansion of VA's biosurveillance system, data-sharing arrangements, and establishment of additional public health reference laboratories.
- Expand agency efforts to train staff and to inform Veterans about important climate change impacts. Develop new emergency preparedness products on types of extreme weather or natural disasters, improving the ability of individuals to respond to climate-enabled emergencies.
- Integrate climate change risks into emergency response planning, including the agency's All-Hazard Emergency Caches of medical supplies and medicines.

VA understands the importance of anticipating and planning for future changes in climate. VA is working to expand its adaptation efforts to include the full scope of its operations and will continue to deploy its climate adaptation strategy.

INTRODUCTION

The climate is changing at a pace never before experienced in recorded human history, affecting natural and human systems alike. Climate change is affecting how and when precipitation falls, the intensity and duration of excessively high temperatures, the availability and quality of water, the intensity of storms, the level of the world's oceans, and the range and intensity of some diseases. In turn, these natural systems affect human systems by increasing the likelihood of damage to built infrastructure, harming human health, impeding operation of existing energy and water systems, damaging plant life and agriculture, and posing risks to national security. All economic sectors and communities, including the federal government, face new challenges.

This *Climate Change Adaptation Plan* is the response of the U.S. Department of Veterans Affairs (VA) to the challenges and potential impacts of global climate change. The plan addresses the potential impacts that pose the most serious challenges to VA's mission, systems, infrastructure, and vulnerable populations. This plan also summarizes all elements of VA's response to the impacts, including actions that are currently in development and under consideration.

Observed and Projected Changes

Changes to the climate have been observed primarily in increases to global temperatures over the last century, but the fingerprints of climate change can be seen in an increasing number of physical records and natural systems. Temperatures at the surface of the earth rose by more than 1.5°F between 1880 and 2012, and in the next several decades, temperatures in the United States are projected to rise by another 2° to 4°F, depending on uncertainties about both the climate and human actions to accelerate climate change.¹ Higher temperatures have influenced weather systems, precipitation patterns, the occurrence of winter storms, and the level of the oceans around the world. Regional differences in precipitation are expected to drive changes in water availability, including increased likelihood of drought in already-dry regions such as the Southwestern United States. Climate change has also driven increases in the occurrence of climate extremes such as heavy downpours and heat waves. Over the last three to five decades, heavy downpours have increased, especially in the Midwest

¹ This section summarizes climate change trends and projections found in Chapter 2 of the third National Climate Assessment: J. Walsh, D. Wuebbles, K. Hayhoe, J. Kossin, K. Kunkel, G. Stephens, P. Thorne, R. Vose, M. Wehner, J. Willis, D. Anderson, S. Doney, R. Feely, P. Hennon, V. Kharin, T. Knutson, F. Landerer, T. Lenton, J. Kennedy, and R. Somerville, Ch. 2: "Our Changing Climate," in *Climate Change Impacts in the United States: The Third National Climate Assessment*, eds. J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, U.S. Global Change Research Program, 19-67 (2014).

and Northeastern United States. In the Western United States, heat waves have become more frequent and intense. And in the North Atlantic, hurricanes have increased in frequency, intensity, and duration since the early 1980s, and the strongest hurricanes (Categories 4 and 5) have become more frequent. Climate change has also driven increases in global sea levels. Since recordkeeping began in 1880, average global sea levels have risen about eight inches.

The third National Climate Assessment projects that many of the trends witnessed historically will continue as the climate warms. By the end of this century, global average temperatures could increase anywhere from 3° to 10°F. Across the United States, heat waves are projected to become more frequent, longer-lasting, and more severe, and cold waves are projected to become less frequent. Similarly, heavy precipitation events (rainfall events that currently happen once every 20 years) are expected to occur between two and five times as often, depending on region and future concentrations of greenhouse gases (GHGs) in the atmosphere. Heavy precipitation events are also associated with increased risk of flash flooding. Other types of extreme weather are expected to change regionally or seasonally. Combined with storm surge, projected increases in sea level may increase the likelihood and severity of coastal flooding. By the end of the century, sea levels are expected to increase another one to four feet. In some parts of the United States, such as the Chesapeake Bay, local land subsidence will further increase these impacts.

Federal Government Actions to Adapt to Climate Change

In 2009, President Obama signed Executive Order (EO) 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, which required that all federal agencies conduct an internal assessment of climate change vulnerabilities and publish a plan identifying the actions they will take in response to these vulnerabilities. In addition, EO 13514 reinforced the role of the Interagency Climate Change Task Force to improve interagency collaboration on adaptive best practices and to develop institutional knowledge. In 2013, the Administration issued EO 13653, *Preparing the United States for the Impacts of Climate Change*, to build upon the progress made by agencies subsequent to EO 13514. EO 13653 established the Interagency Council on Climate Preparedness and Resilience as a successor to the Interagency Climate Change Task Force. EO 13653 also requires that agencies update their climate change adaptation policies and plans. VA fulfills that requirement through this plan.

About the U.S. Department of Veterans Affairs

VA accomplishes its mission – to fulfill President Lincoln's promise “to care for him who shall have borne the battle, and for his widow, and his orphan” by serving and honoring

the men and women who are America's Veterans – by providing and administering benefits and services. VA is organized into three administrations, each with a primary service mission, and departmental staff offices. The three administrations are the Veterans Health Administration (VHA), the Veterans Benefits Administration (VBA), and the National Cemeteries Administration (NCA).

VHA is the largest of VA's administrations and oversees the management and delivery of healthcare services to Veterans. It operates the country's largest integrated health care system, consisting of 152 medical centers, nearly 1,400 community-based outpatient clinics, community living centers, vet centers, and domiciliaries.² Together, these health care facilities, and the more than 53,000 independent licensed health care practitioners who work with them, provide comprehensive care to more than 8.3 million Veterans each year. VHA also performs biomedical research related to Veterans' health issues and monitors public health data through VHA patients.

VBA is charged with the administration of benefits to Servicemembers, Veterans, their families, and survivors. It provides benefits ranging from service-related compensation (including disability compensation, pension payments, and insurance programs) to economic opportunity services (such as education benefits, loan guaranty access, and vocational rehabilitation services). VBA has four area offices and 56 regional offices in the United States, Puerto Rico, and the Philippines.

NCA oversees the 131 national cemeteries that provide internment services for Veterans and eligible family members. NCA cemeteries are located in 39 states and Puerto Rico.

About VA Efforts to Build Resilience

VA is incorporating climate resilience into all of its long-term planning, investments, construction, and training, in conjunction with other policy and practical imperatives. To best allocate resources, VA is focusing first on ensuring that its largest and most long-lived investments feature measures to adapt to projected climate change impacts. This *Climate Change Adaptation Plan* is the latest step in this effort.

In 2011, VA conducted an agency-wide study focusing on the risks that climate change poses to critical agency operations, facilities, and systems. To complete the *High-Level Analysis of Agency Vulnerabilities*, VA reviewed the relevant climate change science and identified the important impacts threatening VA's core mission. The analysis evaluated the importance of each risk to VA systems, the degree of each risk, whether it was increasing or decreasing in magnitude, and the relative priority of addressing the

² VHA website, last updated May 22, 2014, <http://www.va.gov/health/aboutvha.asp>.

risk. The conclusion of the *High-Level Analysis* was that VA should focus on infrastructure and health impacts, addressing any associated vulnerabilities.

In 2012, using the *High-Level Analysis* as a guide, VA developed its climate change policy statement and issued VA Directive 0065, its climate change adaptation plan. VA's policy statement established the importance of climate adaptation to successful achievement of VA's institutional mission, and Directive 0065 established responsibilities throughout the agency for implementing the policy. VA's updated *Climate Change Adaptation Policy Statement* is shown in the box below.

These actions ensure VA's commitment to addressing the impacts of climate change on its assets and operations. This plan summarizes the progress made in climate change adaptation through investing in long-term resilience, protecting vulnerable assets, monitoring patient populations for health impacts, providing essential climate change information to Veterans and their families, and reducing the impact of VA's resource consumption. This plan also outlines the steps VA will take in the future to stay informed of new findings on climate change impacts, to expand its efforts to build resilient infrastructure and systems, and to take advantage of opportunities to build resilience as they arise.

U.S. Department of Veterans Affairs Policy Statement on Climate Change Resilience and Adaptation

Purpose

It is the policy of the Department of Veterans Affairs (VA) to make climate change resilience and adaptation an integral part of its ongoing mission. Most importantly, VA will use resilience and adaptation as opportunities to continually improve its service to Veterans and their families.

Background

In 2009, the President issued Executive Order (EO) 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*. This EO required all Federal agencies, including VA, to evaluate climate change-associated risks and vulnerabilities. VA completed these evaluations and adopted mitigation plans.

On November 1, 2013, the President issued EO 13653, *Preparing the United States for the Impacts of Climate Change*. This EO tasked agencies to update and improve their Climate Change Adaptation Plan as a living document, reflecting new information and ongoing performance against goals, targets, and strategic priorities.

Vision

VA will make risk-informed decisions, adaptively learn through experiences, and partner with agencies and organizations at all levels of government. VA will continually evaluate the risks and challenges posed by climate change to mission, operations, and programs. A primary mission of VA is the delivery of quality health care to our Nation's Veterans. To ensure that such health care continues, VA will place greater emphasis on how responses to climate change will impact health risks and related clinical and non-clinical requirements.

VA will update its existing Climate Change Adaptation Plan to include strategies so that Veterans Health Administration, Veterans Benefits Administration, National Cemetery Administration, and VA Staff Offices incorporate resilience and adaptation mitigation into their regular business practices. VA will:

- Analyze the best relevant existing and emerging scientific data;
- Periodically review and evaluate risks and vulnerabilities;
- Assess VA's organizational capacity to adapt to both short- and long-term climate threats;
- Periodically evaluate the risk that short- and long-term climate threats pose to providing quality health care and clinical and non-clinical requirements;
- Prioritize responses according to threat severity; and
- Explicitly integrate resilience and adaptation considerations and planning into existing decision-making processes and activities.

Conclusion

The VA Climate Change Adaptation Plan is a living document. VA is continuously improving the integration of resilience, adaptation, and sustainability into all aspects of its mission. VA will build on our previous experiences as it adapts to changing conditions. Above all else, VA will continue to provide high-quality care and services to America's Veterans and their families.



Sloan D. Gibson
Acting Secretary of Veterans Affairs

VULNERABILITIES TO CLIMATE CHANGE

In 2011, VA conducted a comprehensive examination of the climate change impacts likely to affect the agency's core mission and operations. The result was VA's *High-Level Analysis of Agency Vulnerabilities*, which focused on infrastructure and health as two areas where agency adaptation to climate change impacts is essential. This analysis has driven VA's climate adaptation efforts to date, and this plan focuses on VA's efforts to build new, resilient infrastructure; to prepare existing, vulnerable infrastructure for the anticipated impacts of climate change; and to anticipate, monitor, and prepare Veterans and agency staff for the health impacts of climate change. The complete results of the analysis are summarized in Appendix 1.

Threats to VA Facilities and Infrastructure

VA has facilities in every state and several other countries. VA owns over 6,000 buildings and leases almost 2,000 additional buildings, for a total exceeding 170 million square feet. For this reason, any climate-driven changes to VA's siting, design, and construction guidelines and standards will have a large effect on the agency's physical and network vulnerabilities to climate change.

Physical threats to VA facilities identified in the *High-Level Analysis of Agency Vulnerabilities* include inland flooding from more frequent extreme precipitation,³ coastal flooding from sea-level rise (SLR), and SLR-enhanced storm surge. These threats are summarized in the "facilities management" and "new construction and major renovation" planning areas in Appendix 1. Flooding may damage or destroy structures or contribute to erosion on VA properties, necessitating costly repairs and construction and interrupting the provision of essential services. Other structural damage is also possible, as climate change increases the frequency of intense storms, including hurricanes.

VA offices and properties must operate in every climate, each facing unique and potentially diverging climate change impacts. For example, while states in the Northeast are expected to experience more precipitation, the Southwest is expected to become drier. Interconnected elements of infrastructure, such as energy and water supply systems, are also vulnerable.

Interruptions in water or energy supply can prevent VA facilities from effectively providing essential services to Veterans. In many water-constrained regions, droughts

³ Extreme precipitation events are typically defined as 24-hour periods in which rainfall exceeds a certain amount. Because every area experiences different average amounts of rainfall, what is defined as "extreme" in some places might not be "extreme" in other locations.

are likely to become more frequent and severe, threatening water-intensive operations, including activities in VA hospitals.

Electric power supply may become more vulnerable to disruption as increasing air and water temperatures affect every part of America's energy infrastructure. Electric power plants are threatened by higher temperatures and water shortages, and face potential curtailments or shutdowns. Higher temperatures diminish the efficiency of power plants and transmission wires. Higher temperatures also entail higher electricity usage to meet cooling demand. With higher daytime and nighttime temperatures and hotter, longer-lasting heat waves, power grids are likely to become stressed at the same time that demand is highest. Grid reliability issues are most likely to manifest themselves when power for cooling is needed most. For mission-critical facilities such as VA hospitals, reliable power and water access are essential to operations. VA facilities housing sensitive populations (such as senior citizens and those with health conditions) are especially vulnerable to interruptions.

Human Health Impacts of Climate Change

VA serves a population of more than 21 million Veterans and employs a civilian staff of almost 320,000.⁴ Climate change threatens the health of both Veterans and staff, as well as their families and communities, thus stressing VA's ability to achieve its mission and goals. Climate change is expected to have a wide variety of impacts on human health, ranging from acute to chronic, and occurring over the short and long terms. Health-related impacts of climate change include injuries and deaths caused by extreme weather, as well as public health impacts caused by gradual changes in climate.

The risk of more frequent and extreme weather events raises the chance of healthcare emergencies. Severe storms can produce high winds and falling debris, as well as causing structural damage. Coastal and inland flooding can damage infrastructure, including roads and homes. Storm surge enhanced by SLR can rapidly inundate entire communities. Power and service outages can leave vulnerable populations stranded with no access to life-saving services. In all of these cases, the increased likelihood of injury and bodily harm occurs simultaneously with impacts that stress VA's healthcare systems and impede the provision of emergency medical services.

As the climate warms, higher temperatures are expected to have significant negative impacts on public health, increasing average mortality and morbidity.⁵ Heat waves are expected to be hotter, more frequent, and of greater duration. Heat waves with higher

⁴ VA Fiscal Year 2015 Budget Request, Volume 1.

⁵ X. Ye, R. Wolff, W. Yu, X. Pan, and S. Tong, "Ambient temperature and morbidity: a review of epidemiological evidence," *Environ. Health Perspectives* 120(1) (Jan. 2012): 19-28.

night-time temperatures stress populations with compromised background health, including senior citizens and people with existing health and mental health conditions. Heat waves are associated with more visits to emergency rooms and lead to more deaths than storms or flooding.

Higher temperatures are also associated with other public health risks, including increased risk of vector-borne, water-borne, and food-borne diseases. The potential for vector-borne diseases such as Dengue and West Nile virus increases when freezing temperatures occur less frequently. As winters grow milder, mosquito populations are expected to grow, potentially allowing diseases endemic to tropical climates to spread northward. Higher temperatures are also more favorable to many food-borne and water-borne diseases.

Additional climate-related public health impacts include degraded air quality and increased allergen loads. Warming is projected to increase the number of days with unhealthy levels of ozone pollution. Ozone damages lung tissue and leads to lung inflammation, aggravating asthma and other pulmonary conditions. Increased ozone pollution is especially harmful to sensitive populations, such as senior citizens and children, and has been associated with increased emergency room visits and hospital admissions. Climate change also affects the growth of allergen-producing plants. Evidence suggests that the pollen season is occurring earlier in the United States.

The impacts of climate change on agriculture, infrastructure, energy, and other economic sectors may exacerbate the potential for conflict around the world.⁶ Insofar as instability generates military conflicts involving the United States, climate change has the potential to affect VA's mission by affecting the needs of America's Veterans.

⁶ CNA Military Advisory Board, "National Security and the Accelerating Risks of Climate Change" (Alexandria, VA: CNA Corporation, 2014).

CLIMATE ADAPTATION RESPONSE STRATEGIES

Infrastructure Resilience

VA is addressing its vulnerabilities through a number of approaches. The most pressing concern is VA's built infrastructure, including VA's facilities and other fixed assets such as cemeteries. The threats to VA's infrastructure include risk of physical damage and threats to the resource supply networks upon which it relies, including energy and water. VA is responding to these physical and resource vulnerabilities by (1) proactively ensuring that full consideration is given in design and construction of new infrastructure, and (2) in collaboration with partners at the regional level, tailoring each facility's response to local threats. New design requirements and standards will take into account changing baseline climate data for energy use, future SLR and potential storm surge, and other aspects of physical threats associated with climate change. A planned impact study will provide designers with actionable, facility-level information about the projected impacts of SLR and SLR-enhanced storm surge on VA infrastructure. VA is developing new guidance to enable designers to interpret and apply the new adaptation requirements and standards. Together, these programs will ensure that new and renovated facilities are protected against the most certain physical threats of climate change. Over time, the resilience of VA's built infrastructure will continue to increase.

VA is also addressing the risks to vital resources and networks, including risks to electricity supply and risks associated with drought. VA has incorporated adaptation goals such as water and energy efficiency and on-site renewable generation in its long-term capital project prioritization system. Project designers are required to consider a range of water- and energy-efficient designs and appliances. All projects must consider the life-cycle cost of installing new renewable power generation. By reducing overall demand and generating power on-site, VA facilities can reduce their reliance on the grid, its vulnerabilities, and the vulnerabilities of traditional fuel supply sources. Reducing water and energy consumption also benefits others, especially in regions where resources or the capacity of delivery systems are constrained. These actions and the adaptation needs they correspond to are summarized in Table 1.

Table 1: VA actions to improve climate resilience of VA infrastructure. White cells indicate programs currently in force, light blue indicates programs in development, and dark blue indicates programs being considered.

Adaptive Need		Current, Planned, or Possible Response
Infrastructure protection	Protecting facilities and equipment from sea-level rise (SLR)	SLR standard for new and renovated facilities
		SLR impacts study for VA facilities
		SLR guidance materials for building designers
		Sustainable Design Manual (SDM) resilient design requirements
		Inclusion of SLR protection as target in Strategic Capital Investment Planning (SCIP) process
Energy management	Meeting facility cooling/heating energy demand	SDM on-site or renewable generation and energy efficiency design requirements
		Renewable energy generation and energy efficiency goals in SCIP process
	Protecting against disruptions and grid reliability issues	Adaptive climatology standard for new and renovated facilities
		SDM on-site or renewable generation and energy efficiency design requirements
Water management	Managing drought	Renewable energy generation and energy efficiency goals in SCIP process
		SDM water efficiency design requirements
	Meeting increased baseline demand in constrained regions	Water efficiency goals in SCIP process
		Adaptive climatology standard for new and renovated facilities
		SDM resilient design requirements

Sustainable Design & Energy Reduction Manual

VA provides guidance to facility designers to help the Department meet federal sustainability goals. The latest version of the *Sustainable Design & Energy Reduction Manual* (SDM) includes guidance for a number of sustainability goals, including some that also benefit adaptation efforts. The manual, pictured in Figure 1, provides guidance for designers on:

- Employing integrated design principles
- Optimizing energy performance
- Protecting and conserving water
- Enhancing indoor environmental quality
- Reducing the environmental impact of materials

Of these, goals addressing energy and water efficiency are doing the most to improve VA's resilience to climate change impacts that could potentially lead to energy and water shortfalls.

The Current Sustainable Design Manual

The current SDM requires designers to consider implementing efficient on-site power generation and solar water heaters where practical, displacing energy that VA facilities must obtain from the power grid. For each new project, a preliminary feasibility study must be completed to assess the life-cycle cost of efficient technologies. These include water and space heating equipment and power generation technologies such as solar photovoltaic (PV), wind, geothermal generation, ground-source heat pumps, biomass-fueled and traditionally fueled co-generation, and combined heat and power (CHP) systems. A typical PV installation is pictured in Figure 2.

The manual also requires a number of measures to maximize facility energy performance. These measures effectively implement the current federal standard for green buildings. The manual also requires designers to employ energy-efficient roofing and building envelopes, mandates use of utility meters in major new construction and renovation, and requires procurement of Energy Star products and appliances where available. Finally, energy modeling is required for all buildings larger than 5,000 square feet.

To date, VA facilities have installed or awarded contracts for 132 megawatts (MW) of on-site renewable generating capacity, or enough to power 26,000 homes. Energy efficiency measures reduce VA facilities' energy consumption even further. Together, these efforts serve an important adaptation goal – reducing strain on the electricity grid, especially during peak demand periods on hot summer days. Reducing overall demand improves reliability and makes disruptions less likely for all users. On-site and renewable generation, along with energy efficiency measures, also improve facility-level resilience to disruptions in supply. On-site generation using efficient technologies such



Figure 1. PV installation.

as CHP allows VA facilities to "island" themselves from the power grid and to continue operations during outages. Renewable technologies such as solar panels can complement back-up generators, extending capacity and the amount of time that VA facilities can operate during emergencies.

The SDM also addresses water efficiency and conservation for

indoor, outdoor, and process water uses. The manual prioritizes water use for facilities where opportunities to conserve indoor water are secondary to medical needs and infection control. However, in medical offices and residential-type buildings, the manual indicates that opportunities such as low-flow or dual-flush toilets should be employed. Contracts are required to specify water-efficient products, including the use of WaterSense-rated products. The manual requires that both the mission and local climate be taken into account when choosing facility landscaping and horticulture. Strategies to minimize water use are required wherever irrigation is necessary. These include the use of drip irrigation and soil moisture sensors to appropriately meter waterings. The manual recommends strategies including rain gardens, percolation fields, and bio-retention swales, among others, to minimize runoff.

The SDM requires reporting on a number of water-use guidelines, including baseline water use, reduction targets, and strategies to achieve reduction goals. Reporting is expected to detail the types and numbers of water-efficient products and fixtures being used, including numbers of WaterSense-rated products. For outdoor water use, designers must report their plans to minimize water needs through landscaping choices, their plans to achieve efficient irrigation when necessary, and any use of water recycling. Additionally, if potable water is used for energy efficiency or on-site generation, designers must provide information regarding the use of cost-effective water conservation measures.

Water conservation measures are an important strategy for building resilience to water impacts due to climate change. Managing water shortages is the most pressing water-related adaptive need for VA facilities. Reducing the water necessary to operate at full capacity achieves this need by lessening operational constraints imposed by droughts, allowing continuity of services across a wider range of climate change impacts, including water-constrained futures.

Investing in water efficiency also has significant adaptive benefits for the communities in which VA facilities are sited. Large VA campuses making even incremental

improvements in water efficiency can achieve significant savings for a water district. Investing in efficiency today also delays the need for more water infrastructure in the future, conserving public resources.

Sustainable Design Manual Updates

VA is working to complete an updated SDM by the end of 2014. The updated manual will include new guidance to assist designers in adapting to climate change impacts and will direct designers to the Department's current adaptation policy. The updated manual will also include new requirements, including a requirement for designers to review the climate change risks relevant to any new project. The relevant climate change risks will include those identified in this plan. Designers will be required to incorporate climate adaptation concepts into all aspects of site selection and project design. The new updates will also encourage designers to coordinate planning and project intentions with local and regional adaptation efforts. VA's requirements and guidance for new facility design will be continually updated as new science becomes available.

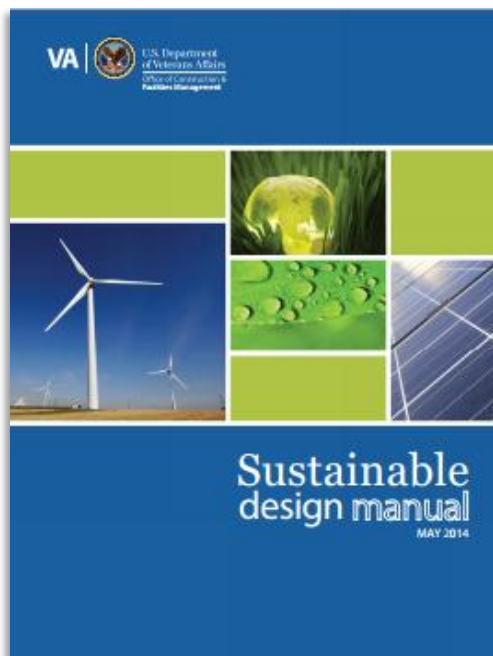


Figure 2: Updated Sustainable Design Manual

New Building Standards for VA Facilities

VA is developing new standards to address specific climate vulnerabilities of its facilities and infrastructure. Two standards are under development, a standard to minimize vulnerabilities to climate-driven sea-level rise (SLR Standard) and a standard updating the period of historical climate data that designers should take into account when modeling heating and cooling energy needs (Climatology Standard).

SLR Standard

VA is developing standards that will require designers of new facilities and renovations to review projections of anticipated future SLR, its effect on flood plains, and site vulnerability to higher storm surges. The new standards will require that selected sites either be protected from flooding or have protective measures in place that can be used to mitigate potential damage. In anticipation of the new standards and guidance, VA's Office of Construction and Facilities Management (CFM) has drafted a standards alert that serves as an interim requirement to incorporate SLR considerations into the design of new facilities.

Climatology Standard

VA is currently evaluating ASHRAE Standard 169 (2013), Climatic Data for Building Design Standards. Upon completion of this evaluation, VA will consider adopting Standard 169-2013. In the interim, VA has drafted a standards alert that encourages designers to use the latest available climate data when working on VA projects. The new climatology standard, as well as VA's commitment to update the standard regularly as new climatology data become available, ensures that new VA facilities will be built with the most efficient and appropriate infrastructure possible. For example, as winters become warmer, facilities in areas facing fewer cold days may decide that a larger heating system is unnecessary.

Strategic Capital Investment Planning – Process and Prioritization

To ensure that new projects incorporate resilient design principles, VA prioritizes these investments among others, including those affecting its core mission. In addition to climate change, VA must address challenges related to demographics, medical and information technology, health care delivery standards and methods, facility condition issues, and others. VA created the SCIP process for determining the optimal path for prioritizing investments among multiple, competing goals. SCIP achieves this goal across the entire agency using data-driven methods to produce a prioritized 10-year strategic capital plan supporting VA's annual capital budget request.

The first stage of the SCIP process creates an agency-wide gap analysis. Gap analyses address facility performance against eight criteria, including some directly relevant to climate resilience. SCIP analyzes gaps and optimizes performance across several specific areas, including benefits/service access, resource utilization, wait times, office and other space, facility conditions, energy and water intensity, security, and emergency preparedness. Both the "energy and water intensity" and "emergency preparedness" goals affect VA's ability to adapt to climate impacts.

Veterans Integrated Service Networks (VISNs), Memorial Service Networks, VBA Regions, and staff offices then complete a strategic capital assessment (SCA) of new projects or designs, and long-range action plans that identify specific investments to close existing gaps. The SCA explains in detail how a project will reduce existing strategic gaps, why investments are chosen, and how capital investments are tiered at

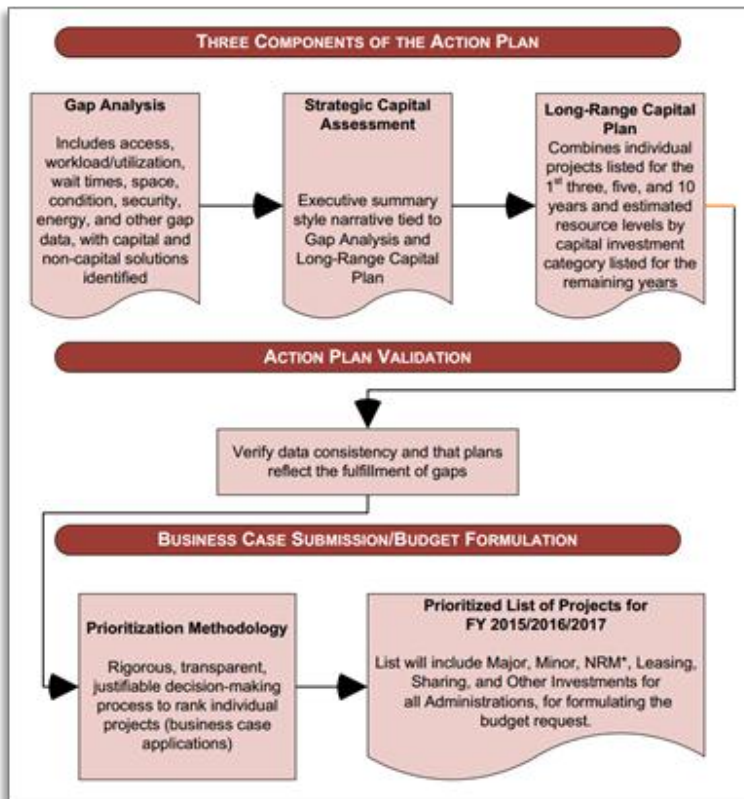


Figure 3: SCIP for Major Construction, Minor Construction, Non-Recurring Maintenance (NRM), Leasing, Sharing, and other investments. The SCIP process allows VA to prioritize investments in climate resilience in conjunction with other mission imperatives.

in the agency-wide capital plan and submitted to Congress in VA's annual budget request. Figure 3 is a graphic presentation of the SCIP process.

VA's goals to reduce energy and water intensity are identified as agency gaps in the SCIP process. VA has several agency-wide goal is to reduce energy consumption per gross square foot by 3 percent annually, and increase renewable energy use 20 percent by 2020. Simultaneously, VA aims to reduce GHG emissions by 3 percent annually, further driving energy conservation and investments in renewable energy. VA also targets an annual reduction in water consumption of 2 percent annually. VA seeks to achieve energy efficiency performance 30 percent higher than applicable building energy standards. Finally, VA aims to meet sustainable design guidelines in 15 percent of its buildings and direct leases by 2015. To achieve these goals, VA will continue to

each facility or office.

Together, the SCA and action plan lay out each network's or office's best effort to meet its goals in closing identified gaps.

To prioritize individual projects, SCIP ranks each project using a number of criteria. The SCIP panel, staff representing VA administrations and staff offices, works with teams of subject matter experts to validate and score each project in the action plans. Projects are then prioritized according to their scores, and high-priority projects are recommended to the VA Executive Board for approval. The highest-scoring projects are included

employ building materials and designs that are more efficient. These goals are summarized in Table 2.

Table 2: SCIP gaps and targets affecting agency resilience.

SCIP Gap	Adaptive Need	Current, Planned, or Possible Response
Conserve Energy	Reduce reliance on power grids; improve back-up capacity	Reduce energy consumption per square foot by 3% annually
Deploy Renewables		Achieve building energy efficiency performance 30% higher than standards
Decrease GHG Emissions		Increase total renewable energy use by 15% by 2015
Conserve Water		Reduce GHG emissions by 3% annually
Sustainable Design	Reduce reliance on water delivery systems	Reduce water consumption by 2% annually
	Improve facility compliance with sustainability goals	Meet sustainable design guidelines in 15% of buildings and leases by 2015

Emergency preparedness gaps are broadly defined, but several networks have identified important gaps in their infrastructural ability to respond to natural disasters such as hurricanes. Typically networks or staff offices identify emergency preparedness gaps and propose projects to close them.

As in the SDM, investments in on-site and renewable energy generation and energy and water efficiency are crucial elements of building long-term resilience into VA infrastructure and improving the climate resilience of the communities where VA facilities are located. In this way, the SCIP process furthers the agency's adaptation goals.

SCIP Process Updates

Going forward, VA will begin taking the necessary steps to comprehensively address climate change adaptation goals through the SCIP process. As VA continues to develop a greater understanding of its facility-level climate vulnerabilities, the need to build climate resilience comprehensively by prioritizing adaptive investments in conjunction with other mission-critical capital expenditures will grow.

SLR Impacts Study and Guidance

In addition to the SDM, CFM is developing guidance for designers of VA facilities based on a facility-level study of SLR impacts. CFM is in the initial phases of the study, which will identify VA facilities that are currently at risk for storm-surge inundation or may become threatened due to future SLR. After completing the study, VA plans to prioritize mitigation options for the facilities at greatest risk. VA aims to complete this study in 2014. For new and renovated facilities, VA will incorporate SLR considerations into the

design choices, including site selection, site protection, equipment, and strategies for locating building equipment and uses on elevated floors.

Deployment of Sustainable Design Guidelines through Grants

In some of its operations, VA provides grants to state, territorial, and tribal governments to provide services when VA facilities may not fully satisfy the needs of local Veterans. One area in which grants to other governments expand VA's reach is the Veterans Cemetery Grants Program, which allows VA to provide up to 100 percent of the development cost for state or tribal Veterans' cemetery projects, including new, expanded, or improved Veterans cemeteries. NCA recommends that grantees of the Veterans Cemetery Grants Program deploy VA's irrigation guidance from the SDM, including the use of xeric or low-volume irrigation systems to decrease the potentially substantial water demands of cemetery irrigation.

By extending the deployment of sustainable guidelines to state, tribal, and territorial grantees, VA is ensuring that it maximizes the adaptive capacity of its grantees. VA enables those grantees to increase their future investments in climate change adaptation by providing technical guidance and demonstrations. Looking forward, VA will consider deploying other sustainable design principles, including energy efficiency and on-site generation, to grantees. The agency will also consider expanding sustainable design principles to other areas of grants, including State Veterans Homes. In addition, VA will explore the role that design requirements can play in influencing grantees' design decisions, including the potential application of energy and SLR design standards to grant contracts.

Climate Change and Human Health

Climate change impacts on the health and safety of Veterans, staff, and the communities they live in will challenge VA's capacity to deliver benefits and services reliably and efficiently. The most important climate impacts affecting VA staff and Veterans' health are the increased occurrence of natural disasters and extreme weather, and the increase in cases of vector-borne diseases. VA is ensuring that its facilities are prepared for emergencies by including emergency response goals in the SCIP prioritization process, as well as through regular emergency management processes. VA also maintains a network of stockpiles of emergency medical supplies and pharmaceuticals, which VA medical centers use to coordinate emergency response planning with local and regional authorities.

VA public health doctors and researchers are using data from VHA's healthcare network to monitor and respond to emerging diseases such as Dengue and West Nile virus. The Centers for Disease Control and Prevention (CDC) is using VA data to inform their

public health tracking systems. VA will address uncertain effects by continuing to monitor health impacts and provide salient information when available.

These efforts are listed in Table 3 and explained in detail below.

Table 3: VA actions to address climate impacts on health and healthcare. White cells indicate programs that are currently in force, and light blue indicates programs in development.

Adaptive Need		Current, Planned, or Possible Response
Healthcare Management	Emergency preparedness and response	VHA Public Health Preparedness Manual
		All-Hazard Emergency Supply Caches
Health Management	Emerging diseases; expanding disease range	Healthcare Acquired Infection and Influenza Surveillance System (HAISS)
		Public health data-sharing initiatives
	Health impacts related to heat and cold	VHA Public Health Preparedness Manual - cold & heat chapters

VHA Public Health Preparedness Manual

To prepare its staff and patients for a wide variety of public health issues, VHA’s Office of Public Health (OPH) is developing a new *Public Health Preparedness Manual*. The manual was first developed following Hurricane Katrina as a resource for VA staff focused on preparing and responding to the impact of hurricanes on affected patients and populations. The updated manual is being designed to train and prepare staff to respond to a wide variety of disaster-related public health emergencies, including many related to climate change impacts. The manual includes sections on cold- and heat-related illnesses, wildfires, and other emergencies, many of which are affected, either in frequency or severity, by a changing climate.

The *Public Health Preparedness Manual* will be organized by type of disaster and address three phases of action: preparation, response, and aftermath. OPH is also developing factsheets that will contain supplementary information applicable to disaster response and aftermath (e.g., coping strategies for disaster survivors, information about protecting pets during and following a disaster, etc.). Training staff for public health emergencies will build operational resilience, increase VA's ability to deliver essential healthcare and enable staff to continue operations during emergencies. VA is also enabling its staff to proactively recognize and address the preparedness of vulnerable individuals to climate-related risks. OPH is working toward making the manual public.

This will empower Veterans to protect themselves and thereby reducing the demand for VHA systems when most stressed.

Critical Supply Stockpiles

VA has established stockpiles of critical medical supplies and pharmaceuticals to be used in response to natural disasters and extreme weather events, including floods, hurricanes, wildfires, tornados, and earthquakes, as well as other disasters including epidemic or pandemic events, terrorist attacks, or other events that could significantly stress VA's ability to deliver medical care.

VA's All-Hazard Emergency Caches were established in response to the September 11, 2001, terrorist attacks when VA recognized that in the immediate aftermath of an emergency, its ability to supply pharmaceuticals may be compromised. The stockpiles are designed to supply Veterans, VA staff, and others who may be present at a VA medical facility in a disaster situation. The caches help VA ensure (1) short-term preservation of the VA health care infrastructure until other resources can be made available in the immediate area and (2) each VHA facility's contribution to local community disaster planning efforts.⁷

VA has established 143 internal pharmaceutical caches at VHA medical centers: 90 large caches, which can supply 2,000 casualties; and 53 small caches, supplying 1,000 casualties, each for one to two days.⁸ For security purposes, the contents and locations of the stockpiles are not published, but they are subject to review by the All-Hazards Emergency Cache Program Review Committee. The Committee includes members from the VHA Office of Patient Care Services, the Office of Public Health, including the VHA Office of Emergency Management. Committee members are charged with ensuring that the caches support VA's role in disaster preparedness and response.

Regular maintenance of the caches requires ensuring an accurate and up-to-date centralized inventory, providing proper labeling and guidance for cache supplies, managing stock rotation among caches, and developing and ensuring appropriate storage and handling of cache stocks. At the VISN level, VISN directors are responsible for integrating cache access, distribution, and use into emergency plans.

The All-Hazard Emergency Caches are designed to enable VA to continue one of its core missions – to deliver healthcare services to Veterans – in the face of all expected climate-related health risks from extreme weather events. But VA's caches extend climate-health resilience beyond Veterans, providing additional capacity to the general population

⁷ VHA Directive 2008-001: All-Hazards Emergency Caches (Jan. 15, 2008).

⁸ *Hearing Before the House of Representatives Committee on Veterans Affairs*, 108th Congress, Second Session (Aug. 26, 2004) (Gordon H. Mansfield, Deputy Secretary of Veterans Affairs, Department of Veterans Affairs), <http://www.va.gov/OCA/testimony/hvac/040824GM.asp>.

and easing the burden on local health authorities in the event of an emergency. Because of VA's national footprint, deployment of All-Hazard Emergency Cache supplies enhances healthcare resilience system-wide in mass casualty events across the country.

VA is also aware that it must consider and respond to climate change impacts and risks as it plans and deploys the caches in the future. How the caches can be used to respond to outbreaks of climate-enabled diseases is an especially important issue, and VA will consider how its caches can be better used to prepare its medical centers to respond to diseases such as Dengue and West Nile virus going forward.

Healthcare-Acquired Infection and Influenza Surveillance System

OPH has implemented a data-driven system for tracking infections, diseases, and illnesses. The Healthcare Associated Infections and Influenza Surveillance System (HAISS) is a biosurveillance tool that tracks new infections as they are recorded in patient visits, laboratory results, and pharmacy utilization providing situational awareness of emerging disease threats.

HAISS extracts data from VA's electronic health records system, Veterans Health Information Systems, and Technology Architecture (VistA). HAISS monitors population data for a number of indicators, including incidence of healthcare-associated infections, antimicrobial utilization, microbial drug resistance, and emerging infectious diseases and/or syndromes associated with natural and/or bioterrorist activities. HAISS incorporates geographic information system (GIS) mapping software to provide geospatial location information for any associated infectious disease within the VA system. HAISS also tracks vector-, food- and water-borne diseases related to or made more likely by climate change. Recent published examples from OPH using HAISS include descriptions of emergent endemic Dengue cases among Veterans in Florida between 2007 and 2010, and heat-related illnesses among Veterans and U.S. Navy personnel in the Chicago area during the summer of 2006. Figure 4 graphically explains the HAISS areas of biosurveillance.

Biosurveillance tools such as HAISS are vital to anticipating and adapting to climate change and changing healthcare outcomes in the population. Monitoring public health data for new outbreaks and tracking cases when they do arise are essential first steps in responding to the health implications of climate change. HAISS provides a robust, data-driven method to proactively seek out emergent disease threats, allowing authorities to respond to and treat outbreaks as early as possible. Proactive monitoring and rapid treatment minimizes the risks of new, climate-enabled disease threats.

Pillar 1	Pillar 2
<p>CDC's National Healthcare Safety Network (NHSN) Healthcare-Associated Infections Surveillance</p> <p>ICU device-associated infection and surgical site infection surveillance are defined using NHSN infection definitions and methodology. Allows all appropriate VHA facilities to participate actively in NHSN surveillance activities, create VHA benchmarks within NHSN using electronic data collection and infection determination, with data transmittal to CDC via the NHSN web-based application. Provides aggregation of data for analysis to evaluate effectiveness of interventions and to compare infection control strategies VHA-wide.</p>	<p>Biosurveillance/Syndromic Surveillance</p> <p>Surveillance for influenza-like illness (ILI) and other conditions included in the seven syndrome groups characteristic of illnesses potentially caused by Category A bioterrorist agents or emerging pathogens:</p> <ul style="list-style-type: none"> • Respiratory: cough, pneumonia, ILI, URI • Gastrointestinal: vomiting, diarrhea • Neurological: meningitis, botulism-like • Dermatologic: hemorrhagic • Dermatologic: vesicular (smallpox-like) • Fever, malaise, sepsis • Coma/sudden death <p>Provides situational awareness to VHA to allow early event detection (including outbreaks of seasonal influenza and emergence of pandemic influenza) and monitoring of disease outbreaks (magnitude, location, rate of spread), with aggregation and tracking of data at the local and national VHA level.</p>
Pillar 3	Pillar 4
<p>Organisms/ Infections of Epidemiologic Significance</p> <p>Includes surveillance for multidrug-resistant organisms (MDROs) such as MRSA, vancomycin-resistant <i>Enterococcus</i>, and multidrug-resistant gram negative organisms; clustering of organisms of epidemiologic significance such as <i>C. difficile</i>, group A streptococcus, <i>Legionella</i>, and tuberculosis; and infectious diseases/conditions reportable to local, state, and national public health authorities. Allows VHA (at local facility and national level) to monitor and detect trends in transmission of infection and to identify and report infections/conditions that require notification to public health authorities.</p>	<p>Antimicrobial Usage and Decision Support Tools</p> <p>Tracks antimicrobial usage trends and organism resistance patterns, by antimicrobial, facility, and locations within the facility. Identifies bacterial pathogen/antibiotic choice mismatch. Promotes appropriate antimicrobial use by allowing VHA (i.e., the IPDO and HAISS as well as at the local facility level) to monitor antimicrobial prescribing and resistance trends and recognize antimicrobial misuse. Provides aggregation of data for analysis to evaluate effectiveness of interventions, and to compare antimicrobial use and ordering patterns across VHA medical facilities.</p>

Figure 4: Four Pillars of the Healthcare-Associated Infections and Influenza Surveillance System (HAISS), VHA's system-wide biosurveillance tool. HAISS tracks new infections including climate-enabled vector-borne diseases such as Dengue and West Nile Virus.

HAISS also contributes to disease resilience for all Americans. Anonymized data from HAISS are shared with the CDC BioSense program, which monitors disease infections across a wide variety of data sources and provides important information to public health agencies at local, regional, and national levels.

VHA is currently working on plans for an upgraded HAISS 2.0. Pilot work and plans include a redefined data architecture to allow for additional types of data, including aggregation of social media, weather or environmental reporting data, local public health alerts, and U.S. Department of Defense (DoD) biosurveillance data, among other sources. In addition to tracking vector-, food-, and water-borne diseases, HAISS could be used to track the emergence and evolution of long-term climate-associated health impacts across the VA patient population, including documented impacts such as increased hospital and emergency room visits during heat waves, decreasing illness or injury associated with periods of extreme cold, or changes in morbidity as a result of exposure to degraded air quality.

Public Health Data-Sharing Initiatives

As a major provider of healthcare, VA collects data relevant to many public health authorities, research groups, and other federal agencies involved in managing public health outcomes. In addition to participating in CDC's BioSense program, VA shares biosurveillance information and data with many other agencies in the effort to prevent and stem disease outbreaks, keep authorities informed, and better understand the changing national public health. VA medical centers provide information via telephone, fax, or mail to local and state public health departments regarding communicable diseases and other reportable illnesses under cooperative memoranda between VA and states.

OPH has an agreement with the DoD through a VA/DoD Joint Incentive Fund project to exchange health-related biosurveillance data. Information is also currently being shared with the Department of Homeland Security.

OPH is in the process of implementing a pilot project with the California Department of Public Health (CDPH) to share California-reportable disease data using the California Reportable Disease Information Exchange (CalREDIE) system. This tool is used by the CDPH to determine the extent of diseases, identify outbreaks and epidemics, evaluate risks of transmission, intervene rapidly, and develop prevention programs. Laboratory data from VA will be shared electronically in accordance with the timeframes established by California law. For example, under California state law, laboratory test results suggestive of Dengue must be reported within one working day. If this pilot project is successful, HAISS will be scaled up for electronic reporting to all local and state public health authorities in the U.S.

Interagency Participation and Climate Adaptation Coordination

VA is the largest civilian federal agency making its resources useful for enabling climate resilience across the federal government. Likewise, VA facilities are influential in the communities in which they operate. VA is working to build climate resilience beyond its own operations and seeking opportunities to contribute to federal adaptation goals by sharing its experience with developing policies to protect infrastructure in general and hospitals in particular.

The Department is taking an active role in interagency adaptation planning through its alignment with the administration's climate change adaptation policy by participating in the Council on Climate Preparedness and Resilience. Through this role, VA is working to ensure that it actively learns from and helps other federal agencies to employ the most efficient, timely, and best-designed adaptive practices.

In support of the Council, VA is participating in four specific workgroups on infrastructure adaptation and healthcare facility resilience: the Deputy Secretary-level Council on Climate Preparedness and Resilience, the Infrastructure Resilience Working Group, the Climate Change Preparedness and Resilience Exercise Series, and an interagency task force on building hospital resilience. These groups allow experts across federal agencies to compare strategies and plans, develop best practices, and develop contacts for expanded interagency collaboration. For example, the Hospitals Resilience Working Group is sharing VA emergency preparedness strategies with the U.S. Department of Health and Human Services.

VA has aligned its approach to climate change adaptation by complying with administration policy and the requirements in EOs 13514 and 13653. VA first established its climate adaptation policy in 2011. This policy was updated in 2012 with the addition of its first climate change adaptation plan, VA Directive 0065. This newest plan includes an updated policy statement, a new look at existing vulnerabilities, and a review of actions taken to date. VA will continue to update its plan whenever appropriate to incorporate new information or requirements, in accordance with administration policy.

Moving Forward

VA's climate change adaptation policy encourages and engages all VA offices and administrations to address climate change vulnerabilities. This *Climate Change Adaptation Plan* identifies many of the high-level policies that ensure that VA prioritizes the most important steps in building climate resilience. Moving forward, VA will continue to improve its internal policies and processes for investing in climate resilience. VA is committed to reviewing new climate impact information when it becomes available and

expediting updates of this plan when needed. Additional plans and considerations to improve climate resilience in the future are described below.

New Design Standards & Guidance

VA is comprehensively rethinking the way it builds facilities. Current efforts will prepare VA for projected climate risks. VA staff will continue to work on developing new standards and new guidance as new climate information becomes available. VA's Office of Asset and Enterprise Management will track new projections of climate change impacts and issue new guidance as necessary.

Bringing Resilience into Capital Prioritization

Having deployed SCIP in the development of a 10-year strategic capital plan, VA will begin efforts to incorporate climate adaptation considerations into the prioritization process. First steps may include identification and assessment of gap criteria related to climate resilience.

Fully Deploying Design Standards in VA State, Territorial, and Tribal Grants

VA is committed to interacting with external stakeholders in a manner that enables greater investments in resilience. To that end, VA will consider amending its requirements for grantees to ensure that facilities such as State Veterans Homes and State Veterans Cemeteries utilize VA's SDM and improved resilience-building design guidance and comply with VA's resilience-building design standards. Currently, VA is recommending sustainability principles to its state, tribal, and territorial grantees. Looking forward, VA will explore the potential to expand both the types of grants and the design components that its recommendations will address. VA will also consider mandating that grantees adhere to its design standards – including updated climatology and SLR standards. Such a step would both increase the resilience of these projects and encourage development of resilient design expertise.

Collecting and Sharing Data

VA currently makes extensive use of its medical data to improve the healthcare outcomes of Veterans and the general public alike. Through the HAISS biosurveillance tool and other data-sharing arrangements, VA is well-positioned to identify, track, and act upon emergent climate-enabled diseases and morbidity. Moving forward, OPH will continue to develop HAISS 2.0 and to pursue other data-sharing arrangements that may improve public health outcomes.

Informing and Preparing Veterans

VHA is moving forward with efforts to inform both staff and Veterans of ways to prepare for projected climate change impacts. Following the publication of the *Public Health*

Preparedness Manual, VHA will continue to develop factsheets with additional information relevant to specific disasters.

Examining Transportation and Communications Vulnerabilities

VA will examine its reliance upon external transportation and communications networks in response to concerns about organizational resilience in the face of climate impacts affecting such systems. VA facilities and operations rely on both VA staff's and Veterans' access to transportation infrastructure and systems. Transportation infrastructure threatened by climate impacts such as extreme weather and coastal flooding may isolate key staff or Veterans seeking services. Similarly, VA's reliance upon information technology poses a threat to continuity of operations during outages. VA will include a full consideration of these potential vulnerabilities in the next update to its *High-Level Analysis of Agency Vulnerabilities*.

Training Staff

Training staff on climate change adaptation is an important component of VA's strategy. VA will consider expanding its staff training on climate preparedness and resilience, exploring options for training appropriate staff on the basics of climate change impacts and on more specialized material applicable to individual areas of expertise. VA staff should be able to identify and act on climate change vulnerabilities affecting VA suppliers and stakeholders, as well as Veterans. Basic training in climate impacts would enable staff to recognize vulnerable individuals and inform them of simple steps they could take to reduce their vulnerabilities.

Addressing Climate Change in Emergency Response Planning

VA will begin to integrate the climate change risks discussed in this plan into all of its emergency response planning efforts, including those executed by VHA's Office of Emergency Management, such as VHA's Comprehensive Emergency Management Program (CEMP). Emergency response is a key component of organizational resilience to any risk, and anticipating climate change impacts and the risks they pose to VA operations is essential for VA to successfully deliver on its mission.

For example, VA is aware that the planning and deployment of its All-Hazard Emergency Caches must respond to climate change by anticipating changing risks. How to use caches to respond to outbreaks of climate-enabled diseases is an especially important issue, and VA will consider how its caches can better prepare its medical centers to respond to diseases such as Dengue and West Nile virus going forward.

APPENDIX 1: HIGH LEVEL ANALYSIS OF AGENCY VULNERABILITIES

Planning areas	Stresses to systems in planning area	Projected climate change impact	Projected impact of changes to systems in this planning area	Vulnerability of systems	Priority of planning area
Water Management	Managing summer drought — irrigation	Warmer temperatures across the U.S. Decreased frequency of light rain events as well as longer periods between rain, especially in the summer. Reduced summer supply due to decreasing snowpack and earlier snowmelt.	Increased frequency of drought, especially during the summer. Southern areas (particularly in the West) are likely to become drier.	Medium	Low/Medium
Water Management	Meeting water demand at facilities	Warmer temperatures across the U.S. Decreased frequency of light rain events as well as longer periods between rain, especially in the summer. Reduced summer supply due to decreasing snowpack and earlier snowmelt.	Increased frequency of drought, especially during the summer. Southern areas (particularly in the West) are likely to become drier. Lower summer water supply may be compounded by increased growth of patient populations.	High	Medium
Facilities Management	Structural damage to existing facilities	Increased frequency and severity of floods and extreme weather events (e.g., hurricanes). Sea-level rise and increased erosion are likely.	Increased frequency and severity of damage to VA facilities.	High	High
New Construction and Major Renovations	Changing requirements for facility construction and design planning	Increased frequency and severity of floods and extreme weather events (e.g., hurricanes). Sea-level rise and increased erosion are likely.	Increased frequency and severity of damage to existing VA facilities, as well as augmented structural requirements for new VA construction.	Low	Low
Energy Management	Meeting facility cooling demand	Increase in average temperatures across the U.S. Increased frequency of extreme heat events.	Increase in average demand for cooling services at VA facilities.	High	Medium
Energy Management	Energy grid strain/facility electricity reliability	Increase in average temperatures across the U.S. Increased frequency of extreme heat events.	Increased demand for cooling energy (mostly electricity), especially during peak demand periods, due to increasing temperatures. The increased demand could lead to grid strain and more frequent brownouts.	High	Medium/ High
Energy Management	Meeting facility heating energy demand	Increase in average temperatures across the U.S. Some areas of the country are expected to have more extreme winter cold events.	Decreased average demand for heating services at VA facilities due to increasing temperatures. Extreme cold events can increase the demand for heating services.	High	Medium
Energy Management	Managing energy disturbances	Increased frequency and severity of floods and extreme weather events (e.g., hurricanes, tornadoes, ice/snow storms).	Extreme weather events that disrupt energy availability.	High	Medium/ High

Planning areas	Stresses to systems in planning area	Projected climate change impact	Projected impact of changes to systems in this planning area	Vulnerability of systems	Priority of planning area
Land Management	Managing pests (e.g., weeds and disease vectors)	More invasive species present; habitat ranges expanding, and increased occurrence of weeds and insects (potentially insects carrying vector-borne diseases).	Increased demand for pest management and potentially new treatments needed to manage pests.	Low	Low
Land Management	Responding to forest fires and wildfires	Increased frequency of forest fires and wildfires. Longer fire season (especially in the West) due to drier summers.	Potential damage to VA structures and land as well as increased demand for resources to repair damage.	Medium	Low/ Medium
Health Care Planning and Response	Heat stress	Increased frequency and intensity of heat waves across the entire U.S. More days with temperatures exceeding 100°F, particularly in southern regions of the country.	Potential increased frequency of health visits for heat-related illnesses such as cardiovascular disease. Elderly, homeless, and VA staff working outdoors are especially at risk.	Low	Low
Health Care Planning and Response	Poor air quality	Decreased air quality, particularly increased ground-level ozone due to increased temperatures and humidity. Decreased air quality due to forest fires and wildfires.	Increased frequency of health visits for asthma and other illnesses related to air quality such as cardiovascular disease. Elderly, homeless, VA staff working outdoors, and children are especially at risk.	High	High
Health Care Planning and Response	Emerging diseases and expanding disease ranges	Average increase in temperatures across the U.S.	Potential increased frequency of zoonotic (passed from animal to human) disease outbreaks and expanding ranges of insects carrying vector-borne disease.	Medium	Medium/ High
Health Care Planning and Response	Increased pollen/allergens	Increased growth and toxicity of some plants due to increased carbon dioxide levels.	Earlier onset of allergy season, increased pollen count, and increased toxicity of poison ivy and other rash-inducing plants. Veterans and staff could be affected.	Low	Low
Health Care Planning and Response	Increased risk of food-borne diseases	Increased frequency of heavy rainfall events. Average increase in temperatures across the U.S.	Risk of increase of some illnesses (such as salmonella) during high-temperature days. Heavy rainfall and flooding could contaminate fresh produce. Veterans and staff could be affected.	Medium	Medium/ High
Health Care Planning and Response	Increased risk of water-borne diseases	Increased frequency of heavy rainfall events, which will lead to increased storm water and pollution runoff in waterways.	Increased risk of water-borne diseases (e.g., in storm water runoff, especially in areas with combined sewage systems) to Veterans and staff.	Medium	Medium/ High
Health Care Planning and Response	Emergency response	Increased frequency and severity of floods and extreme weather events (e.g., hurricanes, tornadoes, ice/snow storms).	Strained ability to raise readiness to provide services and protect people and assets continuously and in times of crisis/emergency.	High	High
Health Care Planning and Response	Mental health stress	Increased frequency and severity of floods and extreme weather events (e.g., hurricanes, tornadoes, ice/snow storms).	Increased risk of mental health disorders from stress among patients after extreme climate events. Veterans with current/previous mental health problems could be at higher risk.	High	Medium

Planning areas	Stresses to systems in planning area	Projected climate change impact	Projected impact of changes to systems in this planning area	Vulnerability of systems	Priority of planning area
Health Care Planning and Response	Health risks due to exposure of Veterans while in active duty	Expanded disease ranges due to increase in average temperatures. Increased risk of water-borne and vector-borne diseases due to increased severe weather events and flooding.	Increased health risks to Veterans and hospital staff exposed to diseases from foreign countries.	Medium	Medium/High
New Construction and Major Renovations	Veteran migration/ population shifts	Increased severity and frequency of extreme weather events. Increased frequency of heat waves and drought.	Veterans moving for the short term after a natural disaster or for the long term to more mild climates. Increased stress on ability to serve Veterans because of potential strains on hospital capacity and potential inability to access patient records at different hospitals.	Medium	Medium/High
Health Care Planning and Response	Meeting demand for Veteran services resulting from increased demand for military services	Increased global instability and conflict due to increased severity and frequency of extreme weather events and increased frequency of heat waves and drought.	Increased demand for military services to respond to conflicts and correlated increased demand for VA services.	Medium	Medium/High