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U.S. Environmental Protection Agency • Region 6 • Dallas, Texas

Climate Change Adaptation Implementation Plan

Prepared by:

The Region 6 Clean Energy & Climate Change Work Group

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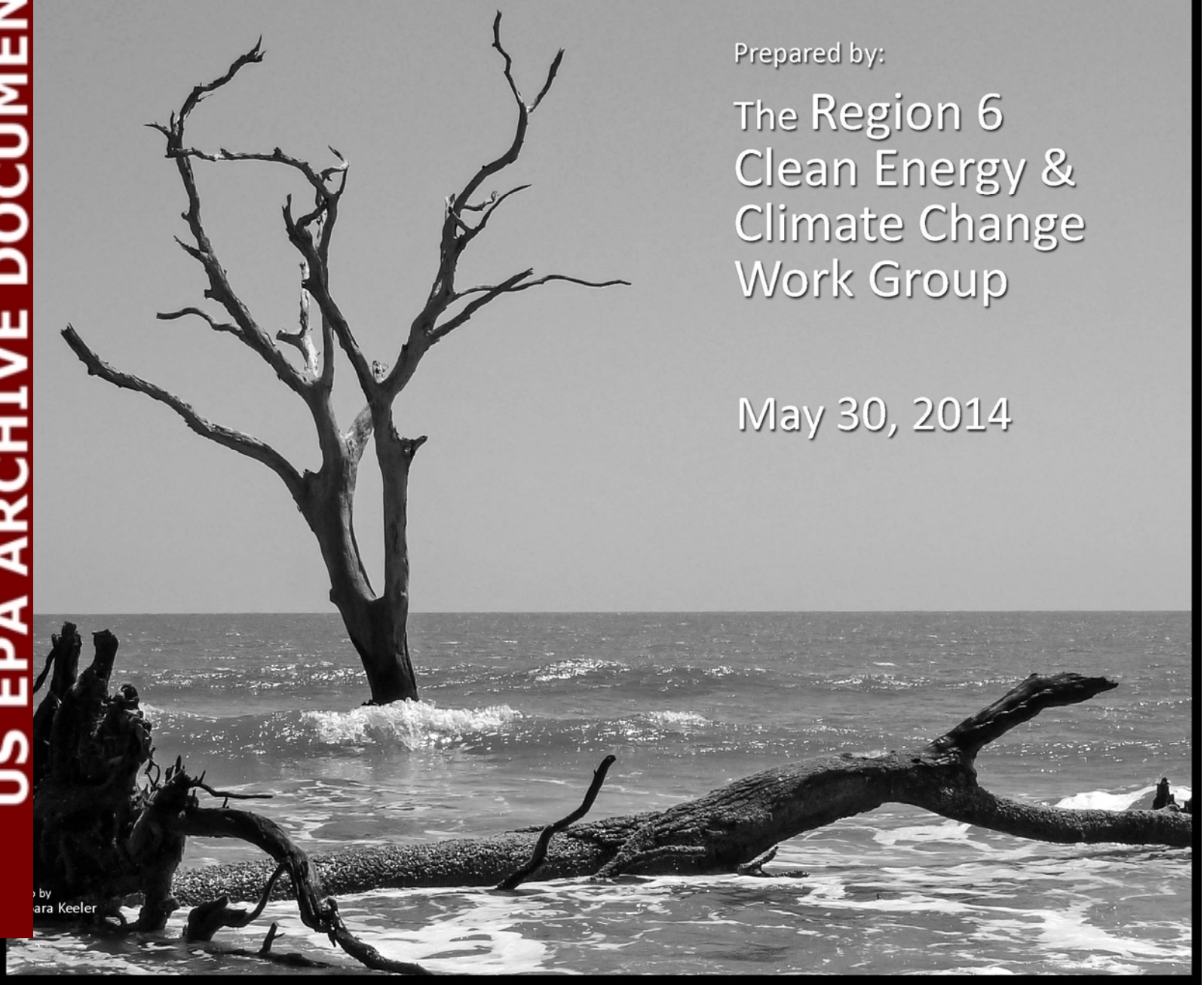

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Preface

The U.S. Environmental Protection Agency (EPA) is committed to identifying and responding to the challenges that a changing climate poses to human health and the environment.

Scientific evidence demonstrates that the climate is changing at an increasingly rapid rate, outside the range to which society has adapted in the past. These changes can pose significant challenges to the EPA's ability to fulfill its mission. The EPA must adapt to climate change if it is to continue fulfilling its statutory, regulatory and programmatic requirements. The Agency is therefore anticipating and planning for future changes in climate to ensure it continues to fulfill its mission of protecting human health and the environment even as the climate changes.

In February 2013, the EPA released its draft *Climate Change Adaptation Plan* to the public for review and comment. The plan relies on peer-reviewed scientific information and expert judgment to identify vulnerabilities to EPA's mission and goals from climate change. The plan also presents 10 priority actions that EPA will take to ensure that its programs, policies, rules, and operations will remain effective under future climatic conditions. The priority placed on mainstreaming climate adaptation within EPA complements efforts to encourage and mainstream adaptation planning across the entire federal government.

Following completion of the draft *Climate Change Adaptation Plan*, each EPA National Environmental Program Office, all 10 Regional Offices, and several National Support Offices developed a *Climate Adaptation Implementation Plan* to provide more detail on how it will carry out the work called for in the agency-wide plan. Each *Implementation Plan* articulates how the office will integrate climate adaptation into its planning and work in a manner consistent and compatible with its goals and objectives.

Taken together, the *Implementation Plans* demonstrate how the EPA will attain the 10 agency-wide priorities presented in the *Climate Change Adaptation Plan*. A central element of all of EPA's plans is to build and strengthen its adaptive capacity and work with its partners to build capacity in states, tribes, and local communities. EPA will empower its staff and partners by increasing their awareness of ways that climate change may affect their ability to implement effective programs, and by providing them with the necessary data, information, and tools to integrate climate adaptation into their work.

Each Program and Regional Office's *Implementation Plan* contains an initial assessment of the implications of climate change for the organization's goals and objectives. These "program vulnerability assessments" are living documents that will be updated as needed to account for new knowledge, data, and scientific evidence about the impacts of climate change on EPA's mission. The plan then identifies specific priority actions that the office will take to begin addressing its vulnerabilities and mainstreaming climate change adaptation into its activities. Criteria for the selection of priorities are discussed. An emphasis is placed on protecting the most vulnerable people and places, on supporting the development of adaptive capacity in the tribes, and on identifying clear steps for ongoing collaboration with tribal governments.

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Because EPA's Programs and Regions and partners will be learning by experience as they mainstream climate adaptation planning into their activities, it will be essential to evaluate their efforts in order to understand how well different approaches work and how they can be improved. Each *Implementation Plan* therefore includes a discussion of how the organization will regularly evaluate the effectiveness of its adaptation efforts and make adjustments where necessary.

The set of *Implementation Plans* are a sign of EPA's leadership and commitment to help build the nation's adaptive capacity that is so vital to the goal of protecting human health and the environment. Working with its partners, the Agency will help promote a healthy and prosperous nation that is resilient to a changing climate.

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September 2013

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Introduction

The EPA Region 6 Climate Change Adaptation Implementation Plan stems from the National Climate Adaptation Plan which was prepared by EPA to fulfill the requirements of Executive Order 13514, calling for all Federal Agencies to develop a plan on how they will address climate change adaptation. EPA's draft Adaptation Plan was submitted to the White House Council on Environmental Quality in June of 2012, and has undergone a tribal consultation as well as a public review and comment period that ended April 9, 2012. EPA expects to publish the final Climate Adaptation Plan in 2014. While the Adaptation Plan was under development, EPA Administrator Jackson issued a *Policy Statement on Climate Change* in June 2011. The *Policy Statement* recognizes that climate change can pose significant challenges to EPA's ability to fulfill its mission, and calls for the Agency to anticipate and plan for future changes in climate and incorporate considerations of climate change into its activities. The *Policy Statement* also directs all EPA Program and Regional Offices to develop Implementation Plans that provide more detail on how they will meet the priorities and carry out the work called for in the Agency's Adaptation Plan.

In response to the Policy Statement, the Region 6 Clean Energy and Climate Change Workgroup produced a draft Regional Implementation Plan and submitted it to EPA's Office of Policy on September 18, 2013. The Plan, along with the draft Implementation Plans developed by all EPA Program Offices and Regional Offices were the subject of a Federal Register notice of availability and request for public review and comment in late 2013. The comments were reviewed by EPA Region 6 and, where appropriate, changes were made to this revision of the Implementation Plan.

The Regional Implementation Plans explain how climate change considerations will be integrated and mainstreamed into programs, policies and operations to ensure they are effective under future climate conditions. Through the Implementation Plans, EPA will continue to protect human health and the environment while accounting for the effects of climate change. The EPA Region 6 Climate Change Adaptation Implementation Plan discusses climate change vulnerabilities the Region will face in coming years, identifies priority actions the Region will take in response to these vulnerabilities, outlines an approach for measuring and evaluating performance, and stresses the importance of working in partnership with stakeholders, states, tribes, and vulnerable communities and places. The Implementation Plan is an evolving document, and will certainly change as new information about the climate and ways to mitigate and adapt to it become available. As a result, periodic updates and changes to this Plan are expected.

This Regional Implementation Plan is voluntary in nature. It does not impose any legally binding requirements or funding commitments on EPA, states, tribes, the public, or the regulated community. Its goal is to address the challenges that a changing climate present to the Region's internal operations, focusing on critical programs, policies and procedures, and to develop and implement appropriate adaptive measures. State and local decision makers remain free to exercise their discretion in choosing to implement the actions described in this Plan. Flexibility is a key aspect of adaptation because it is highly localized and dependent on a variety of site specific factors. EPA further recognizes that the implementation of adaptation measures is contingent upon the availability of resources which could be subject to change.

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Relationship to Sustainability

Many of the adaptations described in this Implementation Plan relate to sustainability. EPA's efforts to address sustainability are described at:

http://www.epa.gov/sustainability/basicinfo.htm#sustainability.

Sustainability is based on a simple principle: Everything that we need for our survival and well-being depends, either directly or indirectly, on our natural environment. Sustainability has emerged as a serious concern as a result of the unintended social, environmental, and economic consequences of rapid population growth, economic growth and consumption of our natural resources. Climate change impacts can affect the natural environment and even our survival and well-being. We will need to adapt in order to support the delicate balance among a healthy environment, societal well-being, and a strong economy.

In the context of this Implementation Plan, sustainability also refers to the momentum and persistence of Region 6 efforts to champion certain approaches or changes in behavior that promote adaptation to a changing climate. Should EPA's involvement at some point become more limited or need to be redirected, Region 6 wants to ensure that the initiative will continue to grow without our presence.

In some cases, market forces will continue to push desired outcomes even without the Agency's involvement. For example, in the drought stricken State of Texas, water conservation and efficiency campaigns through the WaterSense program have been launched by EPA to encourage changes in the way Texans use water in the industrial, agricultural, municipal and domestic sectors. As the demand for water continues to grow and supplies diminish, water will inevitably become more expensive and the free market economy will respond with a variety of water saving devices and products that were previously not widely available. This economic response would likely occur with or without government sponsored water conservation campaigns. Moreover, local watering restrictions and state permitting procedures would enforce water use restrictions beyond involvement by the federal government. Thus, sustainability in water conservation and efficiency would be achieved by market forces, even though an early catalyst to use water more efficiently was created by government. In other cases where market forces provide less motivation to change, EPA's partnerships with organizations aligned with our environmental and public health protection goals will be needed to continue promoting climate adaptation initiatives.

The federal government has an important and unique role in climate change adaptation, but is only one part of a broader effort that must include public and private partners throughout the country and internationally. Partnerships with local communities, tribes, states, other governments, businesses, and international organizations, many of which have already begun to implement adaptation measures, are essential. EPA's leadership and commitment to help build the nation's adaptive capacity are vital to the goal of protecting human health and the environment. Working with our partners, the Agency will help promote a healthy and prosperous nation that is resilient to a changing climate.

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Part 1: Vulnerability Assessment

1.1 Geographic Setting

Region 6 straddles three different climate regions identified by the U.S. Global Change Research Program: the Great Plains, the Southeast and the Southwest. The majority of Region 6 (by land mass) lies in the Great Plains Climate Region.

Climate Regions

The Third National Climate Assessment (NCA3) was released in May 2014, to fulfill the requirements of the Global Change Research Act. To complete the assessment more than 70 workshops were held, comprised of a wide range of stakeholders who identified issues and information for inclusion in the report. Also, over 300 experts compiled and wrote the NCA3, which draws from an extensive number of peer-reviewed scientific research efforts on climate change and related topics. The NCA3 identifies eight different climate regions throughout the United States. While the NCA3 delineates the climate regions by state boundaries, adjacent areas in two climate regions may bear more similar climate characteristics than that described in the climate region. For example, in EPA Region 6 part of coastal Texas has climate characteristics related more to the Southeast climate region as opposed to the Great Plains.

For all U.S. regions, the NCA3 reports that warming in the future is projected to be very large compared to historical variations. Higher temperatures also contribute to the formation of harmful air pollutants and allergens (Portier, et al., 2010). Ground-level ozone is projected to increase in the 19 largest urban areas of the Southeast, leading to an increase in deaths (Chang, et al., 2010). Precipitation patterns will be altered as well, with some regions becoming drier and some wetter. The heaviest precipitation events are projected to increase everywhere, and by large amounts. Extended dry spells are also projected to increase in length. Some areas could capitalize on longer growing seasons which could benefit the agricultural sector in parts of the U.S.

Key climate change projections and related issues and impacts for the climate regions and Region 6 states are presented in the following discussion.

Great Plains

The Great Plains Climate Region extends from the Dakotas and Montana in the north to Texas in the south. On the west, it is bounded by the Rocky Mountains and the Basin and Range geographic provinces, and the central lowlands and coastal plain provinces to the east and to the south. Parts of eight states in two EPA Regions (6 and 8) are located in this vast grassland prairie and mountainous region, which nevertheless includes several very large and rapidly growing urban areas.

Oklahoma and Texas, in EPA Region 6, make up the southernmost extent of the Great Plains climate region. Climate projections summarized in the NCA3 suggest more frequent and more intense droughts, severe rainfall events, and heat waves. The NCA3 identifies key climate change projections, issues and impacts for this region to include:

1. Rising temperatures are leading to increased demand for water and energy. In parts of the region, this will constrain development, stress natural resources, and increase competition for water among communities, agriculture, energy production, and ecological needs.

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2. Changes to crop growth cycles due to warming winters and alterations in the timing and magnitude of rainfall events have already been observed; as these trends continue, they will require new agriculture and livestock management practices.

3. Landscape fragmentation is increasing, for example, in the context of energy development activities in the northern Great Plains. A highly fragmented landscape will hinder adaptation of species when climate change alters habitat composition and timing of plant development cycles.

4. Communities that are already the most vulnerable to weather and climate extremes will be stressed even further by more frequent extreme events occurring within an already highly variable climate system.

5. The magnitude of expected changes will exceed those experienced in the last century. Existing adaptation and planning efforts are inadequate to respond to these projected impacts.

Southeast

The Southeast climate region includes Atlantic and Gulf coastal states of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, and Louisiana. Inland states comprising the region include Kentucky, Tennessee, and Arkansas. In EPA Region 6, Arkansas and Louisiana belong to the Southeast climate region. The NCA3 reports that temperatures across this region are expected to increase during the next century, with a significant increase in the number of hot days exceeding 95°F, and decreases in freezing events. Projections of future precipitation patterns are less certain than projections for temperature increases, with many models projecting drier conditions in the far southwest of the region and wetter conditions in the far northeast of the region. The coastal area of this region is also vulnerable to sea level rise and coastal land loss, with related threats to infrastructure through inundation, and salt water intrusion threatening agricultural practices and drinking water sources (Parris, et al., 2012). All of these projected changes and impacts are expected to be compounded by population growth projections for the region. Though part of the Great Plains climate region, areas along the Texas coast may experience climate change issues and impacts more similar to those projected for the coastal areas in Louisiana. Key climate change projections, issues and impacts reported in the NCA3 for this area include:

1. For coastal Louisiana (and possibly parts of coastal Texas), sea level rise (and associated coastal land loss) poses widespread and continuing threats to both natural and built environments and to the regional economy.

2. Decreased water availability, exacerbated by population growth and land-use change, will continue to increase competition for water and affect the region's economy and unique ecosystems.

3. Increasing temperatures and the associated increase in frequency, intensity, and duration of extreme heat events will affect public health, natural and built environments, energy, agriculture, and forestry.

Southwest

The Southwest climate region extends westward from New Mexico and Colorado all the way to the West coast and includes the states of Arizona, Utah, Nevada and California as well. This vast mountainous and arid region is the driest and hottest part of the United States. Although New Mexico is the lone state in EPA Region 6 that belongs to the Southwest Climate Region,

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areas in West Texas and the panhandle of Oklahoma may experience similar climate change effects. The NCA3 reports that climate changes will pose challenges for the already parched region that is expected to get hotter and, in its southern half, significantly drier. Increased heat and changes to rain and snowpack will impact the region's agriculture sector, and population growth will compound the effects of climate change. Severe and sustained drought will stress water sources, already over-utilized in many areas, forcing increasing competition among farmers, energy producers, urban dwellers, and plant and animal life. Tourism and recreational industries could experience economic losses due to these projected changes. The following climate change projections, impacts and issues which apply to parts of New Mexico, are noted in the NCA3:

1. Snowpack and streamflow amounts are projected to decline in parts of the Southwest, decreasing surface water supply reliability for cities, agriculture, and ecosystems.
2. Increased warming, drought, and insect outbreaks, all caused by or linked to climate change, have increased wildfires and impacts to people and ecosystems in the Southwest. Fire models project more wildfire and increased risks to communities across extensive areas.
3. Projected regional temperature increases, combined with the way cities amplify heat, will pose increased threats and costs to public health in southwestern cities, which is where more than 90% of the region's population live. Disruptions to urban electricity and water supplies will exacerbate these health problems.

As a result of this geographic and climate diversity, Region 6 could face many different types of climate change impacts, including increases in air and water temperatures, drought, increased flooding, increased frequency and intensity of extreme precipitation events, loss of habitat and reduced ecosystem functions, and a general deterioration of water quality. The southeastern part of Region 6 will face continuing problems of sea level rise and coastal land loss, while the western section of Region 6 will likely experience reduced snowpack and associated impacts to natural water storage and discharge in the mountains of New Mexico. These impacts are expected to be compounded by continued drought, population growth and competing demands for fresh water among the industrial, agricultural, energy and municipal sectors throughout Region 6.

1.2 Adaptation Planning

The term "adaptation" relates, in this context, to changes in natural ecosystems that are induced by climate change or to adjustments we make to expected changes in climate. Such adjustments can be defensive in nature (e.g., infrastructure changes to anticipate climate change impacts) or opportunistic (e.g., expanding agriculture in areas that have become more climatically amenable). Historically, humans have adapted to environmental and climate changes by growing different crops, modifying shelter types, and moving to new areas (Adger et al., 2007). However, with the current pressures of climate change on expanding populations, it will be increasingly difficult for societies to adapt. With increasing interdependence, impacts on one population or economy can have world-wide repercussions (USGCRP, 2009; U.S. EPA, 2012a).

In response to this challenge, an Interagency Climate Change Adaptation Task Force has been created and is co-chaired by the White House Council on Environmental Quality (CEQ),

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the White House Office of Science and Technology Policy, and the National Oceanic and Atmospheric Administration. There are also representatives from over 20 federal agencies on this Task Force. The objective is to develop recommendations to the President about what federal government can do to better prepare for climate change impacts. One of the first steps is for each agency to integrate climate change adaptation into their planning, operations, and policies and to develop a climate change adaptation plan (U.S. EPA, 2012b).

EPA issued a climate change adaptation policy statement in June 2011 (U.S. EPA, 2011) and a year later completed an agency-wide Climate Adaptation Plan. The policy statement requires every program and each regional office to develop an Implementation Plan outlining the projected impacts of climate change on its operations and programs, as we well as carrying out the work called for in the Agency-wide Plan.

In response, Region 6 coordinated among all its Divisions and with its standing Clean Energy-Climate Change (CECC) Workgroup. In 2008, the CECC Workgroup produced a strategic plan for Regional climate change priorities, which served as a starting point for the Implementation Plan. The EPA Office of Water's "National Water Program 2012 Strategy: Response to Climate Change," the NCA3, and reports from the Intergovernmental Panel on Climate Change proved to be additional valuable resources to inform the development of the Implementation Plan. The Region also gleaned insights by coordinating in 2011 and 2012 with state, tribal, and local governments in the south-central U.S. The challenges expressed by these governments assisted our efforts to clarify potential vulnerabilities.

Region 6 concluded that our main vulnerabilities internal to our operations involve increasing air temperatures and worsening air quality, water quantity and quality issues, emergency response challenges, contaminated site cleanups (CERCLA, RCRA, Brownfields, LUST), the consequences of enhanced use of pesticides and herbicides, coastal resource protection, increased requests for assistance from vulnerable populations and tribes, and supporting the continuity of Region 6 internal operations by providing consistent electrical power and water to Regional facilities.

Although this document speaks specifically to climate change adaptation, the Region has a host of additional climate change efforts that fall under the separate category of climate change mitigation. As a review, climate change adaptation relates to adjusting to a changing environment while climate change mitigation refers to reducing the human influences on the climate system. Examples of climate change mitigation would include strategies to reduce greenhouse gas (GHG) emissions and increasing the capacity of carbon sinks. By contrast, an adaptation measure might be to move coastal infrastructure further inland in response to the effects of relative sea level rise.

Region 6 has a strong and ongoing climate change mitigation program including a greenhouse gas reduction initiative, technical programs to enhance geosequestration capacity, and efforts to promote energy efficiency used for irrigation and water utilities. However, this implementation plan speaks specifically to adaptation actions. Future revisions to this Implementation Plan may include mitigation activities.

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1.3 Vulnerabilities to Climate Change Impacts

Generally, climate scientists predict that mean temperatures in the five states of Region 6 will rise significantly in the 21st century. This will result in higher mean low temperatures in the winter. In summer months, greater frequencies of heat waves are expected, with elevated high and low temperatures.

Projections of precipitation changes are less certain than those for temperature. In the Great Plains, the NCA3 notes that the number of days with heavy precipitation is expected to increase by mid-century, especially in the north. Large parts of Texas and Oklahoma are projected to see longer dry spells (Garfin, et al., 2014).) Under a continuation of current rising emissions trends, reduced winter and spring precipitation is consistently projected for the southern part of the Southwest by 2100 (Garfin, et al., 2014). Much of the southern plains and New Mexico currently experience modest to little precipitation, but it comes with a high degree of inter-annual variability. The NCA3 notes that “extreme precipitation events” will constitute a larger percentage of the total, which could prompt greater flooding. Seasonal shifts are likely to affect snow packs in the mountains of New Mexico, where runoff is expected earlier in the spring and summer, with attendant decreases in runoff in the warmer months. Droughts are expected to become more frequent and larger in spatial extent and thus more damaging. The NCA3 reports that warmer air temperatures, drought conditions and related impacts such as decreased soil moisture could lead to an increased frequency and spatial extent of wildfires.

Climate change may also play a role in the effects of hurricanes along the Gulf coast, with some studies showing a lower frequency but slightly higher intensity of hurricanes (Knutson, et al., 2010). Hurricanes and tropical storms will continue to impact populations, industry, land, and wildlife in Louisiana and Texas. Coastal land loss and relative sea-level rise are ongoing challenges in Louisiana and Texas, where some of the highest existing rates of wetland loss occur. Climate change projections indicate that Gulf coastal ecosystems and communities will face increasing risks. Though vulnerable populations and critical infrastructure occur throughout the Gulf coastal zone, two of the largest population centers in the Region, the Houston-Galveston and the Baton Rouge-New Orleans corridors, have been subject to major hurricane and tropical storm damage in the past and are of particular concern.

Expected changes in temperature, drought and seasonality are anticipated to significantly impact municipal water availability, agricultural practices, ecosystem functions, types and extent of habitat coverage, occurrence of pest problems, human health, population displacement, coastal infrastructure security, coastal land loss, and air quality in the Region. Complicating this overall picture is a continuing, underlying variability in weather systems which may temporarily modify these overall trends and subject the Region to greater weather variability (Christensen et al., 2007; U.S. EPA, 2012c; Nielsen-Gammon, 2009; Deser et al., 2012; Longergan, 1998; Hanes et al., 2000; Martens et al., 1997).

In order to evaluate fully the vulnerabilities these changing conditions pose to the Region, a full assessment was made of the Regional responsibilities by programmatic Divisions. A Regional organizational chart is included for reference as Figure 1, and a summary of the results is provided in Table 1. Overall, many of the projections for climate change impacts and environmental consequences were found to be consistent with findings from the Intergovernmental Panel on Climate Change Fourth Assessment Report (Field et al., 2007).

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1.4 Region 6 Program Impacts

1.4.1 Multimedia Planning and Permitting Division

1.4.1.1 Air Quality

Currently there are three metropolitan areas that fail to meet the National Ambient Air Quality Standard (NAAQS) for ozone in Region 6. However, up to 18 other areas in Region 6 have recently monitored concentrations exceeding the new NAAQS standard of 75 parts per billion and may ultimately become “nonattainment” areas. Exacerbating the health impacts from ozone pollution on urban populations will likely be higher nighttime temperatures expected in urban areas, both as a consequence of climate change but also because of enhanced effects from urban heat islands. This is apparently particularly evident in sprawling urban centers, which are common in Region 6 (Stone et al., 2010).

A related complication for ozone pollution is an anticipated increase in electricity demand due to higher temperatures in the summer. A further, related complication is the availability of water for power plant cooling purposes. Without sufficient quantities of water that is cool enough, interruptions in service or even shutdowns could occur at these power plants, as happened during the summer of 2011 in Texas (ERCOT, 2011).

Further, other air pollutants, such as particulate matter and sulfur dioxide, may become problematic in Region 6, particularly if many additional fossil-fueled power plants are built to meet an accelerating electricity demand. These may also negatively impact progress in attaining the goals of the Regional Haze Program in Class I National Park and Wilderness Areas. Increased frequency and spatial extent of wildfires due to enhanced droughts may significantly increase particulate matter loadings in the atmosphere (U.S. EPA, 2009).

Greenhouse gas (GHG) emissions from power plants and industrial sources in Region 6 contribute to elevated atmospheric concentrations of GHG pollutants, which endanger both public health and welfare. New major stationary sources and major modifications at existing stationary sources are required by the Clean Air Act to obtain a GHG air quality permit before commencing operations.

EPA Region 6 is currently the GHG Permitting authority for GHG Prevention of Significant Deterioration (PSD) in Texas and is implementing this permitting program in Texas under a Federal Implementation Plan. The other Region 6 states are implementing their own GHG PSD permitting programs through their EPA approved regulations. With an expectation of increased industrial activity in Region 6 states, EPA-Region 6 will continue to perform direct permit development or permit development oversight in those states.

Best Available Control Technology (BACT) determinations for GHGs currently consider options that improve the overall energy efficiency of new stationary sources or existing sources undergoing a major modification. As the climate changes, these BACT determinations may become more detailed and comprehensive, requiring an increased level of Region 6 involvement in order to ensure that sources are constructed and operated in a manner consistent with achieving the energy efficiency goals established as BACT.

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1.4.1.2 Pesticides

Local, regional, and global climate changes that result in an increase and duration of mean and extreme temperature, and a reduced average rain fall in combination with extreme precipitation events and floods, are predicted to result in the increased use of pesticides by volume, target site, and type.

The region is likely to experience increased incidence of existing pests, exotic invasive species, and the rise of new endemic pests. The reduced availability of land for agricultural use, decrease in quality and quantity of water for irrigation, decrease in favorable growing seasons, and increased demand on commodities will have a significant impact on crops. The risk of vector-borne diseases that affect public health and agriculture will likely increase dramatically. This is not only due a predicted increase in abundance of endemic and invasive pest species, but also due to predicted changes to migration patterns of vertebrate hosts, human introduction, and temperature conditions that promote decreased development time for pests and increased pathogen amplification.

As a consequence of the impacts that pests and pest-borne diseases will have on crops and humans, it is expected that the quantity, formulation, or classification of pesticides will change in order to combat these pests. It is reasonable to expect that this increase in pesticide use will generate additional risk to workers, specifically those in agriculture. The use of new and/or unfamiliar pesticides for new or invasive species will pose challenges in communicating risks and implications to workers. Issues will include exposure, reentry requirements, health and personal protective equipment requirements. With an increase in extreme rainfall events and floods, increased pesticide run-off and contamination of both surface and ground water may occur. Such events could reasonably be expected to have significant implications for surface and groundwater quality throughout the Region. Any increased use of pesticides in quantity, formulation or classification may also increase exposure risks to pollinators. New endemic and exotic pests may require the use of pesticides on new target sites and time periods that increase the risk of pesticide exposure to honey bees, native bees, and other beneficial pollinators (i.e., spraying of pesticides for daytime biting mosquitoes that transmit human disease). Introduction of novel pesticides and application techniques must consider their impact on pollinators in a changing climate.

1.4.1.3 Waste Site Management

Flooding from more intense and/or frequent storms may lead to contaminant releases from Corrective Action waste management sites. Inundation and flooding may lead to transport of contaminants through surface soils, ground water, surface waters and/or coastal waters. Saltwater intrusion and increased ground water salinity in coastal aquifers may also increase the permeability of clay liners installed at waste sites, such as landfills, allowing contaminants to spread to nearby properties. These contaminant releases may pose an increased risk of adverse health and environmental impacts.

Additionally, increased incidents of flooding may disrupt existing hazardous waste management networks. Inundation from relative sea level rise or severe storms may disrupt the transportation system in place to handle hazardous waste or may damage treatment, storage or disposal facility infrastructure. A major storm event may increase the amount of hazardous waste generated, and may lead to the release of hazardous materials. Smaller entities that use and store hazardous materials may lack resources for emergency planning, which may increase the risk of abandoned hazardous materials during a flooding or storm event.

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Changes in precipitation patterns and temperature may adversely affect the performance and efficacy of remedies, and cleanup timing and duration. To the extent that climate change leads to more prolonged droughts, water intensive remedies may become limited and the risk of wildfires spreading to contaminated sites and chemical storage areas may increase (e.g., Los Alamos National Lab). Changes in precipitation may affect the rate at which vegetation grows, impacting landfill covers, phytoremediation, ecological revitalization efforts, and remedies relying on biological processes (e.g., land farming and enhanced monitored natural attenuation). The impacts may be positive or negative, depending on conditions at each site. Groundwater characteristics (i.e., depth, flow, chemistry) may also be altered, resulting in potential adverse impacts on the performance and cost of remediation. To the extent that temperatures increase with climate change, contaminants at cleanup sites may become more volatile, increasing risks for local populations.

1.4.2 Water Quality Protection Division

Numerous environmental complications from expected climate change in Region 6 center around the complex and interrelated issues of drought and inundation. General population growth and shifts in population from the Region's rural areas to urban centers will continue to create demands for water storage to maintain sustainable water supplies and increase competition among water users (e.g., energy, industrial, agricultural and municipal uses). Decreased water availability due to increased temperature, increased evaporation, and longer periods of time between rainfall events, coupled with an increase in societal demand, is very likely to affect many sectors of the Region's economy. More frequent and more intense droughts could adversely impact agriculture, silvaculture, energy production and a myriad of other industries and economic sectors.

Decreases in water supply for fire protection could also hamper the capacity of local, state and federal fire-fighting efforts, which could lead to fire loss increases including human life, property, infrastructure, and ecosystem flora, fauna, habitat, and function. Declines in soil moisture are expected to increase the magnitude and frequency of wildfires, which have increased over the last 30 years, and to impact water quality in streams, creeks, rivers, lakes.

Reduced groundwater supply due to a lack of recharge will also be a concern. Declining surface and groundwater quantity and quality, coupled with more frequent and severe droughts, will continue to exacerbate water shortages in the Region.

Loss of snowpack in the western portion of the Region will further impact water use, storage, and irrigation practices. Warmer temperatures will reduce mountain snow packs and peak spring runoff from snow melt will shift to earlier in the season, increasing the shortage of water during the summer. A longer and hotter warm season will likely result in longer periods of extremely low flow and lower minimum flows in late summer. Water supply systems that have no storage or limited storage (e.g., small municipal reservoirs) may suffer seasonal shortages in summer and ecosystems and wildlife may be stressed. The resulting temporal changes in water distribution, storage and availability could have significant consequences for water reservoir and storage system design, operation and management to ensure municipal (e.g., drinking water and fire protection), agricultural and irrigation, industrial, energy production, and other critical needs are met. Moreover, the temporal changes in water distribution, storage and availability could impact downstream water quality and aquatic life. These changes must be

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taken into consideration as the adequacy of current water infrastructure is evaluated and as new infrastructure is designed and brought into service.

Possible increases in the frequency and altered timing of flooding could increase risks to people, ecosystems, and infrastructure. Increased flooding could occur as a result of an increased percentage of winter precipitation falling as rain. Water quality impacts will be amplified both by increases in precipitation intensity and by longer periods of low flow in streams. Increased nonpoint source pollution (e.g., sediments, phosphorus, and nitrogen) is to be expected as a result of increased periods of intense rainfall. This could result in changes to natural stream morphology and could negatively impact the functioning of aquatic ecosystems.

As relative sea levels rise and rainfall patterns change, the physical and chemical structure of estuaries, coastal wetlands, and tidal rivers are likely to become more variable and potentially less sustainable. Some of the fastest rates of relative sea level rise in the U.S. are occurring in areas where the land is subsiding, including parts of the Gulf coast. For example, in coastal Louisiana, relative sea level rise was about eight inches or more during the last 50 years, which is slightly faster than twice the global rate. Much of New Orleans sits below the mean local sea level and the State's only inhabited barrier island, Grand Isle, is reporting one of the highest sea level rise rates in the world. Projections are that an additional 1,750 square miles of Louisiana's coastal zone will be inundated in the next 50 years (CPRA, 2012). As the ecological risks grow so do the financial costs of maintaining and restoring coastal ecosystems. The challenge will be to leverage financial and technical resources with those from outside the agency in order to focus more on landscape scale coastal restoration projects, rather than on small projects yielding more limited results.

Relative sea levels will vary along the Gulf coast and will contribute to changing barrier island configurations and coastal shorelines. Wetlands will be drowned or eroded and low-lying areas, including some populated areas, will be inundated more frequently or permanently. Salinities will increase in the estuaries and aquifers. Hurricanes often have their greatest impact at the coastal margin where they make landfall, intensifying beach erosion, inland flooding, and wind-related damage to both cultural and natural resources. Increasing relative sea level rise, combined with the damaging effects of more intense storm surges and hurricanes, are expected to pose severe and growing risks to people, personal property, and public infrastructure along the coast. Infrastructure at risk includes energy, transportation and communications facilities, as well as wastewater treatment facilities and drinking water systems.

The Water Quality Protection Division will continue to heighten its focus on sustainable infrastructure and climate adaptation planning and implementation issues to ensure the water programs, policies and procedures remain effective even as the climate changes. Attention will include emergency response planning and recovery functions as well as maintaining the long-term viability of the Clean Water Act and Safe Drinking Water Act programs in a changing climate.

1.4.3 Management Division

Region 6 has its main facilities in three different Texas cities. The main Regional office is in downtown Dallas, the Regional laboratory is in Houston, and the U.S.- Mexico Border Office is

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in El Paso. Additionally, a Training and Conference Center is located in Addison, a suburb of Dallas.

In addition to fulfilling Executive Order commitments to reduce energy use, conserve water, reduce waste, and expand recycling, the Region will likely face acute power and water challenges in these locations. This is a consequence of being in an area of rapid population growth that is expected to experience significant warming and less reliable precipitation. Therefore, all these facilities could suffer from decreasing reliability of electrical power and water availability. For example, load-shedding occurred in the Texas electrical grid, ERCOT, in February 2011, with Electricity Emergency Alerts in summer 2011. In addition to employee discomfort from such a situation, without reliable power and water, information technology equipment may be compromised. Whether enhancing employee telework would be an effective response to these challenges is unclear.

1.4.4 Superfund Division

1.4.4.1 Emergency Response

Region 6 Emergency Response personnel are very familiar with the challenges of responding to emergencies and natural disasters, having worked for months in several different hurricane response activities, including that for Katrina in 2005. With hurricanes affecting the Gulf of Mexico coast perhaps being more powerful, coupled with an expected increase in extreme precipitation events, Emergency Response in Region 6 will be further challenged. Although the Region maintains a volunteer, basically trained “Regional Support Corps” to assist emergency response activities in an extreme short-term need, it is likely there will be shortages of specialized Emergency Response personnel to respond to these kinds of events in the future. This is particularly true of major events that may require many weeks or months of follow-up cleanup activities. Further, if the strength of future hurricanes and extreme precipitation events is as predicted, Emergency Response personnel may be confronted with a whole new set of challenges such as massive storm surges, larger and more widespread flash floods, and long-lived breakdowns in electricity grids and water and sewer systems.

1.4.4.2 Superfund Sites

A number of Superfund sites are located in vulnerable areas of Region 6, particularly the Gulf Coast regions of Texas and Louisiana. Rising coastal waters and massive storm surges could potentially flood sites where waste has been capped and left in place. Although most caps and barriers at Superfund sites are engineered to contain waste for many years, the possibility of long term and extensive flooding, even permanent submersion, could affect the integrity of engineered remedies at some sites where waste has been consolidated and remains in place.

Additionally, there are active Superfund cleanups expected to be ongoing for many years to come in the vulnerable Gulf Coast areas that will likely be impacted by energy shortages, flooding, storm surges, water shortages and other expected climate change impacts. For example, domestic or public water supplies could be affected in areas where Gulf Coast Superfund sites are utilizing energy intensive pump and treat methods to remedy groundwater contamination in aquifers used to supply drinking water. Or, as discussed above, EPA’s common practice of consolidating waste and leaving it in place in landfills or under engineered caps may no longer be protective of human health and the environment if climate changes result in frequent, massive flooding in the Gulf Coast areas.

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In December 2013, the Office of Solid Waste and Emergency Response Administrator issued a memorandum to "Encourage Greener Cleanups." The memorandum encouraged all Office of Solid Waste cleanup programs, including the Superfund program, to consider utilizing ASTM's Standard Guide for Green Cleanups (E 2893-13), for reducing the environmental footprints of cleanups. The Region 6 Superfund Division fully supports its project manager utilizing this ASTM Standard Guide to "green cleanups", including efforts to consider climate change and potential adaption when evaluating remedy selections.

1.4.4.3 Brownfields Sites

Brownfield sites in Region 6 exist in many different forms. Brownfield sites can vary from an old abandoned gas station or movie theater to an illegal dump site or old airport. Some of these sites are relatively small while others may cover many acres. It is the goal of the Brownfields program in Region 6 to encourage state, tribal, or local entities that are redeveloping old Brownfield sites to consider green technologies and sustainable practices that reduce energy use. In urban areas, the Region encourages development that reduces GHG effects and minimizes the urban footprint. Some of the Region 6 Brownfield sites have been returned to parks and to new construction that utilizes practices resulting in Leadership in Energy and Environmental Design (LEED) certification. These sustainable practices will continue to be important in the Region 6 Brownfield program and as a means of contributing to climate change adaptation.

1.4.5 Office of Environmental Justice and Tribal Affairs

The Region 6 Office of Environmental Justice and Tribal Affairs (OEJTA) oversees affirmative federal environmental protection programs for vulnerable communities and 66 tribal lands in Region 6. These represent populations that may be at greatest risk as climate change occurs in the future. Many lower-income minority areas are ones characterized by substandard infrastructure which may be the first to fail during times of high temperatures, drought or extreme precipitation events, for example. Older residents of urban areas may be particularly vulnerable to synergistic health impacts due to elevated night time temperatures which are expected as the climate changes. Tribes may be particularly affected by heat waves and drought conditions, as many are dependent upon natural resources on their tribal lands. OEJTA will be challenged to understand fully the differential impacts on these various communities, to educate themselves about how EPA may be able to assist these populations to protect human and environmental health, and to conduct effective outreach to these vulnerable populations.

As more of the Region's tribal partners begin to develop their own climate change adaptation plans, OEJTA will need assistance from Regional staff to help with these efforts. OEJTA should see an increase in this effort and the current draft Indian General Assistance Program guidance mentions this work as an eligible activity. This increase may occur as soon as 2013. Demands for funding to address climate change can be expected to increase and, therefore, there will be a greater need for grant funding from the Region 6 Management Division and OEJTA's EJ Small Grant program.

1.4.6 Compliance Assurance and Enforcement Division

Regional compliance and enforcement activities may be complicated by shifting priorities influenced by climate change. These could include a surge in violations of water-related regulations that may occur as a result of excessive precipitation events and floods. Air-related

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regulations could be more frequently violated because of stress on regional electricity grids. With electricity demand increasing, problematic financing for new electricity generating units, and long-term fuel trends complicating decision-making, construction of new power plants may not keep pace. Ensuring grid integrity may portend increasing difficulty meeting air emissions limits. These same factors can also influence success in meeting water quality effluent limits. Regular assessment of such trends will be necessary to ensure Regional compliance and enforcement resources are appropriately tailored to meet future challenges.

1.4.7 Office of Regional Counsel

The Region's broad mandates to protect human health and the environment afford a reservoir of legal authority to support adaptation work. However, specific legal questions that may arise in the course of adaptation programming cannot be answered in the abstract. As part of a federal agency, EPA Region 6 derives its authority to act from the U.S. Constitution and the laws passed by Congress. Because the legality of its actions is such a high priority for EPA, program managers and staff will consult with the appropriate attorneys in the Office of General Counsel (OGC), Offices of Regional Counsel (ORC), and the Office of Enforcement and Compliance Assurance (OECA) as they conduct their adaptation work.

The variation among the statutes our Region administers, as well as the regulatory programs EPA designs, implements, and enforces under those laws will require special attention and legal analysis on a case by case basis. The evolving scientific understanding of climate change impacts and the sensitivity of EPA programs to those impacts will also necessitate case specific analysis. The relative weight climate change considerations should be given in evaluating options for EPA action will depend on many factors including, but not limited to, the time and geographic scale of the relevant climate impacts compared to the temporal and spatial scale of the proposed EPA action; the scientific understanding of the climate impacts; and the environmental and economic consequences estimated to result from the proposed climate change adaptation measures. Considerations such as these are by definition case-specific. As such, Regional program managers and staff will consult with this Region's ORC branch for special analysis and legal application as discrete issues develop.

1.4.8 Cross Program Impacts

Cross-Divisional and interoffice communications and partnerships are essential methods for Region 6 to understand better its climate change adaptation vulnerabilities and to make plans to address these. The following is an illustrative, but certainly not exhaustive, list of these:

1.4.8.1 Communications — In light of a changing climate, Region will need to maintain strong EPA headquarters and Regional communications, as well as with states and tribes. We will also need to continue Regional training related to climate change (Regional Science Council and Clean Energy-Climate Change Workgroup), as well as outreach initiatives (WaterSense, meetings with elected officials, presentations to citizen groups) and conferences (Municipal Separate Storm Sewer Systems (MS4), Low Impact Development (LID), Green Infrastructure (GI), Clean Air Through Energy Efficiency Conference, and the Texas Combined Heat and Power Conference). Much of the internal communications and integration of climate change adaptation planning and implementation in Region 6 will continue to be coordinated through the cross-program Clean Energy and Climate Change Workgroup.

1.4.8.2 Partnerships — To leverage resources, involvement and cultivate a synergistic response from vested stakeholders, Region 6 will continue and expand partnerships with public, non-governmental organizations, and private sector organizations, such as Councils of

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Governments and Metropolitan Planning Organizations (e.g., NCTCOG), North Texas Sustainable Materials Forum, Texas Association of Builders, Texas AgriLife, DFW International Airport, Region 6 Tribes and vulnerable communities, sporting organizations (Greening Sports Initiative), the Electricity Reliability Council of Texas, Texas Public Utilities Commission, Arkansas Public Service Commission, and the Southwest Power Pool. Efforts will be made to expand informal partnerships throughout affected public and private sectors including but not limited to the municipal, industrial, energy, agricultural, and transportation sectors. Climate change adaptation will not be inclusive, integrated or effective unless these key relationships are developed, fostered, and mobilized into action through active EPA leadership.

1.5 Summary of Vulnerabilities

Region 6 faces many serious vulnerabilities in successfully fulfilling its mission as the climate changes. As an area of rapid population growth but one subject to major future temperature and precipitation changes, increasing numbers of people will be impacted by increased environmental pressures due to climate change. It is our goal to anticipate fully and understand the nature of such pressures in order to achieve our mission to protect human health and the environment in the Region. This vulnerability assessment reveals the current state of knowledge but will necessarily change as additional information is received and new scientific and technical knowledge is gained. Thus, the vulnerabilities outlined herein are expected to take on new characteristics and to continue to pose challenges over time.

Part 2: Responding to Vulnerabilities—Priority Actions

2.1 Overview

The NCA3 states that climate change is happening now and that adaptation efforts need to accelerate to address the impacts. From an Agency-wide perspective, ten separate priorities have been identified to respond to the climate change adaptation challenge:

(1) Fulfill strategic measures in FY 2014-2018 EPA Strategic Plan by such actions as integrating climate change trends and scenarios into five rule-making processes, five major financial mechanisms, and five major scientific models and/or decision support tools;

(2) Protect Agency facilities and operations;

(3) Factor legal considerations into adaptation efforts;

(4) Strengthen adaptive capacity of EPA staff and partners through training;

(5) Develop decision-support tools that enable EPA staff and partners to integrate climate adaptation planning into their work;

(6) Identify cross-EPA science needs related to climate adaptation;

(7) Partner with tribes to increase adaptive capacity;

(8) Focus on most vulnerable people and places;

(9) Measure and evaluate performance; and

10) Develop Program and Regional Office Implementation Plans.

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From the Region 6 perspective, we believe priorities 2, 4, 7, 8, 9, and 10 are the most relevant and lend themselves to direct Regional action. The other priorities are more properly addressed at the EPA headquarters program office level. The Region will defer to headquarters in those areas and will respond when guidance is issued.

To further clarify the Regional roles, EPA's Office of Policy identified several common areas of focus for the Regions:

(a) Vulnerability assessments;

(b) Priority actions on climate adaptation;

(c) Agency-wide strategic measures on climate adaptation;

(d) Legal and enforcement issues;

(e) Training and outreach;

(f) Partnerships with tribes;

(g) Vulnerable populations and places; and

(h) Evaluation and cross-office pilot projects.

As a precursor to completing this priority actions section of the Regional Implementation Plan, Region 6 completed a vulnerability assessment which broadly covers the major climate change-induced conditions to which the Region is expected to be susceptible.

2.2 Selection Criteria

The criteria for selecting priority actions comprised two categories. First, the major Regional vulnerabilities identified above provided the substance from which priority actions were derived. Second, agency priorities numbered 2, 4, 7, 8, 9, and 10 informed the process by which the Region proposed to deal with these priority actions.

2.3 Impacts and Actions

Priority actions relating to the Regional vulnerabilities are summarized in Table 1 and the discussion below provides more detail.

In order to most effectively adapt our ways of conducting business to the realities of climate change, the Region proposes a process that relies on training, some infrastructure enhancements, and constant monitoring and evaluation of indicators that signal climate change in the Region. This approach lends itself to more quickly responding to the effects of climate change than by prescribing many specific actions now which may be deemed ineffective and inappropriate in short order. The discussion below reflects this philosophy. Nonetheless, Table 2 presents specific programs the Region anticipates continuing to emphasize in order to minimize the effects of climate change on Regional operations.

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2.4 Priority Actions for Identified Regional Vulnerabilities

Priority Climate Change Adaptation Actions for 2016

1. Deliver Regional training on climate adaptation to managers and staff;
2. Consider options for the new Regional facility lease that use renewable energy power sources, energy efficient technologies, green infrastructure and low impact development approaches;
3. Mitigate drought impacts by setting water use efficiency goals and promotion of EPA's WaterSense™ program;
4. Continue to strengthen emergency planning and preparedness capabilities within the Region to enhance response capabilities for extreme weather events and natural disasters;
5. Work with Gulf Coast partners on coastal protection, restoration, and climate adaptation planning priorities; and
6. Expand partnerships with stakeholders to enhance climate adaptation opportunities and information sharing.

2.4.1 Higher mean temperatures, with more frequent and intense summer heat waves

The priority action in response to this anticipated impact would involve expanded training for Regional staff in the air program, pesticides program, environmental justice program, and in the Management Division. This training would emphasize the scientific basis and engineering implications of climate change for human health, the efficiencies and risks in employing new and/or alternate doses of existing pesticides, and safeguarding vulnerable urban populations. This latter concern may influence debate and decision-making about the robustness of ozone mitigation strategies in the Region. Also, Regional air program staff should understand the increasing role of energy production emissions in air quality implementation strategies. Management Division staff are likely to benefit from training that imparts better understanding of energy vulnerabilities and needs for Regional facilities.

Together with existing Executive Orders 13514 and 13423 and the expiration of the lease on the main Region 6 offices in Downtown Dallas in 2017, the Management Division should work with the General Services Administration to consider options for a facility that makes broad use of distributed energy generation such as solar, wind, and fuel cells, as well as highly energy efficient technologies such as ground-source heat pumps. This emphasis would greatly reduce the vulnerability of the Region to an increasingly stressed electricity grid and would significantly reduce the Regional office's carbon emissions. Other considerations for the new facility that would enhance energy efficiency improvement efforts include the use of WaterSense™ labeled products and the use of green infrastructure and low impact development approaches where feasible.

2.4.2 More frequent and intense droughts in central and western areas of Region 6

The use of existing programs and tools will be expanded to accomplish priority goals in this arena. Priority actions will include: set goals for enhancing water conservation in new Regional

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Office space; building upon the existing Region 6 web page devoted to the topic of drought; promoting and expanding the use of tools such as Climate Ready Utilities and programs such as WaterSense™, Sustainable Communities, Green Infrastructure, and Healthy Watersheds leveraging and assisting states in using existing funding vehicles to support green infrastructure, such as SRF, Green Project Reserve, and Clean Water Act Section 319 grants.

Expanded training for Water Quality Protection Division and Environmental Justice-Tribal Affairs staff would focus on the increased pressures on agriculture, urban and rural residents, and the power generation industry. While this would focus on water availability, increased water quality concerns would also be part of this training, which would seek alternative ways to conserve, reuse, and process water. Management Division staff would receive training in implications for Regional facilities from increased droughts and water availability. In conjunction with Executive Orders 13514 and 13423, Management Division staff should consider enhanced water conservation measures. Multimedia Planning and Permitting Division staff should receive training to educate them about the role of intense and more frequent droughts and increased wildfires on regulatory programs such as the Regional Haze Program and achieving the Particulate Matter National Ambient Air Quality Standard (NAAQS).

2.4.3 Increase in extreme precipitation events

Given the intensive efforts in responding to hurricanes such as Katrina in 2005, the Region is very aware of the magnitude of labor and resources required to respond to major natural disasters. Because a climate change-forced future is likely to encourage stronger and perhaps more numerous hurricanes striking Louisiana and Texas, the Region's Emergency Response Branch in the Superfund Division will probably be even more active in this arena. Training for these staff is necessary to prepare them for this likely increase in effort, emphasizing opportunities for even more efficient operations; this training may also reveal a need for additional personnel or contractor capability.

Beyond training, the recent events from Hurricane Sandy in the northeast U.S. reveal a critical need for sufficient, uninterruptible power supplies, particularly critical for emergency responders. In the future, with electricity grids perhaps chronically weakened and stressed by the long-term effects of climate change, the demands of natural disasters such as major hurricanes may be significantly more challenging and long-lasting to electricity generation and transmission infrastructure. The same kinds of pressures can result from increased non-hurricane flooding. Therefore, Region 6 believes its Emergency Response Branch should be equipped with distributed generation equipment to produce the electricity it will need to ensure that power is supplied to field operations. Further analysis would be needed to determine the optimal mix of power modes (e.g., solar, wind, fuel cell, others). This infrastructure priority would require a dedicated budget commitment, one that would likely require negotiations between the Region and headquarters.

The Water Quality Protection Division and the Office of Environmental Justice and Tribal Affairs staffs would benefit from supplemental training, emphasizing the special anticipated needs for citizens increasingly impacted by flooding events, as well as temporary infrastructure dislocations (e.g., waste water treatment plans and water distribution systems).

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2.4.4 Seasonal weather shifts

Water quality and quantity issues will drive adaptations that Region 6 staff should anticipate and to which the Region will conform policies and procedures. Priorities will be placed on working with state partners to explore existing infrastructure funding such as SRF to enhance resiliency, promoting watershed planning tools to address the loss of natural storage and to better absorb flashy runoff.

Promoting the use of EPA developed software tools among water utility groups such as Climate Ready Utilities and CREAT 2.0 software will enhance climate adaptation planning in this sector. Additionally, training of Regional Water Quality Protection Division and Multimedia Planning and Permitting Division staff members is a goal. Pesticides staff in the Multimedia Planning and Permitting Division should be trained to anticipate new and expanded pest and weed problems that will endanger public, agricultural, and natural flora and fauna health.

2.4.5 Increasing rates of relative sea level rise and continued coastal land loss

Sea level rise and coastal land loss have long been significant problems in Region 6. The Ecosystem Protection Branch will look for increased efficiencies in working with federal, state, and local partners with a goal of optimizing ongoing efforts to restore, protect, and enhance coastal habitats. The three Region 6 National Estuary Programs and the Coastal Wetland Planning, Protection and Restoration Act program will lead the charge and efforts will be made to improve the effectiveness of the limited resources available. Numerous other coastal protection programs will play a role and additional ways to better integrate them into other Regional programs will be evaluated.

Emerging priorities will involve providing technical and planning support for efforts such as the Gulf Ecosystem Restoration Task Force, the Gulf Ecosystem Restoration Council, the Gulf of Mexico Regional Planning Body as part of the National Ocean Council, and the Gulf of Mexico Alliance. Climate change adaptation goals will be addressed by establishing, refining, or expanding coastal restoration priorities.

Promoting the use of EPA developed tools, such as Climate Ready Estuaries software, among key stakeholders involved in protecting and restoring coastal environments will enhance climate adaptation planning. Internally, training to better familiarize Region 6 staff with long-term implications of sea level rise on “core programs” could be accelerated. Staff of the Water Quality Protection Division, the Office of Environmental Justice and Tribal Affairs, and the Superfund Division would be the main recipients of the training.

2.4.6 Outreach, Partnerships, Communication, and Awareness

Beyond those actions described the Region plans to enhance our outreach, partnership, and communication efforts. One of the top priorities would be to meet regularly with tribes, states, and other government entities about anticipated climate change impacts and adaptation challenges.

The Region has initiated this process by sponsoring specific climate change discussion sessions at the 2011 and 2012 Annual Tribal Environmental Summits, by convening the first Sustainable Practices Symposium for local elected officials in the Dallas-Fort Worth area in August 2012 (including anticipated climate change impacts and adaptation options), and by

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hosting a climate change roundtable with agencies from Region 6 states in July 2008. The Region has sponsored numerous other specialized workshops.

In the future, the Region proposes to continue holding climate change sessions at the Annual Tribal Environmental Summits, sponsor climate change listening sessions at Regional Tribal Operation Committee meetings, speak to individual tribes about climate change, support sustainable practice/climate change workshops for local elected officials in the Region, and schedule at least annual meetings with critical agencies of governments in each Region 6 state. The Region will also continue its actions to encourage climate change mitigation and adaptation through approximately 30 national and regionally-initiated partnership programs.

Region 6 will also maintain close communications with state, local and tribal governments, non-governmental organizations, colleges and universities, the private sector, other federal agencies, and other EPA offices in order to properly sense and assess indicators of climate change in the Region. This process will help inform the Region as to next specific steps to take in coping with climate change.

Part 3: Measuring and Evaluating Performance

An important facet of both the priority actions relating to Regional vulnerabilities and those involving outreach, partnerships, and communication will be performance measurement and evaluation. To this end the Region plans to develop a methodology to assess its effectiveness in accomplishing specific priority actions that grow from this Regional Implementation Plan.

3.1 Background

The EPA Climate Change Adaptation Plan emphasizes the need for measuring and evaluating performance so that climate change adaptation is successfully integrated into the Agency's operations. The agency-wide FY 2014-2018 Strategic Measures address this need by including three such metrics. These include measures to integrate climate change science into at least five rule-making processes; to integrate climate change adaptation impacts and measures into at least five major grants, loans, contracts or technical assistance programs; and to integrate such science into at least five major models and/or decision-support tools.

EPA understands the transition will be a gradual one as we strive to account for projected climate change impacts into day-to-day operations. As the national Climate Change Adaptation Plan states:

> EPA recognizes that the integration of climate adaptation planning into its programs, policies, rules, and operations will occur over time. This change will happen in stages and measures should reflect this evolution. The earliest changes in many programs will be changes in knowledge and awareness (*e.g.,* increase in the awareness of EPA staff and their external partners of the relevance of adaptation planning to their programs). Building on this knowledge, they then will begin to change their behavior (*e.g.,* increase their use of available decision support tools to integrate adaptation planning into their work). As programs mature, there will be evidence of more projects implemented as a result of increased attention to climate-related programmatic issues. Finally, in the long-term, adaptation planning efforts will lead to changes in condition (*e.g.,* percentage of flood-prone communities that have increased their resilience to

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storm events) to directly support EPA's mission to protect human health and the environment (U.S. EPA, 2012d).

3.2 Approach to Measuring and Evaluating Performance

Region 6 employs several tracking mechanisms to measure and evaluate performance of internal operations and programmatic activities and outcomes during the year, many of which relate directly to climate change adaptation. Each year, the Region is active in setting commitments, monitoring progress and reporting results under the various National Program Managers (NPM) Guidance documents issued by EPA program offices. In addition, Region 6 develops and reports semiannually on an Annual Plan designed to track additional measures either not covered or sufficiently emphasized in the NPM guidance. The Annual Plan showcases regional accomplishments in important program sectors and geographic and ecological regions that uniquely characterize the priorities and challenges faced by Region 6. The Region also tracks a variety of progress indicators under its Environmental Management System. As shown in Appendix A, Regional involvement in developing and reporting progress on climate adaptation and mitigation related initiatives is part of a cross division, multimedia reporting and tracking effort. Moreover, the Region recently began hosting what will become an annual "Earthapalooza" event which will serve as an Internal Educational Forum for Region 6 Employees to better acquaint them on climate change and sustainability topics (also presented in Appendix A). Another tracking mechanism for measuring and evaluating climate adaptation related progress involves the Region's Clean Energy and Climate Change (CECC) workgroup. Initially charged with developing a CECC strategic plan which was completed in 2008, the workgroup reports annually on progress made in furthering the goals and objectives outlined in the strategy, many of which relate to climate adaptation efforts.

The Region will continue to evaluate our operations and the dynamic needs of our customers in the midst of a changing climate. This will be an adaptive process in order to constantly identify any additional Regional priority actions that might be necessary. We will engage in ongoing communications with state, local, and tribal governments; non-governmental organizations; colleges and universities; the private sector; other federal agencies; and other EPA offices in order to properly sense and assess indicators of climate change in the Region. This process will help inform the Region as to next specific steps to take in coping with climate change.

3.3 Measures

As Table 1 indicates, Region 6 priority adaptation actions in response to climate change constitute significant amounts of personnel training. Most Divisions will require such training first to evaluate the climate change impacts from the perspective of the various environmental programs and then to evaluate the means with which the Region can best address the impacts. Aside from program specific training, the Region will commit to holding at least one annual training event on climate adaptation such as the "Earthapalooza" event to ensure employees are aware of the issue and opportunities on how to integrate adaptation into their daily work.

As part of implementing this plan, Region 6 will also develop a specific list of needed programmatic training courses and a schedule for delivery. We will establish a roster of Regional personnel that should receive this training and develop a post-training assessment survey to determine the effectiveness of the training. Deficiencies in knowledge acquisition will

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be addressed through training revisions and/or course repetition. This training will be subject to the availability of sufficient resources.

Beyond the Region's training efforts, several priority actions relate to the operation of Regional office space, as reflected in the Regional Environmental Management System. These include evaluating alternatives for electricity, energy efficiency, water, and distributed generation infrastructure. Currently, it is not possible to measure these parameters given the way our leased space meters electrical and water use. Should alternatives that would allow these metrics to be tracked become available in the future, the Region will track electricity, energy, and water use in its office and laboratory space, comparing these totals against those totals prior to such improvements. In the case of any future acquisition of distributed generation equipment for use in Regional Emergency Response actions, the Region will investigate the feasibility of tracking the specific activities that required such power use and the amount of power produced and used in the field. It will also assess the overall value in deploying these types of units.

Additional programmatic metrics that will be tracked and reported on under this Implementation Plan include the following initiatives (with the Region 6 project lead given in parentheses):

1. Provide training for staff and managers on climate change and adaptive measures;
2. Expand Partnerships with stakeholders to leverage their support with climate change implementation efforts (6PD, 6SF, 6WQ);
3. Distribute Information on Availability of Assistance Agreements (e.g., grants) to stakeholders facilitate climate change adaptation planning and implementation (6WQ, 6MD);
4. Provide technical assistance to tribes and environmental justice communities on the development of climate change implementation plans (6PD, 6WQ);
5. Promote the use of tools such as Climate Ready Utilities and Climate Ready Estuaries among states, tribes and stakeholder groups (6WQ);
6. Promote energy efficiency at water utilities through a series of workshops, focusing on the US-Mexico Border area (6WQ);
7. Continue to require that 10% Regional Drinking Water and Clean Water State revolving fund programs support green projects (6WQ);
8. Meet with Tribal and Environmental Justice communities at least once a year to provide training on climate science and adaptation opportunities and practices (6PD, 6WQ);
9. Recruit 30 additional WaterSense™ partners each year as part of a Regional water efficiency and conservation campaign (6WQ);
10. Seek opportunities in permitting, compliance assistance and enforcement actions, remediation and site redevelopment options, as well as funding programs to further expand green infrastructure, low impact development, and other sustainable practices (Region 6);
11. Participate in outreach and pilot projects with states, local governments, tribes, non-governmental organizations, and the private sector focused on implementation of low-impact development (e.g., with the Texas Land-Water Sustainability Forum) (6PD);
12. Restore coastal habitat and reduce coastal land loss. Region 6 will work with a variety of partners and through several different programs to promote the development of scientific models, multi-use planning efforts, and implementation projects for coastal Louisiana and Texas. Working through the Barataria-Terrebonne National Estuary Program, the Coastal Bend Bays and Estuaries Program, the Galveston Bay Estuary

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Program, and the Coastal Wetlands Planning, Protection and Restoration Act Program we will track and report on progress in terms of the number of acres restored, protected, or enhanced per year, with a current goal of at least 3,000 acres per year (6WQ);

13. Work with EPA headquarters to evaluate what, if any, specific Regional actions may be appropriate to include in the Agency's pilot rule-making processes; grants, loans, contracts or technical assistance programs; or scientific models or decision-support tools (Region 6);
14. Brownfields Cleanup and RLF recipients must meet the new term and condition which requires them to consider changing climate conditions when evaluating remedial options at a brownfields property. For Region 6, this new Term and Condition will apply to the following grantees: FY13: three cleanup and five RLF grantees; FY14: one cleanup and four RLF grantees (6SF);
15. The Region 6 Superfund Division has launched the "Greenovations" and "Green Bean" Awards. Both awards recognize outstanding efforts in sustainability, including promoting the utilization or production of renewable energy at Superfund sites. In May 2014, the Superfund Division awarded its first Greenovations Award to Waste Management of Oklahoma for an innovative alternative energy production project, a methane gas to liquids (diesel, paraffin wax, etc.), at a Superfund site in Oklahoma City. The Region 6 Superfund Division will present at least one of these awards annually (6SF).
16. Meet with State Agricultural Directors to discuss the President's Climate Change Management Plan and Adaptation practices;
17. Revise and finalize Region 6 Climate Change Adaptation Implementation Plan based on public comments;
18. Revise Region 6 climate change web page to expand coverage on adaptation planning;
19. Hold two climate adaptation workshops for environmental justice and tribal communities;
20. Pilot test a training module on climate adaptation for the Office of Policy;
21. Hold a climate adaptation and emergency planning and response workshop in New Orleans; and
22. Work in partnership with the Department of Transportation, the Middle Rio Grande Council of Governments, and other federal and state agencies to develop a climate change planning scenario project that identifies the benefits of adaptive practices for transportation and other infrastructure choices in light of a changing climate.

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These measures will be tracked and reported on annually. In addition, the measures will be reviewed regularly and revised as needed to include new initiatives to promote climate adaptation. Higher priority measures that will receive particular focus during the next three years are presented in the text box below:

By 2016, EPA Region 6 will strive to:

1. Train all staff and managers on climate change adaptation;
2. Provide five climate adaptation workshops to Region 6 tribal and environmental justice communities;
3. Recruit 100 new WaterSense™ partners;
4. Expand the Region's extreme weather and natural disaster emergency planning and response capabilities;
5. Improve technical information transfer to state and tribes on climate science and adaptive measures by updates to our climate change website;
6. Require that at least 10% of Regional Clean Water and Drinking Water state revolving fund awards support green projects;
7. Hold three energy efficiency workshops at water utilities;
8. Protect or restore 9,000 acres of coastal wetlands;
9. Begin an annual "Greenovations" award program to recognize outstanding efforts in sustainability; and
10. Reach out to state environmental and agricultural directors to discuss the President's Climate Change Management Plan and Adaptation Measures.

3.4 Greening Assistance Agreements

In addition to the performance measures and tracking noted above, EPA Region 6 will identify opportunities to promote climate resilient investments in keeping with directives to federal agencies such as Executive Order 13653. While the draft Climate Change Adaptation Implementation Plan does not mandate any funding requirements in grant programs, EPA Region 6 will follow Executive Order 13653 relating to grants, which specifically directs federal agencies to:

(i) identify and seek to remove or reform barriers that discourage investments or other actions to increase the Nation's resilience to climate change while ensuring continued protection of public health and the environment;
(ii) reform policies and Federal funding programs that may, perhaps unintentionally, increase the vulnerability of natural or built systems, economic sectors, natural resources, or communities to climate change related risks;
(iii) identify opportunities to support and encourage smarter, more climate resilient investments by States, local communities, and tribes, including by providing incentives through agency guidance, grants, technical assistance, performance measures, safety considerations, and other programs, including in the context of infrastructure development; and
(iv) report on their progress in achieving the requirements identified above, including accomplished and planned milestones, in the Agency Adaptation Plans, developed in response to of Executive Order 13514, which calls for all Federal Agencies to develop a plan on how they will address climate change adaptation.

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EPA Region 6 further notes that existing grant programs such as the CWA 319 program, and the DW and CWSRF programs can and have been used to support climate adaptation related activities such as green infrastructure projects, low impact development projects, green roof projects, as well as energy and water efficiency projects to name a few.

Part 4: Working with Tribes and Other Sensitive Populations

Two fundamental priorities of the National Climate Change Adaptation Plan involve working with tribes to improve their adaptation capacity and focusing on the most vulnerable peoples and places. Many climate change strategy documents conclude that tribal and other vulnerable populations will be the hardest hit by changes in climate because they rely on the land for subsistence and may be less able to readily adapt due to a lack of resources. The Region 6 Implementation Plan aims to improve and expand communications, training, and other outreach efforts with these groups to enable them to better adapt to climate change impacts.

4.1 Partnerships with Tribes

EPA values its unique government-to-government relationship with Indian tribes in planning and decision making. This trust responsibility has been established over time and is further expressed in the *1984 EPA Policy for the Administration of Environmental Programs on Indian Reservations* and the *2011 Policy on Consultation and Coordination with Indian Tribes*. These policies recognize and support the sovereign decision-making authority of tribal governments.

Supporting the development of adaptive capacity among tribes is a priority for the EPA. Tribes are particularly vulnerable to the impacts of climate change due to the integral nature of the environment within their traditional culture. There is a strong need to develop adaptation strategies that promote sustainability and reduce the impact of climate change on Indian tribes.

EPA engaged tribes through a formal consultation process in the development of the Agency's *Climate Change Adaptation Plan*. Tribes identified some of the most pressing issues as erosion, temperature change, drought and various changes in access to and quality of water. Tribes recommended a number of tools and strategies to address these issues, including improving access to data and information; supporting baseline research to better track the effects of climate change; developing community-level education and awareness materials; and providing financial and technical support. At the same time, tribes challenged EPA to coordinate climate change activities among federal agencies so that resources are better leveraged and administrative burdens are reduced.

This Implementation Plan identifies specific steps that will be taken to partner with tribal governments on an ongoing basis to increase their adaptive capacity and address their adaptation-related priorities. These collaborative efforts will benefit from the expertise provided by our tribal partners and the Traditional Ecological Knowledge (TEK) they possess. TEK is a valuable body of knowledge in assessing the current and future impacts of climate change and has been used by tribes for millennia as a valuable tool to adapt to changing surroundings. Consistent with the principles in the 1984 Indian Policy, TEK is viewed as a complementary resource that can inform planning and decision-making.

Networks and partnerships already in place will be used to assist tribes with climate change issues, including Regional Tribal Operations Committees, the Institute for Tribal Environmental Professionals and the Indian General Assistance Program (IGAP). Additionally, efforts will be made to coordinate with other Regional and Program Offices in EPA, since climate change has

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many impacts that transcend media and regional boundaries. Transparency and information sharing will be a focus, in order to leverage activities already taking place within EPA Offices and tribal governments.

4.1.1 Building Tribal Adaptive Capacity

Sixty-six federally recognized tribes are located in Region 6. Consistent with tribal sovereignty, Region 6 partners with these tribes on a government to government basis to strengthen our relationships so we are better able to fulfill our mission of protecting human health and the environment for all Region 6 residents. Tribal communities will potentially experience disproportionate impacts of climate change because of their reliance on natural resources, which support subsistence hunting, fishing, recreational and other important cultural practices. Moreover, a general lack of resources to implement adaptation measures will further compound climate change impacts. In response, Region 6 announced at the Spring Regional Tribal Operations Council meeting in Tulsa (April 3, 2013) the formation of a Region 6 Tribal Climate Change Adaptation Planning Workgroup. The purpose of the workgroup is to form a community of practice among EPA Region 6 and its tribal communities to assist in the development of climate adaptation plans. The objectives are:

1) Create a network of professionals to help inform the development of adaptation plans for Tribal communities;
2) Share scientific information, TEK, grant opportunities, adaptation tools, best practices, and success stories;
3) Provide tribes with guidance and feedback from EPA as they develop their adaptation plans; and
4) Replicate effective adaptation planning efforts.

EPA Region 6 will also partner with the South Central Climate Center (Norman, Oklahoma) and other federal agencies to deliver information and training and to announce the availability of grants, tools and pertinent resources to support adaptation activities.

4.2 Focusing on the Most Vulnerable People and Places

Certain parts of the population, such as children, the elderly, minorities and the poor, persons with underlying medical conditions and disabilities, those with limited access to information, and tribal and indigenous populations, can be especially vulnerable to the impacts of climate change. Also, certain geographic locations and communities are particularly vulnerable, such as those located in low-lying coastal areas. One of the principles guiding EPA's efforts to integrate climate adaptation into its programs, policies and rules calls for its adaptation plans to prioritize helping people, places and infrastructure that are most vulnerable to climate impacts, and to be designed and implemented with meaningful involvement from all parts of society.

This Implementation Plan identifies key programmatic vulnerabilities and the priority actions that will be taken to address those vulnerabilities over time. As the work called for in this Plan is conducted, the communities and demographic groups most vulnerable to the impacts of climate change will be identified. The Agency will then work in partnership with these communities to increase their adaptive capacity and resilience to climate change impacts. These efforts will be informed by experiences with previous extreme weather events, especially those that have impacted the Gulf coast of Louisiana and Texas (*e.g.,* Hurricanes Katrina, Rita, Ike, and Gustav.) and the subsequent recovery efforts.

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Direct impacts on the vulnerable groups in areas experiencing rapid climate change may include not only changes in ecosystem function and production, but also human health impacts such as increased illnesses, injuries and deaths from heat waves, extreme weather events, flooding, and wildfires, as well as respiratory illnesses caused by deteriorations in air quality. Indirect health impacts could include illnesses and deaths that may arise from climate-related changes in ecosystems, migration of infectious agents and disease vectors, or reductions in agricultural and livestock production. Through the Office of Environmental Justice and Tribal Affairs and other program offices, EPA Region 6 will strive to build the adaptive capacity of populations in all areas of the region, but in particular those residing in the most vulnerable places.

In Region 6, people living in areas along the U.S.-Mexico Border and along coastal Louisiana are perhaps among the most vulnerable to climate change effects. Along the border, increases in ambient air temperatures, reduced air and water quality, drought, and the threat of wildfires represent perhaps the greatest climate change impacts. These stressors heighten the importance of a strategic management of water resources, rangelands, and air quality, which remain a critical part of the Region's environmental protection goals along the border.

Ecosystems in coastal Louisiana are already experiencing many stressors that threaten a way of life for people living in this area. Some of these include the loss of habitat and alterations in ecosystem functions due to factors such as land subsidence, eustatic sea level rise, saltwater intrusion, coastal development, habitat fragmentation, hydrologic and landscape modifications resulting from canals and levees, water and air pollution, and declining fishery resources. All of these can be compounded, if not accelerated, by climate change effects. Moreover, increased storm intensity for the area profoundly threaten human health and alter ecosystems, as evidenced by recent hurricanes Katrina, Rita, Gustav, and Ike.

Region 6 program staff and managers will continue to work with within existing networks such as the Region 6 U.S. Mexico Border Program Office, the Mexican Government, the Border Environmental Cooperation Commission and the North American Development Bank in the U.S. Mexico Border area, and with the Gulf of Mexico Program Office, the State of Louisiana and related coastal conservation and protection agencies to ensure they possess the adaptive capacity to integrate climate change considerations into existing programs, policies, operations, and funding considerations. Adaptive capacity will be strengthened through outreach and educational efforts, funding opportunities relating to climate adaptation, and the delivery of climate adaptation tools such as Climate Ready Utilities and Climate Ready Estuaries. In addition, Region 6 will continue to promote the Agency's water utility energy efficiency and WaterSense programs to further strengthen adaptation activities while introducing mitigation elements at the same time.

Part 5: Conclusions

Region 6 faces significant planning and implementation challenges as climate change occurs in the 21st century and will practice an overall anticipatory philosophy regarding climate change adaptation planning. As noted in the NCA3, climate change is happening now and the time to adapt is now. This Regional Implementation Plan has identified internal priority actions including infrastructure enhancement and training, which stem from five major identified climate change vulnerabilities. Externally, the Region has identified technical assistance efforts with a variety of partners, as well as enhanced outreach and communication to be important

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priority actions to fully address those vulnerabilities. Measuring and evaluating new priority actions and ongoing adaptation initiatives will be important in gauging Regional effectiveness in fulfilling our mission. This Regional Implementation Plan is certainly not an endpoint. It is intended to be the first version of a plan that will change and mature as the Region's knowledge of, and experience with, climate change adaptation grows. The Region's most important goal remains to serve all its stakeholders in the most efficient and thorough means possible, even as climate changes.

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Figures and Tables

Figure 1 – EPA-Region 6 Program Organization

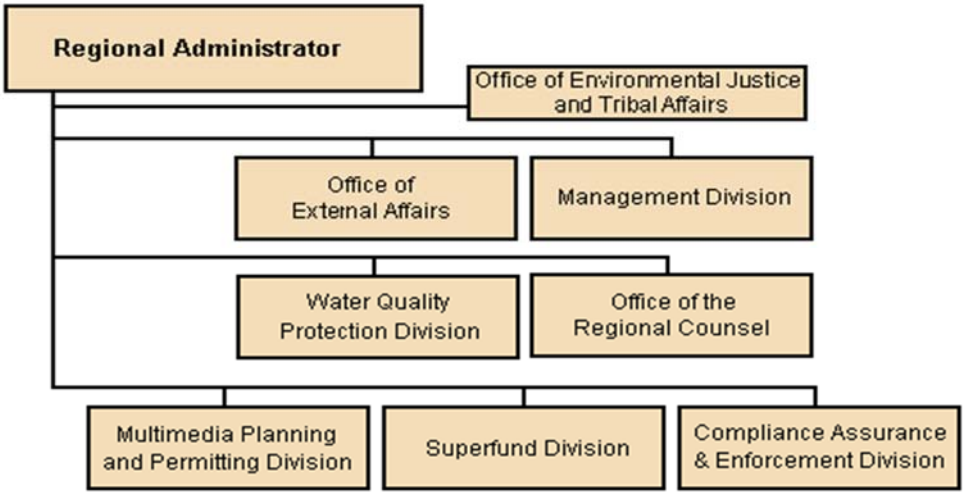

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Table 1

EPA Region 6 Climate Change Vulnerabilities & Priority Actions

Anticipated Impacts	Consequences	Involved Programs	Priority Actions
A. Higher mean temperatures, with more frequent and intense summer "heat waves" (NCA3, 2014)	Higher O3 and other criteria air pollutants with increased difficulty in attaining health standards (Chang et al., 2010); Increased health risks from "heat island" impacts (Portier, et al., 2010);;	Multimedia Planning and Permitting Division; Management Division (facilities); Office of Environmental Justice and Tribal Affairs	Evaluate the potential for using distributed generation electricity & energy efficiency infrastructure enhancements in new Regional office space and energy infrastructure improvements to existing office space, contingent upon budget & GSA considerations; Training for Air, Pesticides, Environmental Justice/Tribal Affairs, and Management Division staff.
B. More frequent and intense droughts in central and western part of Region 6	Reduced agricultural yields; decreased power plant cooling capabilities; consumer rationing; decreased industrial water availability; more wildfires; increased blowing dust	Water Quality Protection Division; Management Division (facilities); Office of Environmental Justice and Tribal Affairs; Multimedia Planning and Permitting Div.	Evaluate the possibilities for enhancing water conservation in new Regional Office space; Build upon the existing Region 6 web page devoted to the topic of drought; promote tools such as Climate Ready Utilities and programs such as Water Sense, Sustainable Communities, Green Infrastructure, and Healthy Watersheds; Leverage and assist states in using existing funding vehicles to support green infrastructure, such as SRF, Green Project Reserve, and Clean Water Act Section 319 grants; Training for Water Quality Protection Division, Environmental Justice/Tribal Affairs, and Management Division staff.
C. Increase in extreme precipitation events	More extensive flooding and wind damage from hurricanes; increased stormwater runoff and flashfloods from other extreme weather events	Superfund Division; Water Quality Protection Division; Office of Environmental Justice and Tribal Affairs	Enhance emergency response capabilities for these types of events; Enhance the capabilities of the Center of Excellence for quickly getting water and wastewater facilities back on line following these events; Provide technical assistance for coastal habitat restoration and protection through such venues as the Urban Waters Initiative, three NEPs and CWPPRA; Provide technical assistance in watershed protection and planning through the 319 and CZARA programs in order to enhance flood water retention; Training for staff in Superfund and Emergency Response Branch, Water Quality Protection Division, and Environmental Justice/Tribal Affairs.

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D. Seasonal weather shifts	High-country snow melt earlier in spring, with early floods and summer water deficits downstream; increased pests and non-native noxious weeds with longer warm-season periods	Multimedia Planning and Permitting Division; Water Quality Protection Division	Explore existing infrastructure funding such as SRF to enhance resiliency; Promote watershed planning tools to address the loss of natural storage and to better absorb flashy runoff; Training for Water Quality Protection Division and Pesticides Section staff
E. Increasing rates of relative sea level rise and continued coastal land loss	Accelerated loss and degradation of estuarine habitats, barrier islands, and shorelines in Louisiana and Texas; Increase in inland floods from coastal storms, local precipitation, and upstream flooding in major river systems	Water Quality Protection Division; Office of Environmental Justice and Tribal Affairs; Superfund Division	Provide technical and planning support for the Gulf Ecosystem Restoration Task Force, Gulf Ecosystem Restoration Council, National Ocean Policy, and Gulf of Mexico Alliance to establish restoration priorities; Develop and implement restoration projects through three National Estuary Programs, Climate Ready Estuaries Program, and CWPPRA; Training for staff in Superfund and Emergency Response, Water Quality Protection Division, and Environmental Justice/Tribal Affairs.

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Table 2

Current Climate Change Partnerships

Lead Region 6 Division	Program
Multimedia Planning and Permitting Division	Ozone Advance, Energy Star, Federal Green Challenge, Landfill Methane Outreach Program, Repowering America, North Central Texas Environmental Stewardship Forum, Blue Skyways Collaborative, WasteWise, Urban Heat Island Mitigation, Energy Efficiency-Renewable Energy in SIPs, promoting ecological enhancements at RCRA sites
Water Quality Protection Division	WaterSense, Green Infrastructure, HUD-DOT-EPA Partnership for Sustainable Communities, National Estuary Program, Climate Ready Water Utilities Program, CWPPRA, National Ocean Council, Gulf Ecosystem Restoration Task Force and Council, Gulf of Mexico Program, Gulf Alliance, Gulf Tribal Climate Adaptation Advisory Workgroup
Management Division	Regional Environmental Management System, E.O. 13514 and 13423 compliance
Superfund Division	Superfund and Brownfields projects utilizing renewable energy
Office of Environmental Justice and Tribal Affairs	Environmental Justice Showcase Communities
Enforcement and Compliance Assurance Division	Partnering with Office of Regional Counsel to fulfill regulatory responsibilities while optimizing responses to climate change-forced water and air compliance issues
Office of Regional Counsel	Continuing coordination with R6 program offices to map out appropriate climate change adaptation support while ensuring regulatory fidelity

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Appendix

Copy of All Hands Memo Announcing Regional Involvement in Climate Adaptation and Mitigation Related Initiatives and the Announcement of "Earthapalooza" which will serve as an Internal Educational Forum for Region 6 Employees

This is being sent as R6 All Employee Memo - Please do not reply to this mass mailing
This memo and all Region 6 "All Employee Memos" may be viewed on the Region 6 Intranet
****
NO HARD COPY TO FOLLOW

April 4, 2013

MEMORANDUM

SUBJECT: How EPA Region 6 is Working to Achieve Better Environmental Practices

FROM: Ronnie Crossland */s/ Ronnie Crossland*
Acting Assistant Regional Administrator
for Management

TO: All EPA Region 6 Employees/SEEs/Contractors

As Earth Day approaches, I want to take this opportunity to highlight some of the exciting ways EPA Region 6 is working to achieve better environmental practices, and how we as individuals can each contribute. EPA is leading a change in how our society protects the environment and conserves resources for future generations by encouraging Americans to rethink the way we manage our resources. Not only are we taking steps within our own organization to reduce our environmental footprint through the hard work of our Environmental Management System Team, but we are also challenging other agencies, organizations, and municipalities to do the same through EPA's Sustainable Materials Management Program; exploring ways to "green" sports events and venues as part of EPA's Green Sports workgroup; and engaging in a pilot climate change mitigation initiative.

Below are highlights of these programs and what you can do to help.

Sustainable Materials Management (SMM) Programs:

The SMM Programs provide opportunities for businesses, universities and government entities to increase efficiency, reduce waste, and gain recognition for protecting human health and the environment. There are three SMM programs:

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• *Food Recovery Challenge* (FRC) – Grocers, universities, stadiums, and other venues commit to a three-year goal for reducing the amount of food reaching landfills by learning to purchase leaner and divert food away from landfills for better uses. We currently have 143 participants signed on to the challenge and collectively diverted 71,521 tons of food from landfills in 2011.

Contact: Golam Mustafa

• *Electronics Challenge* (FEC) – Electronics manufacturers and retailers who become a partner of the Electronics Challenge commit to sending all their collected electronics to only certified electronics recyclers. Certification seeks to ensure environmental excellence in managing used electronics. EPA Region 6 has also lead by example by achieving the Federal Electronics Challenge Platinum award for ensuring environmental excellence in the way we purchase, use, and dispose of federally owned electronics.

Contact: Stephen Sturdivant

• *Federal Green Challenge* (FGC) – Federal Agencies commit to lead by example by reducing their facilities' environmental impact and save money in two of six areas: waste, purchasing, electronics, energy, water and transportation. We currently have 29 facilities representing 12 different federal agencies signed up as participants, including the EPA Region 6 facilities.

Contact: Joyce Stubblefield

Environmental Management System (EMS) Team:

The EMS team is a group of representatives from each division working towards encouraging improvement in EPA Region 6's designated Significant Environmental Aspects: Electricity Use, Vehicle Emissions and Fuel Use, Waste Reduction and Recycling, Electronics Stewardship and Green Purchasing. Along with a focus on the Significant Environmental Aspects, the EMS team helps Region 6 meet SMM program commitments. Through the EMS team:

• Our goal of 5% paper reduction each FY has been exceeded, FY 2012 being the best year by far
• The next big focus in our Regional Office will be green purchasing
• Region 6 joined the FGC, reducing their environmental impact in purchasing and electronics

Climate Change:

The Region's Clean Energy-Climate Change Workgroup, formed in 2008 with Divisional representatives, continues to track and report annually on climate change mitigation and adaptation activities in six sectors. These sectors include Greenhouse Gas Regulatory, Internal Conservation and Efficiency, Alternative and Renewable Energy and Green Remediation, Climate Change Adaptation, Sea Level Rise/Coastal Land Loss, and Greenhouse Gas Mitigation Partnerships. Many different activities which either directly or indirectly benefit climate stewardship are occurring throughout the Region and are captured within these sectors.

The Region is completing a Regional Climate Change Adaptation Implementation Plan, required by the Council on Environmental Quality. It will focus on assessing challenges to Regional operations from future climate change and taking steps to cope with these challenges. The Water Quality Protection Division and the Multimedia Planning and Permitting Division are taking the lead in drafting the plan,

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with input from the other Divisions. Also, the Multimedia Planning and Permitting Division is engaged in a pilot climate change mitigation initiative in 2013. This initiative focuses on encouraging voluntary greenhouse gas emissions from stationary/area sources and on accelerating the purchase of green power and installation of on-site renewable energy.

What can you do?

- Consider ways to reduce your food waste (Learn how to reduce food waste)
- Reduce paper usage by printing double sided or not printing at all
- Ensure electronic purchases are EPEAT certified and energy efficient options are enabled (EPEAT)
- Recycle all paper and #1 plastics
- Turn off equipment and lights when not in use
- Commute efficiently by utilizing public transportation, carpooling, walking or riding your bike when possible
- Participate in the EMS Team (contact Julia Alderete or David Bond for more information)

What's next?

- Come to the EarthApalooza open house on April 11 from 10 am – 2 pm in the 12th floor conference rooms to hear more about the SMM and EMS activities in Region 6
- Enjoy Earth Day themed movies the week of April 15

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