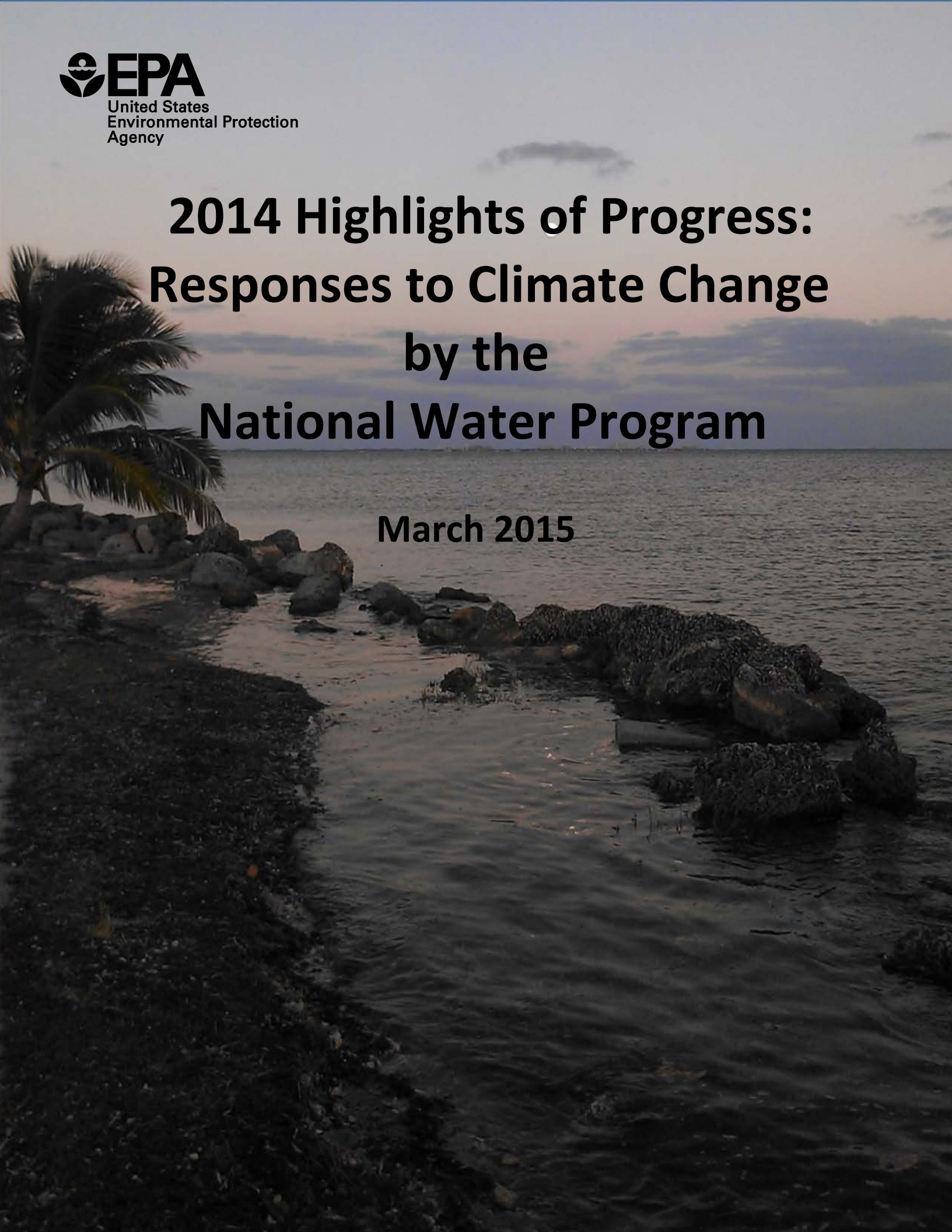

EPA
United States
Environmental Protection
Agency

2014 Highlights of Progress: Responses to Climate Change by the National Water Program

March 2015

Prepared by:
Office of Water
U.S. Environmental Protection Agency
March 2015

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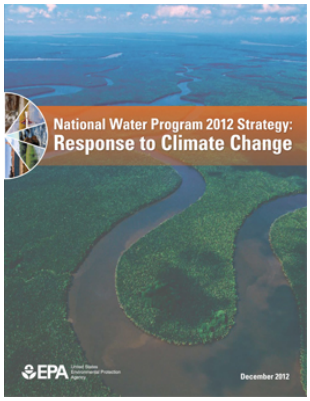
Introduction



The National Water Program at the U.S. Environmental Protection Agency (EPA) released the *National Water Program 2012 Strategy: Response to Climate Change* (2012 Strategy) in December 2012 as an update to an initial climate change and water strategy released in 2008.

The *2012 Strategy* describes long-term goals for the management of sustainable water resources for future generations in light of climate change and is intended to be a roadmap to guide future programmatic planning and inform decision makers during the Agency's annual planning process. The S*trategy* is available here.

This *2014 Highlights of Progress* report provides a summary of the major accomplishments of national water programs and EPA regional water programs in 2014. In addition, major research projects addressing climate change and water that were completed in 2014 by the EPA Office of Research and Development (ORD) are described.

This is the sixth climate change progress report for the National Water Program and is modeled after the *2012 and 2013 Highlights of Progress* report released in March 2013 and April 2014 respectively. Like the *2012 and 2013 Highlights of Progress* reports, the report is organized around the six long-term programmatic vision areas described in the *2012 Strategy:*

- water infrastructure;
- watersheds and wetlands;
- coastal and ocean waters;
- water quality;
- working with Tribes; and
- cross-cutting program support.

Part I of this report presents key "highlight" projects and products implemented by the National Water Program and Office of Research and Development in 2014 in each of these six vision areas. Part II of this report includes descriptions of key 2014 "highlights" of climate change and water work in each of the 10 EPA Regional offices.

In addition to the major accomplishments highlighted in each of these vision areas and for each EPA Region, other important projects and activities were accomplished in 2014. A detailed compendium of 2014 activities and accomplishments related to climate change and water programs underway in EPA national water program offices and Regional offices is provided in Appendix A.

In addition to reporting on highlights of progress for 2014, the National Water Program is continuing past work to assess progress in the overall implementation of the *2012 Strategy* in the context of the stage or phase of development of climate response programs. This assessment effort is described in Part III of this report. The assessment effort tracks program implementation progress through seven developmental phases:

- initiation;
- assessment;
- response development;
- initial implementation;
- robust implementation;
- mainstreaming; and
- monitor outcomes and adaptive management.

Each of these phases is described in greater detail in the *2012 Strategy* and in this report.

Part III includes an assessment of the status of progress toward each of the 19 goals described in the *2012 Strategy* with respect to the developmental phases. This assessment builds on the first, baseline assessment of the developmental status of climate change adaptation programs and projects across the National Water Program that was provided in the *2012 Highlight of Progress* report. The numerical score representing the 1-7 progress under each of the 19 goals in the *2012 Strategy* for 2014 is 57 of a possible score of 133. This is an increase of 5 points above the 2013 score of 52 and 14 points above the 2012 score of 43.

OVERVIEW OF 2014 HIGHLIGHTS

National Water Programs/Research Products

Vision Area 1: Water Infrastructure

1. Addressed Climate Change in State Revolving Fund Program
2. Developed Climate Resilience Evaluation and Awareness Tool (CREAT) 3.0 Framework
3. Addressed Climate Change in Sanitary Survey Program
4. Launched WaterSense H2Otel Challenge
5. Developed Flood Resilience Guide

Vision Area 2: Watersheds and Wetlands

6. Published Workbook for Developing Risk-Based Climate Change Adaptation Plans
7. Built State and Local Capacity to Protect Healthy Watersheds and Enhanced Climate Change Resiliency

Vision Area 3: Coastal and Ocean Waters

8. Launched Climate Change Adaptation Projects with National Estuary Program Partners
9. Published National Estuary Program Grant Guidance Addressing Climate Resilience
10. Developed Approach to Assess Vulnerability of Near Coastal Species and Habitats to Climate Drivers at Regional Scales [ORD Product]

Vision Area 4: Water Quality

11. Developed Green Infrastructure Collaborative Network
12. Awarded Funding for Green Infrastructure Technical Assistance
13. Completed Pilot to Understand Approaches Needed to Incorporate Climate Change Information into Total Maximum Daily Loads (TMDL) Development [ORD Product]

Vision Area 5: Working with Tribes

14. Awarded Funding to Tribes to Study Health Effects of Climate Change

Vision Area 6: Cross-cutting Program Support

15. Published EPA Office of Water *Climate Change Adaptation Implementation Plan*
16. Participated in Workgroups within EPA and Among other Federal Agencies

OVERVIEW OF 2014 HIGHLIGHTS

EPA Regional Water Programs

Region 1: Served on steering committee of Northeast Coastal Acidification Network and helped coordinate regional efforts to improve scientific understanding of ocean and coastal acidification. *(Supports Vison Area 3: Coastal and Ocean Waters)*

Region 2: **Awarded $229 million to New Jersey and $340 million to New York for improvements to wastewater and drinking water treatment facilities impacted by Hurricane Sandy** to increase their resiliency. *(Supports Vision Area 1: Infrastructure)*

Region 3: Conducted 6 workshops and 10 energy audits at water and wastewater treatment with States and formed Delaware Water and Wastewater Energy Efficiency Partnership with public and private agencies in Delaware. *(Supports Vision Area 1: Water Infrastructure)*

Region 4: Trained State Clean Water State Revolving Fund (CWSRF) coordinators to incorporate sustainable and green infrastructure projects into larger wastewater capital improvement loans. *(Supports Vision Area 1: Water Infrastructure)*

Region 5: In partnership with Ohio EPA, **launched Ohio Water & Energy Pilot for Public Wastewater Treatment Works which aims to advance energy management at wastewater treatment facilities.** *(Supports Vision Area 1: Water Infrastructure)*

Region 6: **Hosted Tribal Climate Change Adaptation Workshop** on climate change science and adaptation actions, grant funding opportunities, potential climate change impacts & threats to tribal assets, and steps to address vulnerabilities. *(Supports Vision Area 5: Working with Tribes)*

Region 7: Hosted Native American Heritage Month panel discussion on Climate Change Impacts on Native American People, Places, & Culture. *(Supports Vision Area 5: Working with Tribes)*

Region 8: Hosted WaterSense Partner Summit bringing together WaterSense partners from Colorado, Utah, Montana, and Wyoming. *(Supports Vision Area 1: Water Infrastructure)*

Region 9: Drafted Regional Drought Response Strategy to address drought crisis while increasing resiliency of communities. *(Supports Vision Area 2: Watersheds & Wetlands)*

Region 10: Puget Sound National Estuary Program provided funds to projects to support adaptation and resiliency to climate change impacts. *(Supports Vision Area 3: Coastal & Ocean Waters)*

PART I:
NATIONAL PROGRAM HIGHLIGHTS

Vision Area 1: Water Infrastructure

Vision: *In the face of a changing climate, resilient and adaptable drinking water, wastewater and stormwater utilities (water sector) ensure clean and safe water to protect the nation's public health and environment by making smart investment decisions to improve the sustainability of their infrastructure and operations and the communities they serve, while reducing greenhouse gas emissions through greater energy efficiency.*

1. Addressed Climate Change in State Revolving Fund Program: An EPA Headquarters and Regional State Revolving Fund (SRF) climate project team was convened in early 2014 to explore ways to further promote the incorporation of climate change considerations at the state level. The team, which consisted of Clean Water State Revolving Fund (CWSRF) and Drinking Water State Revolving Fund (DWSRF) staff at Headquarters and EPA Regions 6 and 9, met several times throughout the year. Key 2014 project team activities included:

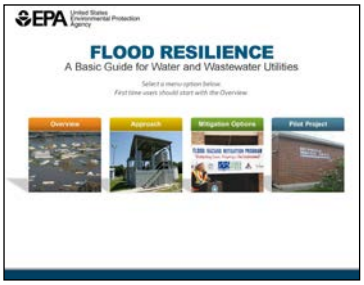
- Adding questions on sustainability, of which climate change adaptation is part, to the checklist that Regions use in annual State Revolving Fund program reviews;
- Finalizing a conversation guide in August 2014 to help EPA Regions engage with States on climate change and extreme weather issues (in addition to other sustainability topics);
- Continuing a dialogue on "SRF Program Response to Climate Change Adaptation Needs" through the State-EPA Workgroup at the Spring Council of State Infrastructure Financing Authorities Policy Conference meeting.

2. Developed Climate Resilience Evaluation and Awareness Tool (CREAT) 3.0 Framework: EPA completed a draft CREAT 3.0 framework providing an overview of the additions and enhancements to CREAT which describes the new web-based program architecture featuring the following modules: Climate Awareness; Scenario Development; Asset Screening; Adaptation Planning; and, Risk Assessment. The final CREAT version 3.0 is expected to be released in the middle of 2015.

3. Addressed Climate Change in Sanitary Survey Program: An EPA Headquarters/Region team was established in 2014 to identify how best to include consideration of weather-related conditions and extremes in the Safe Drinking Water Act Sanitary Survey program. The Sanitary Survey program provides for on-site review of drinking water systems on a three to five year rotating basis. Efforts are currently focused on including climate resilience information, including water availability and flooding, in the *Sanitary Survey Learner's Guide* that is undergoing general revision efforts.

4. Launched WaterSense H2Otel Challenge: In 2014, the WaterSense program launched the H2Otel Challenge to increase awareness of water efficiency opportunities in the hospitality sector. Close to 800 hotels took the Challenge to assess their water use, change products and practices, and track their water use and savings. WaterSense provided a suite of tools and training to help hotels identify opportunities for savings in their facilities.

5. Developed Flood Resilience Guide for Water and Wastewater Utilities: EPA developed this



Flood Resilience Guide for small and mid-size utilities. The *Guide* outlines a simple, 4-step assessment process to help any water utility know their flooding threat and identify practical mitigation options to protect their critical assets. With a user-friendly online layout, the *Guide* provides worksheets, instructional videos, and flood maps to help utilities through the process.

Vision Area 2: Watersheds and Wetlands

Vision: *Watersheds are protected, maintained and restored to ensure climate resilience and to preserve the social and economic benefits they provide; and the nation's wetlands are maintained and improved using integrated approaches that recognize their inherent value as well as their role in reducing the impacts of climate change.*

1. Published Workbook for Developing Risk-Based Climate Change Adaptation Plans: EPA published "*Being Prepared for Climate Change: A Workbook for Developing Risk-Based Adaptation Plans*." This peer reviewed guide describes how to conduct watershed scale climate change vulnerability assessments and create accompanying action plans. It is intended to assist communities, National Estuary Programs, or other similar organizations in preparing risk-based plans for climate change resiliency.

2. Built State and Local Capacity to Protect Healthy Watersheds and Enhance Climate Change Resiliency: The Healthy Watersheds Program (HWP) is working to build state and local capacity to identify and protect healthy watersheds using a systems approach that recognizes watersheds as dynamic, interconnected ecosystems. Natural, intact watersheds are better equipped to withstand, recover from, and adapt to natural and man-made disturbances, including climate change. Implementing strategies to maintain and protect healthy watersheds is key toward enhancing climate change resiliency. In 2014, HWP activities included:

- HWP released "*Strengthening the Resilience of the Taunton River Watershed: A Tool to Prioritize Local Action*". In partnership with EPA Region 1, The Nature Conservancy and local stakeholders, this project will help inform how Taunton River communities decide on priority actions that would increase their overall resiliency and reduce their vulnerability to the converging impacts of climate change and development.

- In March 2014, HWP released the "Wisconsin Integrated Assessment of Watershed Health," a statewide report on the status and vulnerability of watershed health. Fifteen metrics were selected to describe landscape condition, hydrologic condition, habitat condition, geomorphology, water quality, and biological condition. To complement the analysis of watershed health, seven metrics describing the vulnerability of Wisconsin watersheds to future climate, land use, and water use change were selected and quantified for catchments in the Wisconsin Department of Natural Resource's hydrography database throughout the state.

- In June 2014, the Healthy Watersheds Program, Mobile Bay National Estuary Program, Alabama Department of Environmental Management, and other partners completed the "Alabama and Mobile Bay Basin Integrated Assessment of Watershed Health," a statewide and basin-wide report on the status and vulnerability of watershed health. The assessment, integrates the best available data from state and federal agencies to characterize relative landscape condition, watershed health, and watershed vulnerability to climate change, land use change, and water use.

- EPA launched the Healthy Watersheds Consortium Grant program to accelerate and expand the strategic protection of healthy freshwater ecosystems and their watersheds across the country. EPA expects to issue a cooperative agreement to fund a single grantee to manage the Healthy Watersheds Consortium grant program and issue sub-awards on a competitive basis. The Request for Proposals (RFP) was posted on October 10, 2014 and proposals are under review. EPA anticipates announcing the awardee in April 2015. The grant is a 6-year, $3.75 million grant.

Vision Area 3: Coastal and Ocean Waters

Vision: *Adverse effects of climate change and unintended adverse consequences of responses to climate change have been successfully prevented or reduced in the ocean and coastal environment. Federal, tribal, state, and local agencies, organizations, and institutions are working cooperatively; and information necessary to integrate climate change considerations into ocean and coastal management is produced, readily available, and used.*

1. Launched Climate Change Adaptation Projects with National Estuary Program (NEP) Partners: The Climate Ready Estuaries Program worked with four NEPs - Peconic Estuary Program (New York); Coastal Bend Bays and Estuaries Program (Texas); Morro Bay National Estuary Program (California); and San Francisco Estuary Partnership (California) - who will be looking broadly at their vulnerability to climate change. Other NEP projects related to climate change include sea level rise planning, work on flooding with an environmental justice community, and action planning for protecting coastal habitat.

2. Published National Estuary Program (NEP) Grant Guidance Addressing Climate Resilience: In December 2014, EPA published grant guidance to all the NEPs encouraging them to undertake efforts to make their Comprehensive Conservation Management Plans (CCMPs) climate resilient (i.e., to help ensure that CCMPs will be able to provide their intended protection and restoration benefits through time regardless of whether data from the National Climate Assessment reasonably projects the climate change impacts on each study area. EPA's goal is to ensure that no later than FY 2020, the CCMP of each NEP will be informed by a broad, risk-based vulnerability assessment and will include appropriate responses to assessment findings. NEPs are encouraged to use the new tool, *Being Prepared for Climate Change: A Workbook for Developing Risk-Based Adaptation Plans* in this effort.

3. Developed Approach to Assess Vulnerability of Near Coastal Species and Habitats to Climate Drivers at Regional Scales: The EPA Office of Research and Development is developing an approach to assess the vulnerability of near coastal species and habitats to climate drivers at regional scales. In 2014, the Sea-Level Affecting Marshes Model (SLAMM) was enhanced to address distribution of seagrass habitat resulting from sea level rise. A report was completed that describes the procedure used to develop the submerged aquatic vegetation model for the Yaquina Bay Estuary, Oregon. Ultimately, the project aims to apply the framework nationally, with a focus on the Pacific Northwest to assess how vulnerabilities vary geographically and across habitats.

Office of Research and Development: 2014 Product

Vision Area 4: Water Quality

Vision: *The Nation's surface water, drinking water, and ground water quality are protected, and the risks of climate change to human health and the environment are diminished, through a variety of adaptation and mitigation strategies.*

1. Developed Green Infrastructure Collaborative Network: In October 2014, EPA joined with federal agencies, non-governmental organizations, and private-sector entities to form the Green Infrastructure Collaborative, a network to help communities more easily implement green infrastructure. As of December 2014, the Collaborative included more than 25 member organizations. The Green Infrastructure Collaborative members released a Statement of Support outlining commitments to advance coordination around green infrastructure initiatives and noting that "Green infrastructure continues to emerge as an approach to complement and enhance gray infrastructure and provide multi-benefit solutions that create resilient and sustainable communities".

2. Awarded Funding for Green Infrastructure Technical Assistance: EPA awarded $1.1 million worth of green infrastructure technical assistance to 19 communities in 2014. Selected communities received assistance for projects including green infrastructure conceptual designs, feasibility studies, and integration of green infrastructure into local flood management, coastal resiliency, and water security planning efforts.

3. Completed Pilot to Understand Approaches Needed to Incorporate Climate Change Information into TMDL Development: The EPA Office of Research and Development completed a pilot effort to understand the information and approaches needed to incorporate climate change information into Total Maximum Daily Loads (TMDL) development in the Pacific Northwest. This project synthesizes, interprets and presents information in a way that informs and promotes capacity building in EPA Regions to incorporate climate change mitigation and adaption into their operating programs.

Office of Research and Development: 2014 Product

Vision Area 5: Working with Tribes

Vision: *Tribes are able to preserve, adapt, and maintain the viability of their culture, traditions, natural resources, and economies in the face of a changing climate.*

1. Award Funding to Tribes to Study Health Effects of Climate Change: Through the EPA Office of Research and Development (ORD) STAR (Science to Achieve Results) grant program, EPA awarded $5 million to Tribes to study the health effects of climate change. Several of the projects involve water quality, aquatic resources as foods, and sea level rise.

In addition, water programs in EPA's regional offices are working with Tribes to assist them in responding to climate change related issues. These activities, described in greater detail in the next Part of this report, include:

- Region 1's Peconic Estuary Program allocated $30,000 in funds from the Climate Ready Estuaries Program **to conduct a climate vulnerability assessment for the Peconic Estuary in cooperation with the Shinnecock Nation of Indians**.

- Region 6 hosted a **Climate Change Adaptation Workshop for Region 6 Tribes** at the Regional Tribal Summit held on March 26, 2014.

- Region 7 hosted a **Native American Heritage Month Event** in November 2014 with a **panel discussion on "Climate Change and the Impacts on Native American People, Places and Culture"**.

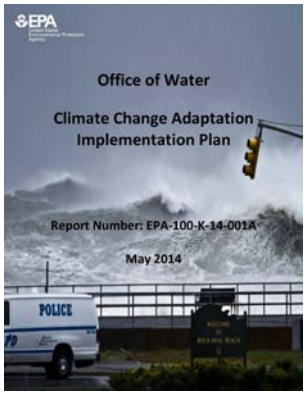
- Region 9 **promoted drought resilience in Indian Country** by giving water efficiency presentations at Regional tribal conferences and developing a water efficiency case study.

- Region 10 and ORD have been working with partners including the Nooksack Indian Tribe, Lummi Nation, and Washington Department of Ecology on a **project that is using a temperature load allocation for the South Fork Nooksack River as a pilot for integrating climate change into a watershed-specific plan for improving water quality**.

- Region 10 **provided funds to the Alaskan Native Tribal Health Consortium** to administer the Local Environmental Observers Network. The project provides an opportunity for local environmental observers to tell the stories of the changing climate.

- Region 10 offered **quarterly webinars on climate change with Alaskan Tribes.**

Vision Area 6:
Cross-cutting Program Support



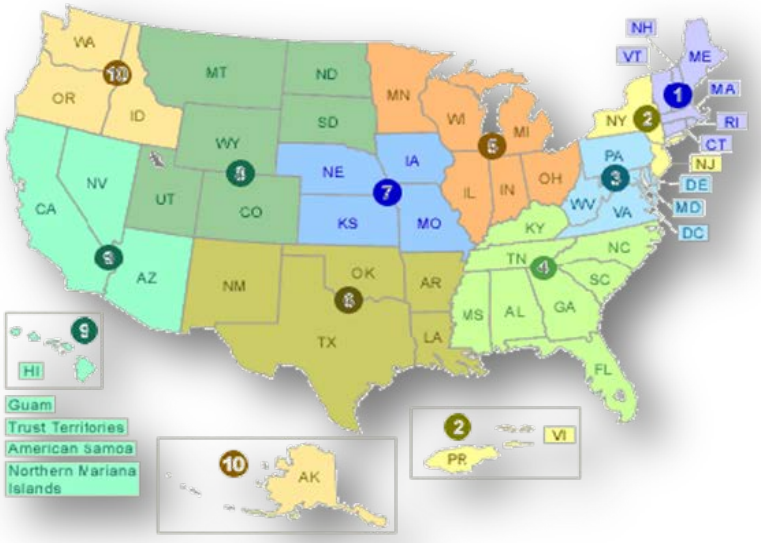
1. Published EPA Office of Water Climate Change Adaptation Implementation Plan: The EPA Office of Water Climate Change Adaptation Plan was released for public comment in September 2013, and the final Plan was published in November 2014. The Plan describes priority climate change adaptation actions for EPA's water programs.

2. Participated in Workgroups within EPA and Among other Federal Agencies. The National Water Program participated in a range of federal agency workgroups addressing climate change adaptation challenges including the:

- EPA Cross-Agency Climate Change Adaptation Workgroup;
- Climate Change Workgroup of the Advisory Committee on Water Information (ACWI);
- Water Resources Workgroup of the Interagency Council on Climate Change Resilience and Preparedness;
- Interagency Joint Working Group implementing the final "Fish Wildlife and Plants Climate Adaptation Strategy";
- "National Ocean Policy" Implementation Plan workgroup on climate change;
- Interagency Ocean Acidification Working Group; and
- Coral Reef Task Force.

PART II: HIGHLIGHTS FROM EPA REGIONAL WATER PROGRAMS

A major highlight of work in each of the ten EPA Regional water program offices (see map of EPA Regions) to implement the *2012 Strategy* is described below. Additional accomplishments by EPA Regional water programs are described in the Compendium in Appendix A.



Region 1

Region 1 **served on the steering committee for the Northeast Coastal Acidification Network (NECAN)**, which was established by the Northeast Association of Coastal and Ocean Observing Systems (NERACOOS) to coordinate regional efforts to improve scientific understanding of ocean and coastal acidification and help affected stakeholders. NECAN sponsored a series of 16 webinars by experts on ocean and coastal acidification that culminated with a "state of the science" workshop in April 2014, the results of which will be published in two scientific journal articles. With funding support from EPA Headquarters, NECAN also began a series of stakeholder engagement workshops in December 2014 to exchange information with aquaculture and other impacted industries and communities.

Region 2

Region 2 reviewed all applications for assistance **under the Disaster Relief Appropriations Act** of 2013 and on September 24, 2014, **awarded $229 million to New Jersey and $340 million to New York for improvements to wastewater and drinking water treatment facilities impacted by Hurricane Sandy**. The funds will be used on projects that reduce the risks of flood damage and that increase the resiliency of wastewater and drinking water facilities to withstand the effects of severe storms. Projects must be for resiliency purposes and "reduce flood damage risks and vulnerability or enhance resiliency to rapid hydrologic change or a natural disaster at water or wastewater facilities."

Region 3

Region 3 **held 6 workshops on water utility energy efficiency and conducted 10 energy audits at water and wastewater treatment in Region 3 States**. In the process, Region 3 forged a close

partnership with public and private agencies in Delaware, **forming the Delaware Water and Wastewater Energy Efficiency Partnership (DWEEP)**. Workshops provided technical information on energy projects to water and wastewater treatment plant operators and municipal managers. Funding opportunities for energy efficiency and renewable energy projects at water and wastewater facilities were also presented.

Region 4

Region 4's Clean Water State Revolving Fund (CWSRF) Program has been **training State CWSRF coordinators to incorporate sustainable and green infrastructure projects into larger wastewater capital improvement loans**. For example, in Port Orange, Florida, a photovoltaic solar array was included in a wastewater treatment plant upgrade project funded by Florida's CWSRF. The solar power system provides the plant a minimum of 25 kilowatt continuous power supply for 6 hour solar day. The energy cost savings for the system is approximately $20,000 per year and reduces the plant's overall carbon footprint.

Region 5

Region 5's Climate Change Adaptation Implementation Plan emphasizes promoting resilient practices at municipal wastewater treatment plants, one of which is improving energy efficiency. In partnership with Ohio EPA, Region 5 **launched the Ohio Water & Energy Pilot for Public Wastewater Treatment Works which aims to advance energy management at wastewater treatment facilities.** Four wastewater treatment works ranging in design average flow from 3.5MGD – 15 MGD (million gallons per day) are participating in the pilot.

Region 6

Region 6 **hosted a Climate Change Adaptation Workshop for Region 6 Tribes** at the Regional Tribal Summit held on March 26, 2014. The workshop included an overview of climate change science and adaptation actions, a survey of grant funding opportunities available in EPA's various media programs, and a tribal led brainstorming session aimed at identifying and evaluating civic, cultural and ecological assets, assessing potential climate change impacts and the threats they may pose to tribal assets, and the steps Tribes will need to take to address these vulnerabilities.

Region 7

Region 7 h**osted a Native American Heritage Month Event** on November 12, 2014 with a **panel discussion on Climate Change and the Impacts on Native American People, Places and Culture**. The nine tribal nations located within Region 7 participated along with 100 EPA staff.

Region 8

Region 8 **hosted a WaterSense Partner Summit**, bringing together more than 40 individuals, both in person and via webinar, representing WaterSense partners from Colorado, Utah, Montana, and Wyoming. This was the first event of its kind in an EPA Regional Office and WaterSense Regional Liaisons from the nine other EPA Regions were invited to observe via webinar in hopes they may be able to do something similar in their Regions.

Region 9

Following the January 17, 2014 declaration of a state of emergency due to drought in California, and severe – exceptional drought conditions throughout much of Region 9, the Region **drafted a *Drought Response Strategy* to identify specific actions that can be taken to address the immediate crisis while increasing the resiliency of communities in the Region** to drought and climate change. Implementation of the *Strategy* has included:

- promoting water conservation, including interagency efforts under the Federal Green Challenge and Federal Regional Council;
- promoting water recycling;
- promoting stormwater capture and Green Infrastructure; assisting Tribes, and
- coordinating with water utilities to promote tools such as water loss control auditing.

Region 10

The **Puget Sound National Estuary Program** in Region 10 **provided funds to numerous projects to support adaptation and resiliency to climate change impacts**. Some of these projects included:

- evaluating sea-level rise to plan for protection of critical ecosystems in the San Juan Islands;
- an assessment of climate change impacts and their influence on Puget Sound; and
- working with counties, cities, and state agencies to provide technical assistance for preparing for climate change impacts while implementing their Shoreline Master Programs.

Part III:
2014 Assessment of Progress

The *2012 Highlights of Progress* Report provided an initial assessment of progress in implementing each of the nineteen goals described in the *National Water Program 2012 Strategy: Response to Climate Change.* That assessment identified the stage or phase of development efforts to implement the goals. Based on its development phase, each goal is then given a score from 1-7 (shown in the third column in Table II).

Recognizing the long-term nature of work to address climate change, the status of work on each of the goals carried out by National Water Program in 2012 and 2013 is shown in Table II.

The seven developmental phases for climate change related work are:

1. **Initiation**; conduct a screening assessment of potential implications of climate change to mission, programs, and operations;

2. **Assessment**; conduct a broader review to understand how climate change affects the resources in question;

3. **Response Development**; identify changes necessary to continue to reach program mission and goals and develop initial action plan;

4. **Initial Implementation**; initiate actions in selected priority programs or projects

5. **Robust Implementation**; programs are underway and lessons learned are being applied to additional programs and projects;

6. **Mainstreaming;** climate is an embedded, component of the program; and

7. **Monitor Outcomes and Adaptive Management;** continue to monitor and integrate performance, new information, and lessons learned into programs and plans.

More detailed descriptions of each of these phases of assessment are included in Table I (on the following page).

The 2012 baseline assessment has a total numeric value of 42 out of a total possible score of 133 (i.e., 19 goals times a score of 7 for each goal equates to a score of 133). This *2014 Highlights of Progress* Report includes an update of the initial 2012 assessment. The 2014 scores are provided in Table II after the 2012 and 2013 scores are listed. Collectively, the total score increases from 42 to 51 in 2013 and increases to 57 in 2014. This combined score indicates that many actions are in the early stages of implementation.

Table I - Description of Implementation Phases

Program Implementation Phases	Explanation	Examples of Evidence of Achievement
1. Initiation	Conduct a screening assessment of potential implications of climate change to mission, programs, and operations	o Preliminary information is developed to evaluate relevance of climate change to the mission or program; a decision is made as to whether to prepare a response to climate change; further exploration of climate change implications has been authorized. o Responsibilities are assigned at appropriate levels within the organization and resources are available to develop more in-depth assessments.
2. Assessment	Conduct a broader review to understand how climate change affects the resources in question Work with stakeholders to develop an understanding of the implications of climate change to the mission, programs, and operations	o Review science literature and assessments to understand how climate change affects the resources being protected (threat to mission). o Engage internal staff and external stakeholders in evaluation. o Identify climate change issues and concerns and communicate with internal and external stakeholders and partners. o Identify which specific programs are threatened and what specific information or tools need to be developed. o Communicate findings to partners and stakeholders and engage them in dialogue on building adaptive capacity.
3. Response development	Identify changes necessary to continue to reach program mission and goals Develop initial action plan Identify and seek the research, information and tools needed to support actions Begin to build the body of tools, information and partnerships needed to build capacity internally and externally	o Develop initial program vision and goals for responding to climate change. o Identify needed response actions or changes that will allow the organization to begin to address climate impacts on its mission. o Initiate strategies and actions in a few key areas to begin to build organizational ability to use climate information in decision processes. o Identify program partners' needs for building adaptive capacity. o Begin working with an external 'community of practice' to engage in tool and program development. o Rudimentary methods are put in place to track progress and options for more formal measures are identified and evaluated. o Develop a strategy and partnerships to obtain additional needed research.

4. Initial Implementation	Initiate actions in selected priority programs or projects	o Make it clear within the organization that incorporating climate change into programs is critical o Initiate actions and plans identified in Step 3 o Initiate projects with partners o Develop needed information and tools o Initial implementation of measures capable of documenting the extent of implementation of needed actions by partners/stakeholders o Some program partners have begun to implement response actions
5. Robust Implementation	Programs are underway and lessons learned are being applied to additional programs and projects	o Lessons learned are evaluated and strategies are refined o Efforts are initiated to consider climate change in additional program elements o Continue to institute institutional changes to include climate change in core programs, including refinement of measures o External communities of practice are in place to support ongoing capacity development
6. Mainstreaming	Climate is an embedded, component of the program	o The organization's culture and policies are aligned with responding to climate change o All staff have a basic understanding of climate change causes and impacts o All relevant programs, activities, and decisions processes intrinsically incorporate climate change o Measures for documenting progress among partners/stakeholders are well established and support program evaluation
7. Monitor Outcomes and Adaptive Management	Continue to monitor and integrate performance, new information, and lessons learned into programs and plans	o Progress is evaluated and needed changes are implemented o As impacts of climate change unfold, climate change impacts and organizational responses are reassessed

TABLE II - Climate Goals with 2012 Baseline and 2013 & 2014 Assessment Scores

Visions and Goals	***Strategic Actions (SA)***	***2012 Baseline and 2013 & 2014 Assessment Scores***
<u>Infrastructure:</u> In the face of a changing climate, resilient and adaptable drinking water, wastewater and stormwater utilities (water sector) ensure clean and safe water to protect the nation's public health and environment by making smart investment decisions to improve the sustainability of their infrastructure and operations and the communities they serve, while reducing greenhouse gas emissions through greater energy efficiency.		
Goal 1: Build the body of information and tools needed to incorporate climate change into planning and decision making.	SA1: Improve access to vetted climate and hydrological science, modeling, and assessment tools through the Climate Ready Water Utilities program.	**Phase Response Assessment:** 2012 Baseline: 3 2013 Assessment: 3 2014 Assessment: 4
	SA2: Assist wastewater and water utilities to reduce greenhouse gas emissions and increase long-term sustainability with a combination of energy efficiency, co-generation, and increased use of renewable energy resources.	
	SA3: Work with the states and public water systems, particularly small water systems, to identify and plan for climate change challenges to drinking water safety and to assist in meeting health based drinking water standards.	
	SA4: Promote sustainable design approaches to provide for the long-term sustainability of infrastructure and operations.	
Goal 2: Support Integrated Water Resources Management (IWRM) to sustainably manage water resources.	SA5: Understand and promote through technical assistance the use of water supply management strategies.	**Phase Response Assessment:** 2012 Baseline: 2 2013 Assessment: 2 2014 Assessment: 3
	SA6: Evaluate and provide technical assistance on the use of water demand management strategies.	
	SA7: Increase cross-sector knowledge of water supply climate challenges and develop watershed specific information to inform decision making.	

Visions and Goals	*Strategic Actions*	*2012 Baseline and 2013 & 2014 Assessment Scores*
<u>Watersheds & Wetlands</u>: Watersheds are protected, maintained and restored to ensure climate resilience and to preserve the social and economic benefits they provide; and the nation's wetlands are maintained and improved using integrated approaches that recognize their inherent value as well as their role in reducing the impacts of climate change.		
Goal 3: Identify, protect, and maintain a network of healthy watersheds and supportive habitat corridor networks.	SA8: Develop a national framework and support efforts to protect remaining healthy watersheds and aquatic ecosystems.	**Phase Response Assessment:** 2012 Baseline: 3 2013 Assessment: 3 2014 Assessment: 4
	SA9: Collaborate with partners on terrestrial ecosystems and hydrology so that effects on water quality and aquatic ecosystems are considered.	
	SA10: Integrate protection of healthy watersheds throughout the National Water Program (NWP) core programs.	
	SA11: Increase public awareness of the role and importance of healthy watersheds in reducing the impacts of climate change.	
Goal 4: Incorporate climate resilience into watershed restoration and floodplain management.	SA12: Consider a means of accounting for climate change in EPA funded and other watershed restoration projects.	**Phase Response Assessment:** 2012 Baseline: 3 2013 Assessment: 3 2014 Assessment: 3
	SA13: Work with federal, state, interstate, tribal, and local partners to protect and restore the natural resources and functions of riverine and coastal floodplains as a means of building resiliency and protecting water quality.	
Goal 5: Watershed protection practices incorporate Source Water Protection to protect drinking water supplies.	SA14: Encourage States to update their source water delineations, assessments or protection plans to address anticipated climate change impacts.	**Phase Response Assessment:** 2012 Baseline: 2 2013 Assessment: 2 2014 Assessment: 2
	SA15: Continue to support collaborative efforts to increase state and local awareness of source water protection needs and opportunities, and encourage inclusion of source water protection areas in local climate change adaptation initiatives.	

Visions and Goals	*Strategic Actions*	*Assessment*
Goal 6: Incorporate climate change considerations into the Clean Water Act (CWA) 404 regulatory program as they relate to permit reviews and compensatory mitigation.	SA16: Consider the effects of climate change, as appropriate, when making significant degradation determinations in the CWA Section 404 wetlands permitting and enforcement program.	**Phase Response Assessment:** 2012 Baseline: 1 2013 Assessment: 1 2014 Assessment: 1
	SA17: Evaluate, in conjunction with the U.S. Army Corps of Engineers, how wetland and stream compensation projects could be selected, designed, and sited to aid in reducing the effects of climate change.	
Goal 7: Improve baseline information on wetland extent, condition and performance to inform effective adaptation to climate change.	SA18: Expand wetland mapping by supporting wetland mapping coalitions and training on use of the new federal Wetland Mapping Standard.	**Phase Response Assessment:** 2012 Baseline: 1 2013 Assessment: 2 2014 Assessment: 2
	SA19: Produce a statistically valid, ecological condition assessment of the nation's wetlands.	
	SA20: Work with partners and stakeholders to develop information and tools to support long term planning and priority setting for wetland restoration projects.	
<u>Coastal and Ocean Waters</u>: Adverse effects of climate change and unintended adverse consequences of responses to climate change have been successfully prevented or reduced in the ocean and coastal environment. Federal, tribal, state, and local agencies, organizations, and institutions are working cooperatively; and information necessary to integrate climate change considerations into ocean and coastal management is produced, readily available, and used.		
Goal 8: Collaborate to ensure information and methodologies for ocean and coastal areas are collected, produced, analyzed, and easily available.	SA21: Collaborate to ensure that synergy occurs, lessons learned are transferred, federal efforts effectively help local communities, and efforts are not duplicative or at cross-purposes.	**Phase Response Assessment:** 2012 Baseline: 3 2013 Assessment: 3 2014 Assessment: 3
	SA22: Work within EPA and with the U.S. Global Change Research Program and other federal, tribal, and state agencies to collect, produce, analyze, and format knowledge and information needed to protect ocean and coastal areas and make it easily available.	

Visions and Goals	*Strategic Actions*	*Assessment*
Goal 9: EPA geographically targeted programs support and build networks of local, tribal, state, regional and federal collaborators to take effective adaptation measures for coastal and ocean environments.	SA23: Work with the NWP's larger geographic programs to incorporate climate change considerations, focusing on both the natural and built environments.	**Phase Response Assessment:** 2012 Baseline: 2 2013 Assessment: 2 2014 Assessment: 3
	SA24: Address climate change adaptation and build stakeholder capacity when implementing NEP Comprehensive Conservation and Management Plans and through the Climate Ready Estuaries Program.	
	SA25: Conduct outreach and education, and provide technical assistance to state and local watershed organizations and communities to build adaptive capacity in coastal areas outside the NEP and Large Aquatic Ecosystem programs.	
Goal 10: Address climate driven environmental changes in coastal areas and ensure that mitigation and adaptation are conducted in an environmentally responsible manner.	SA26: Support coastal wastewater, stormwater, and drinking water infrastructure owners and operators in reducing climate risks and encourage adaptation in coastal areas.	**Phase Response Assessment:** 2012 Baseline: 2 2013 Assessment: 3 2014 Assessment: 3
	SA27: Support climate readiness of coastal communities, including hazard mitigation, pre-disaster planning, preparedness, and recovery efforts.	
	SA28: Support preparation and response planning for diverse impacts to coastal aquatic environments.	

Visions and Goals	*Strategic Actions*	*Assessment*
Goal 11: Ocean environments are protected by EPA programs that incorporate shifting environmental conditions, and other emerging threats.	SA29: Consider climate change impacts on marine water quality in NWP ocean management authorities, policies, and programs.	**Phase Response Assessment:** 2012 Baseline: 2 2013 Assessment: 3 2014 Assessment: 3
	SA30: Use available authorities and work with the Regional Ocean Organizations and other federal and state agencies through regional ocean groups and other networks so that offshore renewable energy production does not adversely affect the marine environment.	
	SA31: Support the evaluation of sub-seabed sequestration of CO_2 and any proposals for ocean fertilization.	
	SA32: Participate in interagency development and implementation of federal strategies through the National Ocean Council (NOC) and the NOC Strategic Action Plans.	
<u>Water Quality:</u> Our Nation's surface water, drinking water, and ground water quality are protected, and the risks of climate change to human health and the environment are diminished, through a variety of adaptation and mitigation strategies.		
Goal 12: Protect waters of the United States and promote management of sustainable surface water resources.	SA33: Encourage States and communities to incorporate climate change considerations into their water quality planning.	**Phase Response Assessment:** 2012 Baseline: 2 2013 Assessment: 3 2014 Assessment: 3
	SA34: Encourage green infrastructure and low-impact development to protect water quality and make watersheds more resilient.	
	SA35: Promote consideration of climate change impacts by National Pollutant Discharge Elimination System permitting authorities.	
	SA36: Encourage water quality authorities to consider climate change impacts when developing wasteload and load allocations in TMDLs where appropriate.	
	SA37: Identify and protect designated uses that are at risk from climate change impacts.	

Visions and Goals	*Strategic Actions*	*Assessment*
Goal 13: As the nation makes decisions to reduce its greenhouse gas emissions and develop alternative sources of energy and fuel, the NWP will work to protect water resources from unintended adverse consequences.	SA38: Clarify how to re-evaluate aquatic life water quality criteria on more regular intervals; and develop information to assist States and Tribes who are developing criteria that incorporate climate change considerations for hydrologic condition.	**Phase Response Assessment:** 2012 Baseline: 1 2013 Assessment: 2 2014 Assessment: 3
	SA39: Continue to provide perspective on the water resource implications of new energy technologies.	
	SA40: Provide assistance to States and permittees to assure that geologic sequestration of CO_2 is responsibly managed.	
	SA41: Continue to work with States to help them identify polluted waters, including those affected by biofuels production, and help them develop and implement TMDLs for those waters.	
	SA42: Provide informational materials for stakeholders to encourage the consideration of alternative sources of energy and fuels that are water efficient and maintain water quality.	
	SA43: As climate change affects the operation or placement of reservoirs, EPA will work with other federal agencies and EPA programs to understand the combined effects of climate change and hydropower on flows, water temperature, and water quality.	
Goal 14: Collaborate to make hydrological and climate data and projections available.	SA44: Monitor climate change impacts to surface waters and ground water.	**Phase Response Assessment:** 2012 Baseline: 3 2013 Assessment: 3 2014 Assessment: 3
	SA45: Collaborate with other federal agencies to develop new methods for use of updated precipitation, storm frequency, and observational streamflow data, as well as methods for evaluating projected changes in low flow conditions.	
	SA46: Enhance flow estimation using National Hydrography Dataset Plus (NHDPlus).	

Visions and Goals	*Strategic Actions*	*Assessment*
<u>Working With Tribes:</u> Tribes are able to preserve, adapt, and maintain the viability of their culture, traditions, natural resources, and economies in the face of a changing climate.		
Goal 15: Incorporate climate change considerations in the implementation of core programs, and collaborate with other EPA Offices and federal agencies to work with Tribes on climate change issues on a multi-media basis.	SA47: Through formal consultation and other mechanisms, incorporate climate change as a key consideration in the revised NWP Tribal Strategy and subsequent implementation of CWA, Safe Drinking Water Act (SDWA), and other core programs.	**Phase Response Assessment:** 2012 Baseline: 3 2013 Assessment: 3 2014 Assessment: 3
	SA48: Incorporate adaptation into tribal funding mechanisms, and collaborate with other EPA and federal funding programs to support sustainability and adaptation in tribal communities.	
Goal 16: Tribes have access to information on climate change for decision making.	SA49: Collaborate to explore and develop climate change science, information, and tools for Tribes, and incorporate local knowledge.	**Phase Response Assessment:** 2012 Baseline: 2 2013 Assessment: 3 2014 Assessment: 3
	SA50: Collaborate to develop communication materials relevant for tribal uses and tribal audiences.	
<u>Cross-Cutting Program Support</u>		
Goal 17: Communication, Collaboration, and Training	SA51: Continue building the communication, collaboration, and training mechanisms needed to effectively increase adaptive capacity at the federal, tribal, state, and local levels.	**Phase Response Assessment:** 2012 Baseline: 3 2013 Assessment: 4 2014 Assessment: 4

Visions and Goals	*Strategic Actions*	*Assessment*
Goal 18: Tracking Progress And Measuring Outcomes	SA52: Adopt a phased approach to track programmatic progress towards Strategic Actions; achieve commitments reflected in the Agency Strategic Plan; work with the EPA Work Group to develop outcome measures.	**Phase Response Assessment:** 2012 Baseline: 3 2013 Assessment: 4 2014 Assessment: 4
Goal 19: Climate Change and Water Research Needs	SA53: Work with ORD, other water science agencies, and the water research community to further define needs and develop research opportunities to deliver the information needed to support implementation of this 2012 Strategy, including to provide the decision support tools needed by water resource managers.	**Phase Response Assessment:** 2012 Baseline: 2 2013 Assessment: 3 2014 Assessment: 3

TOTAL Implementation Phase Assessment Score: 2012 = 43
TOTAL Implementation Phase Assessment Score: 2013 = 52
TOTAL Implementation Phase Assessment Score: 2014 = 57

Total Possible = 133

Appendix A:

Compendium of Additional 2014 Accomplishments for Climate Change Adaptation

In addition to the accomplishments highlighted in this report, other important projects related to climate change adaptation were completed in 2014 by EPA national water program offices and water programs in EPA regions.

I) National Water Program Climate Change Adaptation Accomplishments

Office of Wetlands, Oceans and Watersheds

- The National Estuary Program (NEP) is **developing a network of coastal acidification monitoring stations** located within the estuaries participating in the NEP. In 2014, under a collaborative effort between the Casco Bay Estuary Partnership (Maine), Friends of Casco Bay, University of New Hampshire, Southern Maine Community College, and Northeast Coastal Acidification Network, a monitoring station was set up in Casco Bay, Maine. The station, while equipped with state-of-the-art pH and pCO2 sensors, will increase understanding of how near shore properties modify ocean acidification patterns.

- **Climate Ready Estuaries published a lessons-learned publication** from its projects with National Estuary Programs in the Southeast United States. This is the third lessons learned compilation from Climate Ready Estuary projects with National Estuary Program partners.

- **EPA announced the 2013 Campus RainWorks Challenge winners in April 2014** and opened registration for the 2014/2015 Challenge in June 2014.

- EPA produced an **interactive webinar in 2014 for EPA Regional Wetland Program Managers in order to increase understanding of EPA climate change initiatives**, increase regional capacity to respond effectively to climate change, and promote peer-to-peer exchange and national wetland program accountability.

- EPA continues to work with other agencies and the international community to **provide technical guidance related to marine geo-engineering, including ocean fertilization.** At the 36th Meeting of Contracting to the London Convention and 9th Meeting of Contracting Parties to the London Protocol (November 2014), parties adopted two guidance documents related to marine geoengineering/ocean fertilization and progress was made on a web-based ocean fertilization scientific repository.

- EPA is involved in a Commission for Environmental Cooperation Working Group on Blue Carbon and has **invested in the Tampa Bay National Estuary Program's efforts related to**

Blue Carbon. **EPA** is working with federal agencies and Council on Environmental Quality to account for Blue Carbon in the greenhouse gas inventory (2013 Wetlands Supplement to 2006 Intergovernmental Panel on Climate Change Guidelines) and addressing issues related to science, education and outreach.

- **EPA developed an internal action plan to address coastal acidification** through the Clean Water Act and existing voluntary EPA programs. Key actions initiated in 2014 include:

  - Collaborating with National Center for Environmental Economics to develop ecosystem services valuation methodologies to quantify the economic impacts of acidification on fisheries in the Pacific Northwest (Puget Sound) and Northeast (Gulf of Maine);
  - Partnering with Casco Bay Estuary Partnership, Friends of Casco Bay, University of New Hampshire, Southern Maine Community College, and Northeast Coastal Acidification Network to install state-of-the-art pH and pCO_2 sensors in Casco Bay;
  - Partnering with Washington State Department of Ecology to develop models to determine relative contributions of land-based pollution sources to acidification conditions in Puget Sound;
  - Working with the New England Coastal Acidification Network to conduct and facilitate regional stakeholder engagement and education workshops;
  - Developing a white paper that will outline Clean Water Act regulatory and non-regulatory tools to address acidification-related pollution in U.S. coastal waters; and,
  - Participating in efforts by the Interagency Ocean Acidification Working Group to develop a "Strategic Plan for Federal Research and Monitoring on Ocean Acidification."

- **EPA provided grant funding to the Washington State Department of Ecology for the development of a computer model of acidification in the Salish Sea.** The model will distinguish the impacts of local sources of nitrogen and carbon in atmospheric and water pathways from Pacific Ocean signatures. The purpose is to quantify where, when, and how much local sources impact acidification to guide effective implementation of local nutrient management actions where they are significantly impacting acidification. The results will be used to determine whether nutrient management programs in place now are sufficient or if they need more stringent controls.

- The U.S. Geological Survey's (USGS) **national Monthly Water Balance Model** (MWBM), upon which the initial core modeling is done, has been **converted from a gridded format to one based on over 110,000 NHD-derived Hydrologic Response Units** (areas on the landscape that would be expected to have a similar hydrologic response to changes in factors such as precipitation and temperature), the model has been calibrated for the entire continental U.S. domain based on USGS stream gage data, outputs from over 230 climate model-greenhouse gas emission scenario combinations have been run to provide a broad array of plausible future climate projections, and a web portal designed to facilitate

dissemination of findings to the public. Phase I of the project is scheduled for completion in 2015 with the launch of the USGS web portal.

- The U.S. Fish and Wildlife Service maintains the National Wetlands Inventory. In 2009, EPA co-led a stakeholder working group (Federal Geographic Data Committee (FGDC) Wetlands subcommittee) to develop a new standard to support digital mapping of wetlands for incorporation into the National Wetlands Inventory and the National Hydrography Dataset (NHD). Accurate mapping of wetlands is essential to understanding how climate change may result in changes in wetlands over time. EPA has supported the long-term objective of the FGDC Wetlands subcommittee to complete digital mapping for the country which was completed this year. EPA is currently supporting a number of **2014 Regional Wetland Program Development Grants to support updating the National Wetlands Inventory** to ensure that mapping efforts are current.

- In 2014, EPA **continued work to develop the first National Assessment of Wetland Condition (NWCA).** Preliminary results are under review that will provide an assessment of the overall ecological integrity of the resource and the relative status of wetland processes, such as the ability of a wetland to absorb nutrients and floodwaters. In addition, EPA developed the proper metrics for identifying the stressors most associated with degraded wetlands, providing insights into the causes of declining wetland quality. Baseline information on the location, extent, and quality of wetlands and aquatic resources will help to assess changes associated with climate change and other stressors. The NWCA will be repeated at the national scale every five years and will incorporate those indicators, among others, that EPA identifies as most **meaningful for detecting and predicting the impacts of climate change on the condition of the nation's wetlands** in the 2016 scheduled cycle. EPA expects that recurring monitoring will inform the development of predictive models and management strategies, including climate change adaptation approaches. A report detailing the results of the survey will be released for public comment in 2015.

- In 2014, **EPA awarded $1 million in Wetland Program Development Grants** to strengthen the capacity of States and Tribes **in developing their programs to make them more climate ready/resilient**. The Nation's wetlands provide a variety of ecosystem services including climate change adaptation by protecting shorelines from extreme weather events and sea level rise. The National Wetland Program Development Grants provide interstate agencies, intertribal consortia, and non-profit organizations with funding to develop and refine comprehensive state, tribal, and local wetland programs. The proposed projects link to environmental results and include wetland restoration and training such as the "Living Shoreline Academy."

Office of Ground Water and Drinking Water

- **Climate Ready Water Utilities held four Emergency Response and Climate Change Workshops** in Mattapoisett, Massachusetts; New Orleans, Louisiana; Ft. Pierre, South Dakota; and Fresno, California focused on emergency response and regional climate change

impacts; planning and adaptation; tool demonstrations on the Flood Resilience Guide; and, CREAT, utility case studies, and energy management.

- **Climate Ready Water Utilities developed an interactive Climate Scenario-Based Projected Changes Map** that provides easy-to-access scenarios of projected climate changes derived from CREAT. The tool illustrates projected changes in annual total precipitation; annual average temperature; precipitation intensity for the 100-year storm; and, sea-level rise.

- **EPA began to transition the Climate Ready Water Utilities Toolbox to Georgetown University Climate Center**.

- Climate Ready Water Utilities **completed an update of the *Adaptation Strategies Guide*** and plans to post the *Guide* online.

- **EPA presented five webinars with the Water Utility Climate Alliance** on: Scenario Planning; Robust Decision Making; Threshold Analysis; Communicating Climate Risk; and Financing Adaptation.

- **EPA published the final primary enforcement responsibility (primacy) manual** in April 2014 to support Class VI geologic sequestration regulatory implementation.

- **EPA advanced Class VI geologic sequestration permitting** by working closely with current permit applicants, permittees and potential future permit applicants to:

    - Provide clarity regarding the Class VI requirements and develop permit conditions for six Class VI permits.
    - Issue six final Class VI permits in 2014**.** (Note: four are under Environmental Appeals Board appeal. One has started construction. One was finalized in late December and may yet be appealed).
    - Work through project-specific issues to ensure regulatory compliance and protection of underground sources of drinking water (USDWs).
    - Develop a tool to receive Class VI permit application, reporting and other required information electronically.

- EPA **worked with North Dakota to advance their application for Class VI Primary Enforcement Responsibility (Primacy).**

<u>Office of Science and Technology</u>

- EPA began **collaborating with USGS to develop a plan to improve statistical software commonly used to estimate critical low flows.**

- An EPA Headquarters/Regional/State water quality team developed a **workshop session on climate change and water quality standards for the 2014 Water Quality Standards**

Managers' meeting in late February-early March 2014. The meeting participants reviewed climate change issues in Clean Water Act **water quality criteria and standards** and identified possible options for addressing climate change in the context of water quality standards.

- An EPA Headquarters/Regional **team documented Regional priorities considering impacts of climate change on water quality criteria and standards** in the fall of 2014 to better understand the diverse issues across Regions and develop potential products to address such issues.

- EPA Headquarters continued to provide a c**limate change module at the spring and winter Water Quality Standards Academy**. The module is now a mandatory component of the Academy.

Office of Wastewater Management

- In 2014, the **number of WaterSense partners across the country continued to grow**, increasing by close to 138 to a **total of 1,612 partners**, which includes water utilities, state and local governments, manufacturers, retailers, and builders.

- **WaterSense released a draft specification for flushometer-type commercial toilets.** The program also released a notice of intent to develop a specification for landscape irrigation sprinklers and continued research to support development of a specification for soil moisture based irrigation controllers.

- **WaterSense released revisions to its program for labeling professional certifying organizations that certify professionals working in water efficiency fields**. WaterSense currently labels only three types of irrigation professional certification programs. The changes will position the program to consider other types of programs in the future.

- In July 2014, **EPA's Green Infrastructure Team launched a webpage** documenting the many benefits of green infrastructure in adapting to climate change, including improving resilience to flooding, drought and rising sea levels.

- Building on the success of a partnership between EPA Headquarters and Regions to help water and wastewater utilities become more energy efficient and reduce greenhouse gases, EPA worked with the Department of Energy's Office of Weatherization and Outreach Office to develop a **Notice of Funding Availability (NOFA) that will make up to $1 million available to state energy offices to train and assist these utilities develop sustainable energy management programs**. Participating States will use a variety of energy management tools developed by EPA and others as they assist utilities around the country.

- **Five committee meetings were held on the National Research Council's *Beneficial Use of Graywater and Stormwater: An Assessment of Risks, Costs, and Benefits* study,** which were undertaken as a follow-up to their 2012 water reuse study. The meetings were in Washington, D.C. in November 2013, Marina del Ray, California in January 2014, Washington, D.C. in April 2014, Irvine, California in July 2014, and Denver, Colorado in November 2014.

- Under the Promoting Sustainable Rural Water and Wastewater Memorandum of Agreement (MOA), EPA worked with the U.S. Department of Agriculture to **leverage resources towards helping small and rural water and wastewater systems reliably and sustainably deliver clean and safe water to their customers** and provide wastewater services primarily in four major areas: sustainability of rural communities, system partnerships, water sector workforce, and the compliance of small rural public water and wastewater systems. The two agencies collaborated to develop *the **Rural and Small Systems Guidebook to Sustainable Utility Managemen*t**, and the *Workshop in a Box*. These materials were posted on agency websites in the Fall of 2013. In 2014, both agencies worked with technical assistance providers to identify locations to hold workshops **to help communities assess their operations** based on key management areas that align closely with the sustainability attributes.

  The following activities in support of the MOA were completed in 2014:
  - Provided 6 workshops for rural and small systems using the Rural and Small Systems Guidebook to Sustainable Utility.
  - Worked with assistance providers like the National Rural Water Association (NRWA) to train small systems using the Guidebook.

- EPA held a **webinar for technical assistance providers and U.S. Department of Agriculture (USDA) staff** in September 2014 regarding **energy assessments for small water and wastewater systems**.
- **EPA developed a water loss control manual in 2013 and in 2014 promoted the manual** and worked to raise awareness of the importance of dealing with water loss at workshops and conference events.
- **EPA organized and jointly presented a webinar with the American Water Works Association on "Using Water Audits to Understand Water Loss"** to assist public water systems and state primacy agencies in addressing water loss in water distribution systems.

- **EPA presented** at the Association of State Drinking Water Associations/EPA Annual Small Systems Workshop **on "Public Water System Water Supply Issues-Drinking Water Program Perspective."**

- **EPA developed three information documents for small public water systems** and posted them to the EPA Small System Technical Assistance page:

- Water Audits and Water Loss Control for Public Water Systems;
- Water Efficiency for Public Water Systems; and,
- Water Availability and Variability Strategies for Public Water Systems.

Office of Research and Development

- **EPA has been partnering with the U.S. Army in a "NetZero" partnership** to demonstrate approaches to minimizing water use by taking a systems-oriented approach to design and operation. ORD completed the first project on water use and conservation at Ft. Riley, Kansas which explored the effectiveness of education and awareness campaigns on behaviors, and reducing water consumption through social marketing, competition, outreach, and outcome assessments.

- **EPA published two journal articles** reporting results of modeling of soil column and kinetic studies, in an **effort to develop a computer program for a decision support tool for Aquifer Storage and Recovery (ASR) practices**. The model will integrate treatment (preconditioning), vadose zone characteristics and groundwater characteristics and flow to provide technical guidance for evaluating treatment requirements and permitting and monitoring criteria for ASR practices.

II) Climate Change Adaptation Accomplishments Related to Water in EPA Regions

In October 2014, EPA Regional Offices, in addition to EPA Headquarters, released the final versions of their *Climate Change Adaptation Plans*. These final versions were revised from earlier drafts following public comment periods. They respond to directives in Executive Order 13653 - Preparing the United States for the Impacts of Climate Change. The final Plans are living documents that will be periodically revised in subsequent years to account for new knowledge, data, scientific evidence, and lessons learned from the Agency's ongoing efforts to integrate climate adaptation planning into its programs, policies, rules and operations.

Region 1

- **Region 1 led a Northeast Regional Ocean Council (NROC) workgroup** that planned and conducted a workshop on salt marsh migration modeling and data needs in December 2014 to coordinate New England state efforts to understand the impacts of sea level rise on these wetlands systems.

- **Region 1 provided leadership as co-chair of the joint NROC/NERACOOS** (the Northeast Association of Coastal and Ocean Observing Systems) **steering committee** overseeing the development of an Integrated Sentinel Monitoring Strategy for Climate Change in Northeastern Ocean and Coastal Ecosystems, which is preparing a science and implementation plan to coordinate sub-regional efforts and help attract additional funding.

- The **Long Island Sound Study released its draft, updated Comprehensive Conservation Management Plan (CCMP)**, which includes actions to address the impacts of climate change, in September 2014. (Regions 1 and 2)

- The **Buzzards Bay National Estuary Program used Climate Ready Estuaries funding** to work with other federal, state, and local partners **to complete a vulnerability assessment** of water infrastructure and environmental justice communities in the New Bedford Harbor area to sea level rise and storm surge.

- EPA actively participated on the **New England Federal Partners Climate Change and Ocean Planning committees**, which each met four times during 2014 to coordinate and share information on climate change efforts.

- **Region 1 conducted community-based emergency response workshops**, including extreme weather, climate change, and incident command system training for more than 200 drinking water system operators.

- **Region 1 developed and distributed tools for the water sector and state programs**, including: Lessons Learned Report from Hurricane Irene and Sandy; generic extreme weather power point presentation; and GIS maps of utilities-at-risk. Also supported EPA Headquarters' completion of the national *Flood Guide* using results of the Water System Flood Resilience Pilot Project at the Berwick, Maine water utility.

- **Region 1 facilitated coordination between the Federal Emergency Management Agency (FEMA), U.S. Army Corps of Engineers (USACE), and state agencies to complete the Power for Water Initiative**, utilizing the USACE 249th Battalion to assess power and generator needs at 246 wastewater and drinking water facilities.

- **Working with Department of Homeland Security, Region 1 initiated a Regional Resiliency Assessment Program pilot project** in Portland, Maine to assess the vulnerability of critical infrastructure and to ensure the inclusion of water, wastewater, and energy infrastructure in the assessment.

- **Region 1 released the draft Massachusetts Small Municipal Separate Storm Sewer System (MS4) permit** in September 2014, **which includes low impact development (LID) requirements** and encourages infiltration when appropriate, to control more extreme precipitation events. The final New Hampshire small MS4 permit, with similar requirements, should be released in Fiscal Year 2015.

- The Regional SRF program continued to **promote the use of SRF funds for climate change resiliency projects** during the annual SRF reviews, and encouraged States to consider modifications to their SRF Priority Ranking Criteria to include additional points for Climate Change/Resiliency projects.

- **Region 1 participated on the USGS Northeast Climate Science Center Steering Committee** to help identify key research needs, including effects of climate induced changes on aquatic resources.

- **With the U.S. Fish and Wildlife Service (USFWS), USGS, North Atlantic Landscape Conservation Cooperative, and Northeast Climate Science Center, Region 1 co-sponsored a major regional stream temperature modeling workshop** in May 2014 and continued to work with the EPA Office of Research and Development Atlantic Ecology Division to predict thermal regimes in streams across New England.

- With USFWS, USACE, and National Marine Fisheries Service (NFMS) Region 1 initiated a working group to identify opportunities for **integrating climate change considerations into the CWA 404 permit program**.

- Through the Region's **Wetland Program Development Grants**, New England States have completed the following:

- New Hampshire has modified grant criteria, stream crossing protocols, and mitigation rules to include climate change concerns. They are also enhancing the wetland review process for projects in areas of high ecological integrity, and identifying opportunities for climate related restoration projects.
- Massachusetts Department of Environmental Protection has undertaken coastal erosion mapping, tide gate mapping (with Massachusetts Coastal Zone Management (MCZM) and is doing a study with the USGS on culvert sizing and assessing which precipitation data to use.
- Massachusetts completed a marsh migration model to identify areas to be protected and is establishing a monitoring program to track changes over time.
- Maine Natural Areas Program (MNAP) created a statewide invasive species database and map (IMAP) to document invasive species and help with early detection. In Fiscal Year 2012 MNAP worked with Maine Geological Survey to map sea level rise and verify locations of tidal marshes and also developed an ecological integrity assessment method for Maine wetlands, to set a baseline and measure change over time and identify species of greatest conservation need and those at risk due to climate change.

- Region 1 worked with directors of educational programming at Save the Bay (Rhode Island) and the Buzzards Bay Coalition **to identify opportunities to combine climate change educational goals with existing environmental programs** to educate urban youth from environmental justice communities on the importance of wetlands and their value in climate change resiliency. The three sessions included an eelgrass expedition, field investigation techniques, and working with a teachers development program to guide them in the use of outdoor classrooms.

- The Region 1 Geographic Information System (GIS) Office **coordinated a cross-program climate adaptation mapping workgroup** that met monthly to help further define common mapping needs, datasets, models, and tools for Region 1 programs. As a first step the group attempted to better understand which questions needed to be answered with mapping, and began tracking relevant GIS datasets to help inform a regional mapping strategy to support climate adaptation.

- Region 1 helped **develop a climate change GIS mapping platform** that will provide On-Scene Coordinators, Remedial Project Managers, and other project managers and regulatory personnel a means to determine how climate change may impact a contaminated site or other regulated facility.

- Working with EPA Brownfields Program Office, Region 1 **developed climate adaptation guidance and checklists that will enable brownfields grantees to appropriately consider climate change impacts in site cleanups and reuse.**

Region 2

- Region 2's Caribbean Environmental Protection Division (CEPD) is **participating in the Puerto Rico Climate Change Council and the Caribbean Regional Ocean Partnership (CROP)**, both led by the Puerto Rico Coastal Zone Management Program and the VI Coastal Zone Management Program. In addition, CEPD is also a member of the Caribbean Regional Planning Body (CRPB). The CROP and the CRPB are focused, among other things, on coastal and marine spatial planning and coastal vulnerabilities to climate change are an integral part of the groups' discussions.

- Region 2, in conjunction with Puerto Rico Sea Grant, University of Puerto Rico – Mayaguez Campus, the U.S. Caribbean Coastal Ocean Observing Program, the San Juan Bay Estuary Program and the ENLACE Caño Martín Peña Project, kicked off the **development of the first community based Adaptation to Climate Change and Disaster Risk Assessment Plan in Puerto Rico** for the Buena Vista Community of the Caño Martín Peña in 2014.

- The **Caribbean Coral Reef Partnership** held public listening sessions and partners discussed the structure of the Partnership and future rules of engagement, climate change, coral reef protection capacity needs in Puerto Rico and U.S. Virgin Islands, and coral reef focal projects in the St. Thomas East End Reserve and Northeast Reserve in PR. The partners agreed to sign a memorandum of understanding (MOU) to memorialize the commitment of the participating federal agencies.

- Region 2 has been **actively recruiting promotional partners for the WaterSense Program**. **New partnerships in New York** have been established with the New York State American Water Works Association (AWWA), the New York State Department of Environmental Conservation (DEC) and the Hudson River Sloop Clearwater, Inc.. **New partnerships in New Jersey** include the Town of Montclair, which has been designated as a Climate Showcase Community, as well as the Camden County Municipal Utilities Authority in New Jersey. Sustainable Jersey, a nonprofit, nonpartisan organization has also become a promotional partner. Sustainable Jersey is a statewide certification program that presents communities with a roadmap, technical assistance, and incentives to go green, save money, and take steps to sustain their quality of life over the long term. Sustainable Jersey has signed up 419 communities for its statewide sustainability certification program, covering 86% of New Jersey's population.

- There are currently **two WaterSense initiatives underway in Puerto Rico to promote EPA's WaterSense H2Otel Challenge**. One initiative is with the Puerto Rico Tourism Company, a new WaterSense promotional partner as of 2014, which is the government agency in charge of educating hotels on how to save water. A second WaterSense initiative focuses on the 6 vocational centers/hotels that are handled by the Puerto Rico Department of Parks and Recreation, and also involves the participation of students from 3 Schools of Architecture in Puerto Rico. The EPA Headquarters and Region 2 WaterSense team also organized a

question and answer session to clarify key points and better motivate hotels in Puerto Rico to take the next important steps towards water efficiency.

- Funded by **EPA's Clean Water State Revolving Fund (CWSRF) Program**, New York State offers Green Infrastructure project funding as a possible alternative to, or for use in conjunction with, existing grey infrastructure (e.g. conventional pipes, pumps) as a way to manage stormwater. During FY2014, New York's CWSRF Green Infrastructure Program provided 90% grants to support projects across New York State that utilize green technologies including rain gardens, stream "daylighting" projects, wetland restoration, rainwater harvesting and reuse, infrastructure retrofits, pervious pavement, green roofs and green walls, street tree plantings, pervious pavement and bio-retention projects, all of which help to sequester carbon and other greenhouse gases, and reduce the urban heat "island" effect. During FFY2014 the total SRF funding in New York State for Green Infrastructure exceeded $10 million.

- Region 2 staff has conducted **outreach efforts promoting Green Infrastructure**, including:
  - A presentation on green infrastructure municipal tools at the Western New York Stormwater Conference & Tradeshow in Buffalo, New York;
  - Meeting with the New York League of Conservation Voters which is developing a white paper on the state of New York City's green infrastructure program with an eye towards recommendations for New York Mayor de Blasio's administration. EPA provided input on what is working well in green infrastructure and where there may be additional opportunities for improvement and expansion; and
  - Participation in the *Roundtable on Integrating Resiliency and Smart Growth on a Post-Sandy Long Island* convened through the Long Island Smart Growth Resiliency Partnership.

- EPA Region 2 and the New Jersey Department of Environmental Protection (NJDEP) has discussed how **Green Infrastructure** and **New Jersey Municipal Separate Storm Sewer Systems (MS4) permits** could be integrated with the development of **Combined Sewer Overflow (CSO) Long Term Control Plans (LTCPs**). Furthermore, The NJDEP also requested assistance from EPA to provide training for NJDEP staff in the review of CSO Long Term Control Plans.

- EPA Region 2 established a **Sandy Recovery Green Team** to coordinate EPA efforts and interface with the federal **Sandy Regional Infrastructure and Resilience Coordination** (SRIRC) **Group** to implement the National Disaster Recovery Framework, various executive orders, and the President's Hurricane Sandy Rebuilding Strategy. EPA is working on the SRIRC 10 targeted teams and is the lead for the Water Supply and Wastewater Treatment teams.

- **HUD's Rebuild by Design Competition** is a unique initiative by HUD asking the world's most talented design professionals to envision solutions that increase resiliency across the Sandy affected region. Staff from Region 2 shared EPA's SRF Sandy resiliency program for water

and wastewater projects for consideration by the design professionals and also discussed the importance of considering Green Infrastructure as part of their proposed solutions. The Rebuild by Design Winners and Finalists include projects for Hunts Point, Bronx, Nassau County South Shore, Lower Manhattan, and Staten Island, New York and Hoboken and Meadowlands, New Jersey. More information available here.

- Region 2 has been involved with the development of the **USACE North Atlantic Coast Comprehensive Study**, which included a considerable amount of outreach to federal, state and local partners. The assessments and products of Phase 1 included storm suite modeling, state-specific coastal risk frameworks, a storm economic impact estimation tool, sea level rise and vulnerability assessments and maps, and identification of risk and preliminary approaches for system resilience. Phase 2 includes the validation of developments from the first phase, integration and alignment of these developments with other regional plans, and continued and continued collaboration with interagency and international partners.

- EPA Region 2 had an **article published** in the spring edition of New York Water Environment Association's (NYWEA) quarterly journal, ***ClearWaters***. The article was entitled, "CREATing Climate Resilience." This article was also published in ***Effluents Magazine***, the New Jersey Water Environment Association's (NJWEA) quarterly journal. The article provides WEA members with valuable information regarding climate change resiliency for water and wastewater infrastructures and the **CREAT** tool.

- Region 2 has been involved with **utility emergency preparedness exercises**, including:
  - The New Jersey Office of Homeland Security and Preparedness Wastewater System Communication Exercise in Sayreville, New Jersey on February 25.
  - Participation in the **New Jersey Water Association Emergency Management for Water Systems Training**.
  - Participation in the **New Jersey Water Sector Security Working Group Sub-Committee**. The working group is a water security advisory committee that ensures the protection, preparedness and resiliency of New Jersey's critical water and wastewater system infrastructure and the working group meets every two months and continues to advise the water sector on water security matters.

- The EPA Water Security Division is providing support for an EPA Region 2 & EPA Region 3 **Interstate Mutual Aid Workshop** that was held on September 25-26, 2014 at the EPA Region 3 Office in Philadelphia, PA. This joint effort developed actionable items to help improve "Interstate" mutual aid and assistance among utilities and Water and Wastewater Agency Response Networks (WARNs). Approximately 45 representatives of the industries and agencies participated in this workshop. (Regions 2 and 3)**.**

- During the review of EPA actions requiring **National Environmental Policy Act (NEPA) documentation**, Region 2 Environmental Review Section **requires the grantees to evaluate greenhouse gas emissions** from the project and to **consider impacts of climate change** to the project and adapt the project as possible. In conducting its reviews of Federal agency

projects, Region 2 has included comments regarding climate change and that project proponents should consider the potential impacts of climate change (e.g., extreme storm events, sea level rise) on the proposed project and incorporate adaptation measures to minimize impacts.

- Region 2 has been conducting ongoing coordination with the **New York State Department of Environmental Conservation Flood Task Force pilot communities** as they demonstrate the use of climate vulnerability assessments for sea level rise as a public planning process to inform the future plans of highly flood prone Hudson River waterfront communities.

- The Peconic Estuary Program was allocated $30,000 in funds from EPA Headquarters under the Climate Ready Estuaries Program. The program proposed **to conduct a climate vulnerability assessment for the Peconic Estuary in cooperation with the Shinnecock Nation of Indians**. The Shinnecock Nation faces many of the same climate vulnerabilities as the Peconic Estuary due to its close proximity, so cooperation will benefit both groups. The vulnerability assessment will build upon climate prediction data collected for the Peconic Estuary Project and evaluate the impact of climate predictions on the environment and ecological and cultural resources.

- The **Peconic Estuary Program** and partners co-hosted a three-day **training course** with NOAA **on Climate Adaptation for Coastal Communities** in December 2014. The course provided individuals with a climate adaptation toolkit to proactively address adaptation planning priorities.

- The **Peconic Estuary Program** contracted with **The Nature Conservancy** (TNC) to examine the strategies and goals within the Comprehensive Conservation and Management Plan (CCMP) with regard to climate change and its effects on the estuary. TNC provided general information about climate change and new prioritized CCMP actions based on this information. Through this work, a new Climate Change workgroup was formed.

- The **New York-New Jersey Harbor & Estuary Program** successfully hosted a **conference** entitled ***Restoring the New York-New Jersey Harbor Estuary: Ensuring Ecosystem Resilience and Sustainability in a Changing Future***. The topics covered during the conference included progress and next steps for comprehensive restoration planning and actions in the Estuary, real opportunities and limitations for incorporating ecosystem restoration into resiliency planning, and moving forward by securing commitments and resources for action.

- In support of EPA's **Climate Ready Estuary (CRE)** program and its ongoing work better understand the impacts of climate change on the local level, the **Barnegat Bay Partnership (BBP)** has been engaged in a number of activities to monitor, assess, develop and promote eco-system and economic based climate adaptation strategies and tools. BBP's CRE related activities include conducting critical long-term monitoring of our coastal wetlands through

the **Mid-Atlantic Coastal Wetlands Assessment (MACWA)** which was establish by 2 National Estuary Programs. Core MACWA monitoring parameters are going to be used as the basis for assessing **natural based living shoreline and marsh sediment enhancement projects** in New Jersey. In addition. BBP continues to **provide technical expertise** to the Ocean County Office of Emergency Management in their multi-jurisdictional **all hazards mitigation plan** and Ocean County Department of Planning in **the Long Term Community Recovery Plan**. The BBP is also a partner in The Nature Conservancy's *New Jersey Resilient Coastlines Initiative*, which is developing an online decision support tool called **"Restoration Explorer"** for New Jersey. The tool will provide communities interested in coastal restoration with a simpler way to identify potential restoration projects based on both community input and the best available ecological and engineering data.

- **The Partnership for the Delaware Estuary's (PDE) Climate Change and Wetlands Assessment program** participated in the Mid-Atlantic Coastal Wetlands Assessment (MACWA) to address climate adaptation needs in the estuary. **MACWA studies wetland health and aims to supply coastal managers with data to help plan wetland recovery and protection**. It is a joint effort of two National Estuary Programs (The Partnership for the Delaware Estuary and Barnegat Bay Partnership) with other federal, state and academic institutions. Their climate change work involved helping communities identify needs and options for dealing with climate change, sea level rise and increased storm intensity. Wetlands assessment efforts help PDE track the current conditions of the estuary's wetlands and track changes over time comparing to the baseline assessment.

- The **Partnership for the Delaware Estuary (PDE)** will receive $323,000 in Clean Water Act Section 319 (Nonpoint Source management) funds from New Jersey Department of Environmental Protection (NJDEP) for work in Camden, New Jersey. In coordination with NJDEP, PDE will develop the **conceptual plan for a living shoreline** at the Harrison Avenue landfill site in North Camden. The living shoreline design will aim for a hybrid-mosaic configuration consisting of high marsh, low marsh, submerged aquatic vegetation and freshwater mussel beds. A new and unique element of this Camden living shoreline design will be the potential incorporation and enhancement of **freshwater mussel beds in tandem with landward shoreline stabilization.** PDE will also **train local volunteers** to survey and monitor freshwater mussels in the Cooper River watershed using a protocol they developed and piloted. Finally, PDE and partners will perform quantitative analyses and calculations for the contribution of native freshwater mussel populations to water quality improvement, including the potential uplift of these ecosystem services if mussel bed enhancement were to occur. PDE is currently engaged in field and laboratory analyses of filtration rates for suspended particulates and nitrogen by marine mussels of the Delaware Estuary through a Region 2 Regional Applied Research Effort grant. (Regions 2 and 3)

- The **Long Island Sound Study** Habitat Workgroup is conducting **an assessment of both the historic and current quantity of tidal wetland habitats** and their current quality. Work group members and partners are collaborating with local and regional experts to quantify historic extent of priority habitat types and to set up a rubric for assessing the quality of

habitats like forest and tidal wetlands. A rapid, mainly desktop-based open water assessment for tidal wetlands is underway now. Experts feel due to sea level rise, marsh subsidence, and other causes the marshes around Long Island Sound may have more standing water on them at low tide than is ideal. This study will give a general idea of the health of tidal wetlands and outline some generally agreed-upon indicators as helpful guides for habitat health assessments. In addition a **Tidal Wetlands Workshop** was held in October 2014 in Port Jefferson, New York which brought together expert marsh managers, researchers, practitioners, and regulators regarding tidal wetland loss and change in Long Island Sound and beyond. (Regions 1 and 2)

- The **Long Island Sound Study Sentinel Monitoring for Climate Change Work Group** has been continuing to work on four sentinel monitoring projects:
  - Synthesis of land information system Data in the Context of Climate Change – Coastal Ocean Analytics
  - Marsh Migration Modeling – Warren Pinnacle Consulting
  - Pilot Salt Marsh Sentinel Monitoring – Wally Fulweiler, Boston University
  - Sentinels of Climate Change: Coastal Indicators of Wildlife and Ecosystem Change in Long Island Sound – University of Connecticut (Regions 1 and 2)

Region 3

- In 2014, EPA Region 3 **funded projects under the Drinking Water and Clean Water SRF programs which support climate change adaptation and mitigation**. $22 million from the Clean Water SRF funded water- and energy-efficiency projects which reduce greenhouse gas emissions through lower energy use. The CWSRF funds also supported green infrastructure projects which help communities adapt to and mitigate the effects of a changing climate. A $150,000 project for radio-read water meters, funded through the Drinking Water SRF, is a water conservation measure key to climate change adaptation.

- The **Clean Water SRF funded a project in Virginia which will reuse 1.2 million gallons of water per day** (to meet a current need) and has the potential to reuse up to 3.2 MGD in the future. Planning for water reuse is critical, as future water availability conditions are anticipated to change as precipitation patterns change.

- **Region 3 promoted the WaterSense program at 12 events** during 2014.

- ***All Hazards Water Resiliency*, a training module on climate change, was offered in January 2014 as part of the regional training effort for water utilities** in the National Capital Region. Attendees were given a basic understanding of climate change and its implications for the water sector. They also received invaluable information about tools available to them to adapt to and mitigate anticipated climate change impacts. An unique aspect of this multi-module training is that it requires homework to be completed by the attendees and

presented at a future session, allowing participants time to work on utility projects related to climate change.

Region 4

- **Region 4 worked with Monroe County, Florida to finalize a *Climate Action Plan* for the Florida Keys** that provides a five-year framework to implement seventy two recommendations through existing local organizations tasked with integrating climate adaption science and mitigation strategies into current systems. Recommendations include reducing greenhouse emissions 20% below 2005 levels by 2020 and incorporating future sea level rise projections into infrastructure planning. Annual reports will be developed to determine progress towards the goals.

- EPA Region 4 is **promoting the beneficial use of suitable dredged material to support environmentally sound projects to protect from sea level rise and storm surge.** A Regional current meter study in Charleston Harbor has now been completed. The study will assist the Corps of Engineers Charleston District in evaluating options for beneficial use of dredge material. The Region has participated in efforts for beneficial use in Mobile Bay and Pascagoula Harbor as well.

- The Region is **developing protocols to address the likely increase in emergency dredging from hurricanes of increased intensity** and other extreme precipitation events that may cause unexpected sedimentation and shoaling.

- Region 4's Energy Management Initiative (EMI) began Round 2 in Tennessee with a new group of wastewater utilities. In addition, Alabama and United South and Eastern Tribes, Inc. are beginning their energy management efforts with the assistance of Region 4's EMI. The Region 4 EMI Team is **providing assistance to the utilities in developing vulnerability assessments to the anticipated effects of climate changes while teaching the utilities how to reduce energy consumption**. Anticipated energy savings in 2014 are estimated to be from 4 to 8 million kilowatt-hour/year and projected 3800 to 7600 MMTCO2e (million metric ton of carbon dioxide equivalent) reduction.

- Region 4, EPA Headquarters, and the State of Mississippi planned and **conducted a 1-day emergency response and recovery exercise examining the impact of a catastrophic incident affecting the water, wastewater, and interdependent sectors in Mississippi.** The exercise scenario simulated a high-magnitude earthquake event along the New Madrid Seismic Zone with resulting major infrastructure impacts throughout northwest Mississippi and neighboring States. Participants included representatives of water and wastewater systems and key support organizations and agencies during a disaster situation. Discussions among participants during the exercise revealed a general need for more robust disaster planning within and between key response organizations.

- The Water Protection Division's Flow Workgroup is **working with States to address impacts from all types of hydrologic alteration** including the hydrologic alterations caused by climate change. During 2014, the Workgroup Chair served as the co-lead for the National Water Quality Standards (WQS) and Climate Change workgroup to better understand and make recommendations on the development of the technical resources needed to assess how water quality will be affected by climate change. The FWG championed at the 2014 National WQS Coordinator's Meeting the consideration of how water quality standards should be viewed in the context of climate change. This led to consensus among the coordinators that designated uses for waters should not be revised to account for climate change. Waters that are impaired due to climate change should be listed on the 303d list to maintain an inventory of waters impacted by climate change.

Region 5

- To continue **promotion of climate–readiness at water utilities**, Region 5 integrated **sustainable water infrastructure approaches** in the following areas:
  - Supported Michigan Department of Environmental Quality efforts to incorporate asset management as a condition in major National Pollutant Discharge Elimination System (NPDES) permits.
  - Incorporated sustainable water infrastructure practices (e.g., green infrastructure, asset management and energy efficiency) into seven EPA-issued tribal NPDES permits and five enforcement actions.
  - Developed outreach materials on sustainable water infrastructure for distribution to facilities with inspection reports.
  - Conducted, with Ohio Environmental Protection Agency, energy management training for 50 water utility professionals.
  - Drafted "Review of Green Infrastructure in CSO Long Term Control Plans: A Training Tool."
  - Used the Avoided Emissions and Generation Tool to increase energy efficiency at Ohio utilities.
  - Facilitated energy audits through the Department of Energy (DOE) Industrial Assessment Center for Indiana utilities.
  - Awarded about $6.8 million to Great Lakes Shoreline Cities for green infrastructure implementation.

- Region 5 continued **promotion of WaterSense** through the following efforts:
  - Added 10 new WaterSense partners in 2014.
  - Provided assistance to Michigan Habitat for Humanity to incorporate WaterSense in affordable housing;
  - Modified "Hotel Challenge" tools for use by churches/schools in Chicago.
  - Briefed State Water Directors about WaterSense partnership opportunities.

- Region 5 **encouraged Source Water Protection for tribal public water systems** vulnerable to impacts of climate change through targeted outreach and compliance assistance to those systems. Tribal source water assessment guidance/methodologies were updated to include climate change considerations. Additionally, State work plans were revised to include climate change in source water assessment and protection.

- The **Great Lakes National Program Office** (GLNPO) supported several efforts, including:
  - **Integrated climate change into Great Lakes Restoration Initiative (GLRI)-funded state and tribal capacity projects** for Minnesota, Wisconsin and Michigan, GLNPO's 2014 Request For Applications (RFA), and GLRI Interagency Agreements.
  - Initiated development of climate resiliency criteria for GLRI funding.
  - Added 25 field-deployed dissolved oxygen data sensors to track hypoxia in Lake Erie.

Region 6

- On May 14, 2014, EPA staff participated in a second **workshop to assist the Dallas Fort-Worth International Airport (DFW) in the development of their Sustainability Management Plan (SMP**). The Sustainable Advisory Council members reviewed and commented on the results of the baseline assessment conducted as a result of the January workshop, and identified future sustainability initiatives, including points of collaboration. The purpose of the SMP is to further integrate sustainability into the airport's business processes, and then integrate these sustainable best practices throughout North Texas.

- On May 15 – 16, 2014, stakeholders participated in the *Water Sector Emergency Response, Extreme Event, and Climate Change Planning: Greater New Orleans Metropolitan Area* in New Orleans. The workshop, presented by EPA, was designed to allow participants to **discuss how both past emergency responses, as well as potential changes in extreme weather patterns, may impact their utilities and communities moving into the future.** Discussions also focused on adaptation options and implementation planning. Workshop conversations focused on impacts from floods, hurricanes, storm surges, drought, salt water intrusion, and freezes. Potential steps that utilities and communities could take to ensure that water and wastewater systems are able to respond more effectively and increase resiliency were discussed.

- **Led by the U.S. DOT's Volpe National Transportation Systems Center**, EPA Region 6 and a group of federal agencies and the Mid-Region Council of Governments (MRCOG), located in Albuquerque, New Mexico, **initiated a project to help the region address climate change challenges using scenario planning**. Scenario planning allows participants to consider the impacts of growth and evaluate the costs and benefits of various future scenarios. The project will influence transportation and land use decision-making in the Albuquerque region by using scenario planning to analyze strategies to reduce carbon pollution and prepare for the impacts of climate change.

- On October 6, 2014, the City of Houston, 28 federal agencies, state and local government agencies, non-governmental organizations, and representatives from academia participated in **a Climate Change Preparedness and Resilience Workshop in Houston, Texas.** The workshop series was sponsored by the White House National Security Council, Council on Environmental Quality and the Office of Science and Technology Policy with the goal of advancing climate adaptation and identifying collaborative and sustainable approaches to community-based climate preparedness and resilience capabilities.

- Commitments in Region 6's **Climate Change Adaptation Implementation Plan** include:
  - Incorporating climate adaptation criteria in the Brownfields grants process to ensure cleanup actions taken by communities are effective as the climate changes;
  - Providing communities with the tools they need to increase their resilience. For example, a Stormwater Calculator and Climate Adaptation Tool empowers community planners to estimate the amount of stormwater runoff that they'll have to manage today and in the future;
  - Integrating considerations of climate change into the CWSRF process and continue working with States to ensure investments in water infrastructure are resilient to changes in climate; and,
  - Training staff on climate change science and ways to integrate climate change adaptation measures into our daily regulatory, policy, and operational activities.

- In partnership with the Regional South Central Climate Science Center in Norman, Oklahoma, Region 6 representatives attended the annual face-to-face meeting of the U.S. Department of Interior's South Central Climate Science Center Stakeholder Advisory Committee on November 19, 2014. Representatives from USGS, NOAA, National Park Service (NPS), USFWS, State agencies, universities, and Landscape Conservation Cooperatives worked on **refining and ranking 2015 research priorities, as well as discussing the Gulf Coast Vulnerability Assessment** and other topics that integrate climate change work across agencies and disciplines. The priorities for EPA Region 6 were: hydrologic responses to climate change; coastal response to sea level rise and changing geomorphology; land use and land cover change.

- Region 6 continues to bring **Green Infrastructure into the mainstream of stormwater management**, as well as integration in other EPA efforts. Because the Region 6 regulated community remains apprehensive with the concept of green infrastructure as an environmentally preferable, often more cost-effective approach to stormwater, Region 6 continues to focus on Outreach and Education. During 2014, at almost a dozen events, approximately 1,500 water practitioners were informed of the multitude of water quality and quantity benefits, as well as socio-economic benefits, projects of all scales (site, neighborhood, and region/watershed) may achieve with incorporation of green infrastructure.

- The Barataria-Terrebonne National Estuary Program, the Coastal Bend Bays and Estuaries Program, and the Galveston Bay Estuary Program worked with numerous partners in 2014

to initiate new projects or complete implementation of **projects that will contribute to the protection, enhancement, or restoration of vulnerable Gulf of Mexico coastal habitats**. These projects will reduce the vulnerability to the effects of sea level rise and increase coastal sustainability.

- Staff served on the Steering and Planning Committees for the 2014 biennial **Louisiana State of the Coast Conference**, playing key roles in designing special panel sessions on coastal climate change and sea level rise, blue carbon, protecting resilient coastal natural areas, and building resilient coastal communities.

Region 7

- During 2014, the **Wichita State University-Environmental Finance Center in partnership with Kansas Municipal Utilities (KMU) conducted 6 Asset Management Kan-Work training sessions,** one in each Kansas Department of Health and Environment (KDHE) district. A total of 85 participants attended. The KDHE awards 5 hours of renewal credit for water and wastewater operators that complete the one-day workshop. KMU also provided 16 on-site technical assistance visits for asset management implementation.

- Region 7's **Water Enforcement Program continued to pursue settlements incorporating items such as energy conservation, green infrastructure, and wetland preservation into Supplemental Environmental Projects.** Fiscal Year 2014 settlements included Sioux City, Iowa in which the city installed a bioswale to reduce runoff from a parking lot (project was completed in 2014); Raymore, Missouri in which the city agreed to construct two rain gardens (project completion is May 2015), and; Branstad in which the concentrated animal feeding operation (CAFO) owner agreed to put approximately 5 acres into the USDA's Wetland Reserve program (to be completed in the fall of 2015). In addition, Region 7's Water Enforcement Program continued to monitor compliance with existing Decrees requiring sewer system improvements that have green infrastructure components replacing traditional grey construction projects.

- The Region 7 Water Division set out to organize, identify and classify climate change, green infrastructure, and sustainable projects and priorities within the Division. The Region is focused on **strategically prioritizing its response to Climate Change and Green Infrastructure** activities including where there is overlap.

- Region 7 hosted a **Native American Heritage Month Event** on November 12, 2014 with a **panel discussion on Climate Change and the Impacts on Native American People, Places and Culture**. The Nine Tribal nations located within Region 7 participated along with 100 EPA staff.

Region 8

- Region 8 and Headquarters' Water Security Division **conducted a climate change and extreme events resiliency workshop in Fort Pierre, South Dakota** on July 9-10, 2014. It focused on building water preparedness, resiliency, and adaptation. At the workshop, the Region 8 Drinking Water Program hosted an interactive workshop to help drinking water and wastewater utilities plan for extreme weather events and long-term climate adaptation. About 50 state and local water professionals, emergency management officials, and public works personnel participated.

- Region 8 selected **two communities to participate in a pilot project using EPA's Climate Resilience Evaluation and Awareness Tool (CREAT)**: 1) the City of Bozeman, Montana, and 2) the City of Helena, Montana. The communities will receive training and technical assistance in using the CREAT software that helps users identify assets, threats, and adaptation options to build climate resilience. Region 8 is working with OW on this multi-year program. Challenges to be addressed include drought, more intense and frequent storms, flooding, and water quality changes.

- Region 8 **incorporated climate resiliency into Colorado flood recovery efforts,** including the following: Region 8 provided water/wastewater infrastructure and river/watershed planning support based on resiliency, sustainability, green infrastructure, climate adaptation, and smart growth principles; during the flood, Region 8's National Disaster Recovery Specialist staffed the Joint Field Office to coordinate recovery efforts with FEMA and the other participating organizations; and the Region 8 Water Emergency Response Team provided assistance to the Town of Jamestown, Colorado, to rebuild its water and wastewater facilities that were damaged during the floods. This assistance included analysis and recommendations for including resiliency and sustainability into the design of the facilities (a final report was released on the project in March 2014).

- Region 8 **conducted training/outreach to Region 8 Tribes, municipalities, and other stakeholders on climate resiliency and the tools/programs/resources EPA has available** to assist in various areas. For example, Region 8's Regional Administrator sent a letter to all Region 8 municipal leagues and county associations discussing EPA and other federal tools and resources to build resiliency. Also, the Region 8 Climate Change Coordinator participated in the Region 8 annual Regional Tribal Operations Council meeting to discuss the Agency and Region 8 Climate Adaptation Plans, specifically the areas that address tribal issues.

- Region 8 **worked with other federal agencies to enhance understanding of climate change, leverage collective knowledge about climate adaptation planning, and initiate on-the-ground projects**. One such project that was initiated in Fiscal Year 2014 through the National Drought Resilience Partnership relates to drought resilience in the Missouri Basin above the Fort Peck Reservoir. It will demonstrate how drought resilience can be

improved when the federal government goes “all-in” by coordinating and focusing its resources on specific watershed basins.

- Region 8 **hosted a WaterSense Partner Summit**, bringing together more than 40 individuals, both in person and via webinar, representing WaterSense partners from Colorado, Utah, Montana, and Wyoming. This was the first event of its kind in an EPA Regional Office, and WaterSense Regional Liaisons from the nine other EPA Regions were invited to observe via webinar in hopes they may be able to do something similar in their Regions.

- **EPA selected Colorado Springs as the national Water Sense Promotional Partner of the Year**. Colorado Springs has promoted WaterSense, has offered rebates for water-saving products, and has a new home in its jurisdiction built to WaterSense specifications.

- EPA worked with Boulder, Colorado **to use the WaterSense Commercial, Institutional and Industrial (CII) BMPs to create a CII Water Assessment Too**l. The tool can be used by water utility staff, professional engineers, and end-users alike to assess their water use while still allowing more advanced auditors to change assumptions and customize fields. WaterSense helped Boulder promote and pilot this tool by hosting webinars for interested partners.

- Region 8 **continued education and outreach for the WaterSense** program, including working with various partners in the Colorado to host a series of water efficiency workshops for local plumbers to educate them on local water issues, the benefits of WaterSense labeled products, efficient hot water distribution systems, plumbing requirements for green home labels and certifications (e.g. WaterSense, ENERGY STAR, LEED), as well as Colorado’s new WaterSense legislation. Workshops were held in Denver, Colorado and Colorado Springs, Colorado. Region 8 was also involved in numerous speaking engagements to promote the WaterSense label for new homes, and to educate consumers about the Program. These included, among others, the Colorado WaterWise Water Conservation Forum in Denver, Colorado, the American Water Works Association Sustainable Water Management Conference in Denver, Colorado (March 2014), and the Utah Water Conservation Forum in Salt Lake City, Utah (April 2014).

- **Colorado’s landmark legislation phases out the sale of ALL non-WaterSense labeled products by September 2016**. The legislation was championed by WaterSense partner Denver Water and supported by a coalition of more than 40 WaterSense partners and stakeholders from throughout the state of Colorado. Supporters estimate the replacement of existing lavatory faucets, showerheads, and toilets with WaterSense labeled fixtures will save Colorado 13 billion gallons water by 2050.

- Region 8 assisted the Wyoming Association of Rural Water Systems in conducting an 8-hour workshop at their Spring Conference in April 2014. The goal of the workshop was **to**

help small and rural water and wastewater systems improve management practices in ten key areas that are important for system sustainability. These key areas range from product quality and financial viability, to operational resiliency and community sustainability.

- Region 8's National Environmental Policy Act (NEPA) and Section 404 programs have been working with other federal agencies **to have climate change analyses included in water supply project Environmental Impact Statements (EISs).** Region 8 advocated for a more quantitative consideration of climate change's influence on water resources in the documents for new water supply projects. These efforts mainly resulted in qualitative analyses of climate change effects. The Region did review a quantitative climate change analysis for one water supply project (the lead agency was the Bureau of Reclamation), although the focus was on future water availability rather than potential environmental impact. Although Region 8 has not yet developed generalized watershed information in the region for use in climate change analyses, comments and requests for such analysis from other federal agencies may be influential. Key partners include the U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, States, and local water providers.

- Region 8's **NEPA program priorities and activities shifted in 2014 to include more emphasis on climate change mitigation and adaptation work with federal land management agencies** (e.g. Bureau of Land Management and U.S. Forest Service), and with project proponents. The NEPA Program's renewed focus on climate change mitigation and adaptation comments have resulted in a number of actions in some categories. In fact, Region 8's NEPA Program completed over 50 specific actions, some including robust emphasis on the need for identifying, quantifying, and analyzing impacts for climate change and/or greenhouse gas and greenhouse gas precursor emissions. In a few cases, the Region was successful in obtaining climate change and greenhouse gas emission estimate information that was not previously included in project descriptions. Federal partners and project proponents continue to reply that there is a lack of resources to complete analysis at the project level for completing life cycle analyses related to greenhouse gas emissions reductions.

- **Region 8 emphasized the importance of preservation, restoration, and management of wetlands and riparian areas as potential tools in response to climate change impacts**. This helped increase understanding of the value of the resource and its vulnerability to climate change impacts.

- Region 8 worked with regulated federal facilities on construction of facilities with a footprint greater than one acre to ensure the facilities are designed, planned and constructed **to manage storm water through low-impact procedures** and vegetation to reduce pollutant loading and flow-related pollution.

- Region 8 continued **external education and outreach on the use of green infrastructure and actual implementation of green infrastructure in the planning, design, and**

construction various projects throughout the region. For example, Region 8 worked with FEMA and flood impacted communities in the State of Colorado, met with multiple developers to discuss the barriers to the inclusion of green infrastructure in various projects, and coordinated with Region 8 MS4 coordinators and state water directors to create a green infrastructure contact list.

- Region 8 worked to **integrate green infrastructure into the work of the EPA regional office**, including: forming a Region 8 green infrastructure team, working with the Brownfields and Revitalization programs to discuss project fact sheets, providing NEPA comments for a project in Utah on using green infrastructure, submitting summaries of green infrastructure projects on brownfields sites, and holding discussions with Region 8's State Revolving Fund Program on how to use green infrastructure in their work

Region 9

- With the backdrop of California's state of emergency due to drought conditions, on June 13, 2014, Region 9 **co-sponsored a June 13, 2014 Southern California Stormwater Capture Meeting with the Southern California Association of Governments** and other state and local stakeholders. The meeting explored means for increasing the volume of stormwater captured to benefit water supply and protect water quality. It included panels discussing how Green Infrastructure provisions in MS4 permits could be improved to facilitate stormwater capture, successes and challenges in stormwater capture in Southern California, and improving the availability of financing for stormwater capture projects.

- In 2014 Region 9, working with the US Coral Reef Task Force's (CRTF) Climate Change Working Group, **hosted a workshop on Maui about Ocean Acidification (OA) Impacts to Coral Reefs** and participated on an expert panel with coral scientists. Workshop participants developed recommendations for CRTF action including reducing nutrient inputs to slow coastal acidification, improving CRTF outreach on the imminent threat of acidification to coral reefs, and linking severe OA impacts to marine life with outreach efforts about the control of greenhouse gas emissions.

- Working with the Office of Research and Development, Region 9 participated in a July EPA workshop in Honolulu on **Climate Change Adaptation Planning for Coral Reefs**. Participants from the Caribbean and Pacific learned about climate smart planning and worked up a straw-man climate adaptation plan for the CRTF priority West Maui Watershed.

- Under the National Coastal Assessment, **American Samoa and Commonwealth of the Northern Marianas Islands conducted reef flat assessments** and developed status reports on water quality and coral condition. These assessments serve as a baseline for assessing future changes.

- On February 5, 2014, Region 9 organized a press event touring the Ballona Wetlands in Los Angeles to discuss **how climate change scenarios are being incorporated into plans for wetlands restoration with support from EPA's Climate Ready Estuaries program**. EPA's Santa Monica Bay National Estuary Program grantee provided an overview of how potential impacts of rising sea level rise and extreme storm events were being considered in restoration plans. EPA Assistant Administrator Nancy Stoner discussed the wetlands restoration project in the context of the federal government's support for climate resilience.

- The goals of the San Francisco Bay Water Quality Improvement Fund include restoring wetlands and restoring water quality within the Bay and its watersheds. Region 9's March 14, 2014 **Request for Initial Proposals for this grant funding specified that projects should "account for climate change** to help ensure that the project achieves its expected outcomes even as the climate changes," and notes that the "scope and approach described in the initial proposal should include a brief discussion of climate change considerations." Proposals were evaluated on a range of criteria, including whether or not they provide, "appropriate considerations for anticipated climate change effects."

- **Region 9 and the EPA Climate Ready Water Utilities Program conducted a workshop in Fresno, California entitled "Water Sector Emergency Response, Extreme Event, and Climate Variability Planning"** on Sept 10-11, 2014. During the workshop, participants discussed potential water utility and community impacts associated with more frequent and extreme events, such as drought, and identified short-term and long-term planning actions to build water and energy resilience to the impacts of climate change. The workshop was co-sponsored by the California-Nevada Chapter of American Water Works Association and the California Utility Executive Management Association.

- **Region 9 arranged for 10 energy audits at wastewater treatment plants**. To date, Region 9 has funded or coordinated 46 energy audits and 5 water audits at water and wastewater utilities that have identified estimated annual savings of over 94,000 megawatt hours, $17 million, 10 billion gallons of water, and 94 million pounds of greenhouse gas emission reductions**.** In 2014, the Victor Valley Wastewater Reclamation Agency (VVWRA) in Victorville, California completed implementing recommendations from a 2012 audit, including energy efficiency improvements and energy production via co-digestion of food waste and enhanced biogas capture. As a result, VVWRA will soon become one of the world's few energy-neutral wastewater treatment plants, and expects to save approximately $9 million and reduce greenhouse gas emissions by 180,000 pounds over 20 years.

- Region 9 **promoted drought resilience in Indian Country** by giving water efficiency presentations at two Regional tribal conferences and developing a water efficiency case study. The presentations provided outreach information on the benefits of the WaterSense Program (including how to become a WaterSense Partner), water audits, graywater

systems, water efficiency ordinances, and federal funding options for water efficiency projects. The case study focused on the Big Pine Paiute Tribe's successful water efficiency efforts that have resulted in a 67% reduction in water use since 2007.

Region 10

- The **Idaho's Clean Water State Revolving Fund (CWSRF) program has effectively incorporated the Green Project Reserve (GPR) into their CWSRF program**, predominantly for energy efficient and environmentally innovative waste water treatment projects. During the period of Fiscal Years 2010 - 2014, the Idaho Department of Environmental Quality (DEQ) received $37.5 million in grants funds from EPA with over $36 million in GPR eligible components. Not only is DEQ doing a thorough job of capturing all possible GPR elements, but they are also influencing their assistance recipient (or their consultants/contractors) to rethink their projects to include more energy efficient components that results in a savings to the community and use of less resources.

- Region 10 partnered with EPA Office of Water, Oregon Department of Environmental Quality, small community assistance organizations and others **to bring Effective Utility Management training to small utilities in Oregon.** The workshop was funded by a grant from EPA for training and technical assistance for small/rural community wastewater and drinking water systems.

- The **Farmers Irrigation District used Clean Water State Revolving Funds loans granted by Region 10 to Oregon Department of Environmental Quality's load program to convert almost 100% of the open irrigation canals to pressurized pipes, install micro-hydroelectric turbines in the newly pressurized pipes, and upgrade and rehabilitate its old, inefficient hydroelectric re-powering plant.** The District obtained such extensive water conservation savings that they were able to fully irrigate all existing croplands using only a portion of their water rights. They are now selling these excess water rights for permanent in-stream habitat and to repay a portion of the CWSRF loan. The installed micro-hydro units and upgrade to the re-powering plant are expected to conserve additional water that will be sold as well as generate clean, renewable power to be sold to the local wastewater treatment plant. The benefits of the CWSRF loans include water conservation, permanent in-stream habitat, and generation of clean, renewable energy.

- Region 10 worked with multiple partners in the areas of healthcare, affordable housing, lodging, sports facilities and real estate transactions **to promote water and energy efficiency through the use of WaterSense certified products and homes**. For example, worked with Seattle Public Utilities and Cascade Water Alliance to develop a comprehensive plan for both indoor and outdoor water use at all the Virginia Mason Medical Centers (plan has saved at least 6 million gallons of water). Also, worked with HUD to collaborate with King County Housing Authority to do change outs of toilets and other plumbing fixtures.

- The **Puget Sound National Estuary Program provided funds to numerous projects to support adaptation and resiliency to climate change impacts**. Some of these projects include:
    - evaluate sea-level rise in the San Juan Island to plan for protection of critical ecosystems;
    - an assessment of climate change impacts and their influence on Puget Sound; and
    - working with counties, cities, and state agencies to provide technical assistance on Shoreline Master Program implementation and how to prepare for climate change impacts.

- Region 10 was engaged on several activities related to **ocean acidification** including:
    - providing funding to Washington State to evaluate the local contributions to ocean acidification;
    - participating on numerous working groups in Washington State and the Pacific Coast on ocean acidification;
    - forming an internal working group to better coordinate activities within EPA; and
    - coordinating with various partners including the University of Washington Ocean Acidification Center, National Oceanic and Atmospheric Administration, and Washington State on needed research.

- Region 10 meant with its three **National Estuary Program partners** several times to discuss **incorporation of climate change considerations into their programs**. The Lower Columbia Estuary Program and Tillamook Estuary Program **completed preliminary assessments of the potential impacts from climate change.**

- EPA Region 10 lead an effort to organize a two-day **workshop on the impacts of climate change on stream temperature on cold-water fisheries in the Pacific Northwest**. The purpose of the workshop is to bring together scientists and managers from tribal, federal, and state partners together to provide a forum to discuss the latest science and the implications for both regulatory and resource management decisions.

- Region 10 continues to provide **opportunities to increase internal and external awareness of climate change** including: hosting a monthly climate change speaker series; publishing a monthly newsletter on current climate change activities within and outside Region 10; forming an internal climate team; and developing a SharePoint site for staff and managers on climate change.

- Region 10 co-lead a **workgroup examining incorporating climate change considerations in Water Quality Management Plans**. Region 10 developed a survey for EPA Regions to identify how their States currently incorporate climate change into their water programs. Also, helped develop questions that could be used by state associations to better understand how States are currently or plan to consider climate change in their water programs.

- EPA Region 10 and ORD have been working with numerous partners including the Nooksack Indian Tribe, Lummi Nation, and Washington Department of Ecology on a **project that is using a temperature load allocation for the South Fork Nooksack River as a pilot for integrating climate change into a watershed-specific plan for improving water quality**. Three documents were developed in Fiscal Year 2014: 1) "Quantitative Assessment of Temperature Sensitivity of the South Fork Nooksack River under Future Climates using QUAL2Kw"; 2) "Draft Qualitative Assessment; Evaluating Climate Change on Endangered Species Act Recovery Actions for the South Fork Nooksack River, Washington" ; and 3) "Climate Change Considerations for TMDL Development in the South Fork Nooksack River, Washington".

- Region 10 **provided funds to the Alaskan Native Tribal Health Consortium** (ANTHC) to administer the Local Environmental Observers Network (LEO). The LEO project provides an opportunity for local environmental observers to tell the stories of the changing climate in Alaska including impacts of thawing permafrost on water quantity and quality and reduced sea ice and impacts on water infrastructure. EPA also funded a project by ANTHC that will help build tribal capacity for assessment, monitoring, and adaptation to food and water security threats from the changing Arctic climate in Alaska Native villages.

- Region 10 partners with Northern Arizona University, Institute of Tribal Environmental Professionals (ITEP) to offer on-going **quarterly webinars on climate change with Alaskan Tribes.** Region 10 also works with the Pacific Northwest Tribal Change Climate Network to provide a guide for Tribes on the latest funding opportunities.

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