



2015 Workplan: National Water Program Response to Climate Change

**Office of Water
U.S. Environmental Protection Agency
June 2015**



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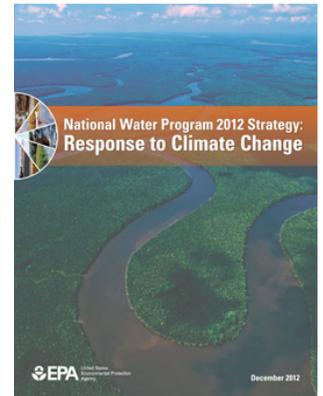
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Introduction

This *Workplan* describes the actions that the National Water Program is planning to take in 2015 to implement the *National Water Program 2012 Strategy: Response to Climate Change*.

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 the climate change strategy released in 2008. The 2012 Strategy describes long-term goals for the management of sustainable water resources in light of climate change. It is intended to be a roadmap to guide program planning and inform decision-makers during the Agency’s planning and budgeting process.



This *Workplan* builds on substantial work conducted in 2012-2014 to implement the 2012 Strategy. These implementation actions by EPA water programs at the national and regional levels are described in annual “highlights of progress” reports for 2012-2014 (available [here](#)).

The five long-term programmatic “vision areas” described in the 2012 Strategy provide the framework for this *Workplan*. These five areas are:

1. water infrastructure;
2. watersheds and wetlands;
3. coastal and ocean waters;
4. water quality; and
5. working with Tribes.



The *Workplan* includes a brief summary of the 19 goals and 53 supporting actions described in the 2012 Strategy that support each of these five vision areas. For each of the 19 goals, the *Plan* describes specific implementation actions expected to be taken in 2015 by:

- National water program offices within the Office of Water at EPA Headquarters;
- Water programs in the ten EPA regional offices; and
- EPA Office of Research and Development (ORD) offices and laboratories.

These national and regional actions, supported by research initiatives, constitute the best progress that the Agency is able to make toward achieving climate change adaptation goals for EPA water programs given the resources that are presently available.

The program office within the Office of Water responsible for the national adaptation action is also identified (see text box for abbreviations of national water program offices).

In 2014, each EPA national program office and Regional office developed a general climate change adaptation implementation plan (found [here](#)). Each plan includes “priority actions” and many of these actions continue to be priorities in 2015. “Priority actions” from the *Office of Water Climate Change Adaptation Implementation Plan* for national programs are identified throughout the document and are summarized in Appendix 1.

In addition, water programs in EPA’s ten Regional offices play an important role in adapting clean water and drinking water programs to a changing climate. Each regional office developed a climate change adaptation implementation plan last year and many of the actions in these plans relate to water programs. In addition, regional water programs worked with the Office of Water to identify a common set of priority actions and these actions are listed in this document under the goal that the action supports and are summarized in Appendix 2. Finally, Regional water programs are implementing an impressive range of innovative programs and policies for climate change adaptation that respond to the specific challenges in that Region. These innovations are identified throughout the document and are summarized in Appendix 3.

In 2015, the National Water Program is committed to working with State agencies to build the program and policy foundation to support climate adaptation actions by States that implement clean water and drinking water programs. EPA identified ten actions that state agencies might take to adapt to a changing climate in the [Fiscal Year 2015 Addendum to the 2014 National Program Guidance](#). These ten actions are identified in Appendix 4.

To prepare for and support state work to implement climate adaptation actions, EPA has organized a series of Headquarters/Regional office teams to address key policy topics that need to be better defined to support state implementation actions in 2015 and later years. These five policy initiatives are listed below and identified in text boxes at appropriate places in this *Workplan*.

EPA National Water Program Offices

OGWDW:	Office of Ground Water and Drinking Water
OST:	Office of Science and Technology
OW/IO:	Office of the Assistant Administrator for Water
OWM:	Office of Wastewater Management
OWOW:	Office of Wetlands, Oceans and Watersheds

Headquarters/Region Climate Program/Policy Development Teams

- 1) Clean Water/Drinking Water State Revolving Loan Funds** (OWM/OGWDW/Regions 6 and 9)
- 2) NPDES Permits** (OWM/Regions 5 and 8)
- 3) Water Quality Planning and Management** (OWOW/Region 1 and 10)
- 4) Water Quality Criteria and Standards** (OST/Regions 4 and 7)
- 5) Sanitary Surveys** (OGWDW/Regions 2, 3 and 6)

National Water Program: Climate Change Actions for 2015

A) Water Infrastructure:

Vision Statement: 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

Goal
1

- ❖ Strategic Action 1: Improve access to vetted climate and hydrological science, modeling, and assessment tools through the Climate Ready Water Utilities program.
- ❖ Strategic Action 2: 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.
- ❖ Strategic Action 3: 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.
- ❖ Strategic Action 4: Promote sustainable design approaches to provide for the long-term sustainability of infrastructure and operations.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- **Issue an updated Version 3.0 of the Climate Resilience Evaluation and Awareness Tool (CREAT)** to improve this tool to help water utilities in development of climate resilience plans. CREAT 3.0 will be upgraded from desktop software to a web-based tool, among other improvements. EPA will conduct two pilots of the beta 3.0 web tool - one in March 2015 with the water utility in Oakland, California and the other in mid-April 2015

in Spartansburg, South Carolina. CREAT 3.0 will be made available as a free download on the EPA website in fall 2015. (OGWDW)

- Promote the use of CREAT by water utilities, including providing technical assistance to 23 drinking water, wastewater, and stormwater utilities in conducting comprehensive climate-related risk assessments using CREAT in ongoing collaborative process as part of a **Water Utility Climate Resilience Support Project**. (For a list of participating utilities, visit: <http://water.epa.gov/infrastructure/watersecurity/climate/index.cfm>.) (OGWDW)
- 
- Using CREAT, **provide four utility training workshops** to be held in the vicinity of Los Angeles, California; Portland, Oregon; Santa Fe, New Mexico; and Des Moines, Iowa. Twenty to thirty utilities will be trained in each workshop. (OGWDW)
 - Provide three coastal resilience trainings for water sector utilities and technical assistance providers. These two-day training events will focus on how drinking water, wastewater, and stormwater utilities can understand and adapt to impacts from coastal storm events and related threats using two new EPA tools: CREAT and the Storm Surge Inundation and Hurricane Strike Frequency Map. Locations are as follows:
 - June 16-17, 2015: Boca Raton, Florida
 - June 25-26, 2015: Mobile, Alabama
 - July 21-22, 2015: West Babylon, New York
 - Provide assistance to Georgetown University Climate Center to **re-launch the EPA Climate Ready Water Utilities Toolbox** on the Georgetown Climate Clearinghouse website. (OGWDW)
 - Carry out **climate resilience and sustainability pilots** to focus in on sustainability and financial components to help select the best adaptation strategies and improve implementation. Regional workshops to be held in Faribault, Minnesota and Blair, Nebraska. (OGWDW)
 - Work with Rural Community Assistance Partnership and other associations to **update the “Preparing for Extreme Weather Events: Workshop Planner for the Water Sector”** based on feedback from Emergency Response/Climate Ready Water Utilities workshops and technical assistance providers. Focus on making tool web-based, updating data/content, and improving the facilitation process. (OGWDW)
- 
- Continue to develop an interactive, multimedia guide to assist water utilities in increasing their **drought preparedness and resilience**. This drought response guide is based on lessons learned from six water utilities across diverse regions of the country. (OGWDW)

- Encourage the **Clean Water and Drinking Water State Revolving Funds (CWSRF and DWSRF)** to incorporate climate change considerations into their processes. (OWM/OGWDW)

**National
Priority
Action**

**Headquarters/Region
Climate Project Team:
State Revolving Funds**

Activities planned in 2015 include:

- **Continue a dialogue on "SRF Program Response to Climate Change Adaptation Needs"** (OGWDW and OWM)
 - Begin **development of a paper on CWSRF eligibilities**, which will include information on eligible climate and extreme weather resilience projects. (OWM)
 - **Continue meetings of the Headquarters-Regional SRF climate project team to explore ways to further promote the incorporation of climate change considerations at the state level.** The Team will build on its benchmarking work to communicate to States what is being done in the SRFs to consider climate change and to encourage States to build on those efforts. Actions include promoting peer-to-peer learning opportunities and sharing and highlighting best practices. (OGWDW and OWM and Regions 6 and 9)
 - **Develop an indicator measure for the Fiscal Year 2016-2017 National Water Program Guidance** concerning the integration of climate resilience considerations into SRF programs. (OGWDW and OWM)
- Work with the U.S. Department of Energy (DOE) and state energy offices to **initiate energy management training programs for drinking water and wastewater utilities in several States**, modeled after the successful efforts led by OWM and several EPA Regions. The training programs will focus on helping water and wastewater utilities assess their current energy usage, undertake energy audits, identify energy efficiency projects, and help these utilities identify and apply for federal, state, or local funding. (OWM)
 - Continue to work with assistance providers like the National Rural Water Association as they **train small systems using the *Rural and Small Systems Guidebook for a Sustainable Utility***. (OWM)
 - In collaboration with utility stakeholders, including the Water Environment Federation, National Association of Clean Water Agencies (NACWA), and others, **continue to promote the use of best practices that highlight a range of sustainable management practices for utilities to consider**, including those that help build climate resilience based on EPA's "Moving Towards Sustainability: Sustainable and Effective Practices for Creating Your Water Utility Roadmap." (OWM)
 - Under the Promoting Sustainable Rural Water and Wastewater Memorandum of Agreement (MOA), **EPA and the U.S. Department of Agriculture (USDA) will continue**

to collaborate on promoting sustainable practices such as asset management and energy efficiency. (OWM)

- **Plan a videoconference to help EPA Regions engage SRFs on climate change and extreme weather issues** (in addition to other sustainability topics). (OWM and OGWDW)
- Work with utilities and communities to analyze a range of infrastructure alternatives using the Alternatives Analysis Criteria Guide. (OWM)

Regional Program Actions

- ***Actions Common to All Regions***

- **Promote Community Engagement on Climate Resilience Using Tools from the Climate Ready Water Utilities (CRWU) Initiative and Climate Ready Estuaries (CRE)**
Program: Work with municipal and private utilities to promote the use of CREAT to recognize and respond to climate change risks and support communities in building climate resilience using tools such as the new workbook for developing risk-based climate adaptation plans developed by the National Estuary Program.
- **Work with State Revolving Loan Fund Programs to recognize climate change impacts.**

- ***Additional Regional Actions***

Region 1

- The State Revolving Fund (SRF) Program will continue to **use its annual SRF reviews to encourage States to consider resiliency projects** in their SRF funding decisions each year.
- **Continue support for energy efficiency improvements at water utilities.** One drinking water facility has reached Zero Net Energy, three wastewater facilities are near Zero Net Energy, and at least eight others are working on plans to reach this goal. Completion dates for proposed Zero Net Energy facilities are mostly unknown, while others have completion dates between 2016 and 2018.
- Partner with U.S. Department of Energy and National Science Foundation to **develop a research agenda to help wastewater facilities more easily reach Zero Net Energy** through new methods such as microbial fuel cells.
- Partner with Federal Emergency Management Agency (FEMA) and U.S. Army Corps of Engineers (USACE) to **leverage resources to enhance capabilities of wastewater and drinking water utilities to recover from power outages.** An outreach campaign will be developed to market the use, by utilities, of a USACE database of critical generators.

- **Conduct a Water-Energy Interdependency Workshop** for water utilities in western Massachusetts.
- **Conduct two Water/Wastewater Agency Response Network (WARN) Tabletop Exercises/Workshops** in Maine and Connecticut.
- **Complete a Water Health and Economic Analysis Tool (WHEAT) pilot** in North Kingston, Rhode Island.
- **Plan and initiate two Small System Resilience Pilots**, based on tools developed through the national pilot with the Berwick, Maine Water System.
- Work with Massachusetts Water Works Association to **assess the adequacy of drinking water construction design standards** in addressing future impacts from climate change.
- Work with the New England Interstate Water Pollution Control Commission **to develop climate preparedness guidance** for water and wastewater facilities with a focus on preparing for extreme weather events.
- As a follow-up to the New England Hurricane Summit held in 2013, which focused on key issues and lessons learned from Tropical Storm Irene and Hurricane Sandy, coordinate with state Emergency Management Assistance Compacts and water sector contacts to **establish an interstate water mutual aid program for New England**.
- Continue to enhance partnerships with FEMA and USACE to **advance water emergency response preparedness in New England**, including promoting use of the Emergency Power Facility Assessment Tool (EPFAT), a database of electrical and generator capabilities for water systems.
- Continue to enhance partnerships between EPA, U.S. Department of Housing and Urban Development (HUD), and Connecticut and Rhode Island state water agencies to **coordinate support for Hurricane Sandy relief resiliency efforts** for water and wastewater utilities.
- **Work with EPA OGWDW on two CREAT pilots** in Manchester-by-the-Sea, Massachusetts and Portsmouth, New Hampshire.



Region 2

- Continue to participate in the Hurricane Sandy Recovery Office's **Wastewater Technical Coordination Team**. Activities include a meeting in January 2015 which featured

speakers on power supply issues for the wastewater sector covering topics such as combined heating and power, biogas collection, energy efficiency, and microgrids for wastewater treatment power needs.

- Continue to participate along with state water and wastewater system representatives in the **New Jersey Water Sector Security Working Group Meetings**. 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.
- Continue to provide support for the **National Disaster Resilience Competition** in 2015. This Competition will award \$1 billion in HUD/Rockefeller Foundation funding to design resilient recovery activities across the U.S. plus \$181 million in funding for areas affected by Hurricanes Sandy and Irene, and Tropical Storm Lee in the Northeastern United States. Phase 1 winners will be announced in June 2015 and Phase 2 winners in December 2015. (See [HUDNo 14-109](#) for more information).
- The **Hurricane Sandy Green Team** will implement the Hurricane Sandy Rebuilding Strategy and implement and construct recovery projects and ideas with regards to environmental compliance, green infrastructure, climate change, sustainability, and resilient solutions.
- Region 2's experience with the Hurricane Sandy recovery will be used by EPA nationally to **develop a Recovery Standard Operating Procedures (SOPs)** and identify a Recovery Coordinator in each Region.
- Region 2 and the Climate Ready Water Utilities Initiative will **host CREAT training** in Region 2 for water and wastewater utility staff.

Region 3

- **Continue efforts to work with state and local partners to raise awareness of water utility energy efficiencies** by:
 - Partner with the State of Maryland to develop a water/wastewater energy efficiency partnership with the goal assisting local facilities in obtaining a free energy assessment and educating staff, management, and governance on energy.
 - Team will conduct 10 energy audits at wastewater treatment plants, and
 - Hold 2 energy workshops for water and wastewater operators.
 - Continue to work with existing clients on energy efficiency projects in Pennsylvania and Delaware.
 - Partner with the Eastern Pennsylvania Water Pollution Control Operator's Association to conduct a one-day energy efficiency training at Whitpain Township, Pennsylvania on 6/17/15 and present a water/wastewater continuing education 3-5 credit hour course related to energy efficiency.

- Continue to encourage State Capacity Development programs include energy efficiency in their workplans by incorporating:
 - energy conservation in the assessment and ranking of drinking water systems, and
 - energy conservation in a State’s Capacity Development Strategy when revising its Strategy.
- **Participate with energy and waste program staff on cross-program workgroups** related to anaerobic digestion and biogas.
- Continue use of annual SRF reviews **to encourage States to consider climate change, resiliency, and sustainability projects in their SRF funding decisions** each year.

Region 4

- Assist and support the development of **Energy Management Initiatives** with Tennessee Department of Environment and Conservation, Alabama Department of Environmental Management, and Region 4 Tribes with United South and Eastern Tribes. (As resources allow additional States will be added.)
- Include assistance to utilities in developing **vulnerability assessments to the anticipated effects of climate changes through the Region’s Energy Management Initiative** to reduce energy consumption at wastewater and drinking water utilities.
- Coordinate with SRF Managers on **incorporating components of green infrastructure and energy management into water and wastewater capital project loans.**
- Work on development of **screening criteria to identify water and wastewater facilities on the Atlantic and Gulf Coasts that may be at risk of inundation in the event of a storm event and storm surge** comparable to Hurricane Sandy using the recently developed Storm Surge Inundation Map and other tools.
- **Assist and support the Climate Ready Water Utilities Initiative’s CREAT technical assistance pilot projects** at wastewater and drinking water utilities in Lee County, Alabama and at the Seminole Tribe Utilities in Florida.
- Provide outreach to States on available resources to **assess drinking water and wastewater sector resiliency to severe climate impacts.**

Region 5

- **Increase climate–readiness at water utilities using sustainable water infrastructure approaches** by:

- Incorporating sustainable water infrastructure conditions into National Pollutant Discharge Elimination System (NPDES) permits, compliance assistance and enforcement settlements, where appropriate;
- Promoting energy management and other sustainable at utilities as resources allow, specifically through the Ohio Energy Pilot; and
- Promoting awareness and encourage use of the Climate Ready Water Utilities Tools with an aim toward incorporating climate change impacts into resiliency planning by drinking water and wastewater utilities.

Region 6

- **Host Climate Resiliency Workshops featuring CREAT** in Austin and Houston, Texas, and at the Pueblo of Sandia, New Mexico.
- Continue focus **on drought planning and response.**
- **Promote energy efficiency at water utilities through a series of workshops,** focusing on the U.S.-Mexico Border area.
- Continue to require that ten percent of regional **DWSRF and CWSRF programs support green projects.**
- Work in partnership with the U.S. Department of Transportation, the Middle Rio Grande Council of Governments, and other federal and state agencies to **develop a climate change planning scenario project that identifies the benefits of adaptive practices for transportation and other infrastructure** choices in light of a changing climate.

Region 7

- Work with three water utilities which agreed to be part of the **CREAT Training with the Climate Ready Water Utilities Initiative.**
- Work with Missouri in **encouraging water utilities at the local level to use the Vulnerability Self-Assessment Tool (VSAT) and Water Health and Economic Analysis Tool (WHEAT) Training.**
- Work with Region 7 States regarding options related to inclusion of **climate change considerations in the Safe Drinking Water Act Sanitary Survey program.**
- Encourage the **Clean Water and Drinking Water State Revolving Funds to incorporate climate change considerations** into their intended use plans and point systems.
- **Utilize SRF's revised Annual Review Checklists** which incorporate sustainability and climate change questions. Communicate with state programs regarding **nontraditional**

program eligibilities, including an entire section on climate and extreme weather resilience.

- **Encourage sustainable practicing such as green infrastructure and energy reduction in supplemental environmental projects when negotiating enforcement.** Monitor results of such actions.

Region 8

- Hold a Region 8 Water Climate Change Workshop with the EPA Headquarters to conduct an **in-person training session on the recently updated Vulnerability Self-Assessment Tool (VSAT) and Water Health and Economic Analysis Tool (WHEAT)** in June 2015 in Helena, Montana. Region 8 will assist in planning and coordination, WSD will handle all aspects of the training (through professional trainers), register participants, and provide all training materials.
- Work with EPA Headquarters **to provide assistance using CREAT** in Region 8 with two water system utilities: 1) Bozeman, Montana, and 2) Helena, Montana. Communities will receive technical assistance in the use of the CREAT.

Region 9

- Work with ORD **to publish and conduct outreach on “Food Waste to Energy,”** a publication describing the feedstock, technologies, partnerships, and funding mechanisms six Water Resource Recovery Facilities have pursued to implement co-digestion projects and increase on-site renewable energy production.
- As follow-up to a 2014 workshop in California entitled “Water Sector Emergency Response, Extreme Event, and Climate Variability Planning,” **support the preparation of Drought Resilience guidance** based on the experience of the Tuolumne (California) Utilities District. EPA Headquarters plans to complete this guidance in spring of 2015.
- **Provide training to state DWSRF programs on drinking water system water loss control approaches** with hands-on and interactive water auditing practice using the American Water Works Association’s (AWWA) Free Water Audit Software. Reducing real losses in water systems is an ideal drought mitigation approach with substantial economic and environmental co-benefits.
- Work with EPA Headquarters to **provide technical assistance using CREAT for utilities** in San Diego, Redwood Valley, and Los Angeles, California.

Region 10

- Work with the **Climate Ready Water Utilities Initiative to conduct risk assessments for Homer, Alaska and Sandpoint, Idaho**. Region 10 will work with CRWU to organize and host a two-day workshop in April 2015 in Anchorage for Alaska drinking water and wastewater utilities on using CREAT.
- Continue to **hold discussions with each state during its annual SRF reviews** to encourage the States to consider resiliency projects in their SRF funding decisions.
- Work to **provide drinking water, wastewater, and stormwater facilities with up-to-date information on projected impacts from climate change** to their utilities.

Office of Research and Development Projects and Initiatives

- Partner with U.S. Army **to demonstrate approaches to minimizing water use** by taking a systems-oriented approach to design and operation. This “Net Zero” partnership is expected to develop cost-effective tools, technology, and approaches for sustainable water resource management and performance verification data for new, decentralized, cost effective, energy efficient waste water treatment technologies.

Goal 2: Support Integrated Water Resources Management (IWRM) to sustainably manage water resources

Goal
2

- ❖ Strategic Action 5: Understand and promote through technical assistance the use of water supply management strategies.
- ❖ Strategic Action 6: Evaluate and provide technical assistance on the use of water demand management strategies.
- ❖ Strategic Action 7: Increase cross-sector knowledge of water supply climate challenges and develop watershed specific information to inform decision making.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- In cooperation with EPA Regional offices, **expand the number of WaterSense partners** nationally and in each Region, with a goal of a 150 additional partners annually. Include a measure addressing this work in the *Fiscal Year 2016-2017 National Water Program Guidance*. (OWM)
- **WaterSense will continue to carry out the H2Otel Challenge.** As part of the 2015 program, EPA is encouraging WaterSense partners to join a Recruiting Rally to sign hotels up for the Challenge, the winner of which will be rewarded with free technical assistance for hotels in their area. Participating hotels will also be provided additional tools and training. (OWM)
- **WaterSense plans to release a final specification for flushometer-type commercial toilets.** Subject to the progress of research, the program also plans to release draft specifications for soil moisture based irrigation controllers and landscape irrigation sprinklers. (OWM)

National
Priority
Action

Regional Program Actions

- **Actions Common to All Regions**
 - **Develop Regional WaterSense Partners:** Work with States, Tribes, municipalities, non-profit organizations, and businesses to promote the WaterSense Program in the region.
- **Additional Regional Actions**

Region 1

- **Promote WaterSense Program** and support New England WaterSense Partners including:
 - Support regional WaterSense partners in program campaigns (i.e. Fix-a-Leak-Week; H2Otel Hotels Challenge; Shower Better; Sprinkler Spruce-up etc.);
 - Recruitment, outreach, media support, and presentations at various Region 1 meetings, events;
 - Participate in New England Water Works Association (NEWWA) Water Resources Committee; and
 - Participate in the WaterSense Coordinators National Workgroup.

Region 2

- Region 2's WaterSense program is working with Clearwater, an environmental organization located in the Hudson Valley, New York, to help them develop an **online radio spot about the WaterSense program**.
- **Collaborate with the New York State Department of Environmental Conservation Office of Climate Change's Climate Smart Communities (CSC) program on the WaterSense program.** The CSC is a state-local partnership to meet climate challenges in ways that are consistent with community goals and its membership includes over 140 cities, villages, towns, and counties. The Region 2 WaterSense liaison is on the CSC webinar agenda for 2015 to present WaterSense to the Climate Smart Communities program.

Region 3

- **Promote the WaterSense program** including:
 - Fix a Leak Week (March 2015);
 - Earth Day activities (April 2015)
 - Pennsylvania State Association of Township Supervisors (May 2015)
 - National Drinking Water Week (May 2015);
 - Maryland Rural Water Conference (May 2015)
 - Pennsylvania Municipal Authorities Conference (August 2015)
 - Delaware Green Tourism Conference (September 2015)
 - Participate in the WaterSense National Workgroup (conference calls, national coordinator meeting, and other related activities); and
 - WaterSense Coordinators Conference Call (every quarter).
- Region 3 is conducting a study in the Delmarva Peninsula to evaluate the **effects that climate change imposes on socio-economic and natural resources**. The objective of this study is to build upon the integrated sustainability approach championed by ORD using the Triple Value (3V) Model. This study will set the stage to developing a cohesive, integrated strategy for achieving environmental, economic, and social progress. The

project is a collaborative effort among the Region, ORD, and Delaware, Maryland, and Virginia.

Region 4

- Develop consumer water conservation awareness and **regional metrics of water conservation.**

Region 6

- Provide Urban Waters Federal **Partnership support to City of New Orleans proposal development for the HUD National Disaster Resilience Competition.** City will be proposing project features that will address integrated water management in more sustainable and resilient ways.
- **Recruit thirty additional WaterSense partners each year** as part of a regional water efficiency and conservation campaign.

Region 8

- **Promote early collaboration among federal agencies/States/Tribes/municipalities on water supply projects** and other water infrastructure to encourage the consideration of climate change impacts.

Region 9

- Work with the national WaterSense program on **Water Loss Control**, including follow-up from a webinar on this topic in 2014, providing an overview of free water loss control tools, and describing successful water loss control programs and policies.
- Work with the national WaterSense program and [Stop Waste.org](http://StopWaste.org) to **include WaterSense products in Quantity Quotes, an on-line bulk purchasing platform.** With this fast and simple tool, institutional customers (e.g. multifamily building owners, public housing authorities, etc.) have been able to locate ENERGY STAR products, contact suppliers, and negotiate prices. Beginning in January 2015, these customers will be able to use this same tool to obtain WaterSense products (January 2015).
- Coordinate with HUD and the national WaterSense program to develop a webinar series for HUD project officers and grantees. The series will provide introductory information about relevant tools and resources and **help HUD incorporate water efficiency into its core programs** (January through August 2015).



Regional
Climate
Innovation

Region 10

- **Expand outreach opportunities to potential WaterSense partners as well as broadening the use of WaterSense certified fixtures** through the following activities:
 - Work with EPA Region 9, EPA Headquarters, and HUD on a series of webinars to introduce HUD Headquarters and Regional staff to WaterSense and related programs.
 - Enhance the H2otel Challenge by holding a Sustainable Lodging Workshop for up to 80 hotels from Washington State in May.
 - Work with Seattle Public Utilities on a Public Service Announcement.
 - Present on WaterSense at continuing education courses for real estate agents and appraisers.
 - Work with Cascade Water Alliance and the Master Builders Association joint BuiltGreen/WaterSense certification and incentive program for builders including Habitat for Humanity.
 - Partner with our entities in Idaho and Eastern Washington on Fix-A-Leak Week press and social media to encourage the public to reduce the more than a trillion gallons of treated water that is wasted every year on leaks.

Office of Research and Development Projects and Initiatives

- Partner with the U.S. Army **to demonstrate approaches to minimizing water use** by taking a systems-oriented approach to design and operation. This “Net Zero” partnership is expected to develop cost-effective tools, technology, and approaches for sustainable water resource management and performance verification data for new, decentralized, cost effective, energy efficient waste water treatment technologies.
- Work on research to **assess the vulnerability of Pacific Northwest hydrologic landscapes and streamflow to climate change** will report on a changes analysis for Oregon, Washington, and Idaho hydrologic landscapes.

B) Watersheds and Wetlands:

***Vision Statement:* 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

Goal
3

- ❖ Strategic Action 8: Develop a national framework and support efforts to protect remaining healthy watersheds and aquatic ecosystems.
- ❖ Strategic Action 9: Collaborate with partners on terrestrial ecosystems and hydrology so that effects on water quality and aquatic ecosystems are considered.
- ❖ Strategic Action 10: Integrate protection of healthy watersheds throughout the National Water Program core programs.
- ❖ Strategic Action 11: Increase public awareness of the role and importance of healthy watersheds in reducing the impacts of climate change.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- **EPA’s Healthy Watersheds Program** (www.epa.gov/healthywatersheds) continues to work with States to build the capacity to identify and protect our nation’s remaining healthy watersheds and to build the resilience of these watersheds to a changing climate. (OWOW)
- The Healthy Watersheds Program will complete **three projects to further assess and identify healthy watersheds**: a Montana Prairie Pothole Assessment; A Report on the Aquatic Ecological Health of the Clinch and Powell River System; and the Tennessee Integrated Assessment of Watershed Health report. These efforts continue to build state and local capacity to identify and protect healthy watersheds using a systems approach that recognizes watersheds as dynamic, interconnected ecosystems. (OWOW)

- **The Healthy Watersheds Consortium Grant Program** will be launched in summer 2015 to accelerate and expand the strategic protection of healthy freshwater ecosystems and their watersheds across the country to expand the program's reach into numerous watersheds across the country. The grant will leverage a moderate federal investment with other partners and resources to grow state healthy watersheds programs and to sponsor local projects to protect and maintain intact watersheds. The successful grantee will administer a sub-award program to support either healthy watershed program development projects or local demonstration/training projects. (OWOW)

Regional Program Actions

Region 1

- Work with the **Resilient Taunton Watershed Network** using a tool developed in 2014 to conduct municipal outreach and work to build capacity at the local and regional level to target actions to improve climate resilience.
- Complete the RARE (Regional Applied Research Effort) project to **refine the Watershed Management and Optimization Support Tool (WMOST V2) to consider how to meet high and low flows** in the Monponsett Pond Watershed in Halifax, Massachusetts using green infrastructure and other water management techniques in the most cost effective manner.
- Work with University of Massachusetts Conservation Assessment and Prioritization System (CAPS) to consider how to better **use the CAPS data in targeting protection of vulnerable wetlands** and areas of high ecological integrity and in improving stream continuity for habitat protection and climate resilience.

Region 3

- Continue to support the **Watershed Resources Registry (WRR) as a watershed level, web-based GIS (geographic information system) planning tool**. The WRR has potential to be used as a tool for climate change adaptation planning. The WRR team will work to ensure climate change related information layers are included in the WRR.
- With the EPA Chesapeake Bay Program Office, develop communication strategies about the importance and role of healthy watersheds and a **healthy watersheds protection goal for the Draft Chesapeake Bay Watershed Agreement**.

Office of Research and Development Projects and Initiatives

- Produce a report on the **impacts of nitrogen deposition on plant biodiversity that accounts for the interactive impacts with climate change**. This work connects with

modeling efforts to understand connections between hydrology, climate change, and air quality, with a focus on impacts to ecosystems and ecosystem services.

- Using multimedia modeling that integrates atmospheric behavior and hydrology with effects of climate change, produce **scenarios of air-water nitrogen budgets and associated ecosystem services for the Mississippi River basin**. This effort will link multiple, media-specific behavior and impact models to gain a systems-based understanding of these interconnected systems.
- Research the interactive effects of climate change and nitrogen deposition on ecosystems and ecosystem services and produce a **report on how climate change affects the impacts nitrogen emissions and deposition** on various ecological critical loads.
- Model **ecosystem response to changes in climate and nitrogen loading** in watersheds. The model will be calibrated and validated for specific watersheds to ensure it is able to adequately represent actual system behavior.

Goal 4: Incorporate climate resilience into watershed restoration and floodplain management.

Goal
4

- ❖ Strategic Action 12: Consider a means of accounting for climate change in EPA funded and other watershed restoration projects.
- ❖ Strategic Action 13: 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.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- The National Water Program will implement newly established **Flood Risk Management Standard**. This work will include review of interagency implementing guidelines for the Standard and application of the Standard to water programs as appropriate. (OW/IO)

Regional Program Actions

Region 1

- Work with Vermont Agency of Natural Resources and a community (probably Colchester, Vermont) to **pilot flood resilience checklist** and consider ways to connect wetland restoration and flood protection for climate resilience.

Region 2

- The Region continues to be involved with the Hurricane Sandy **Recovery Office's Coastal Flood Management Technical Coordination Team**. The team is working on, for example, a living breakwaters project off Staten Island and a review of National Oceanic and Atmospheric Administration (NOAA) planning considerations including Coastal Zone Management Act and living shorelines and the Corps "Systems Approach to Geomorphic Engineering (SAGE)."

Regions 2 and 3

- The **Partnership for the Delaware Estuary continues efforts toward climate change adaption planning** by expanding upon the work of the climate change adaptation plan of 2010 developed through Climate Ready Estuaries program funding. They continue to host workshops and develop education materials for municipalities within the Basin. Projects underway include:

- promoting a living shorelines process document that combines their knowledge of the Delaware Estuary Living Shorelines Initiative planning, installation, and outreach processes and best practices;
- holding biannual climate outreach roundtables; and
- recruiting communities for the Weathering Change program in which the agencies work with the community to help them understand the weather-related changes that are beginning to happen in their community.

Region 4

- Work with Gulf of Mexico Alliance to **include climate change considerations in projects and programs under the British Petroleum (BP) Deepwater Horizon Natural Resource Damage Assessment** and Restore Act procedures.
- **Work with the Governors South Atlantic Alliance to include climate change considerations** into Alliance efforts.

Region 6

- Continue efforts with **Urban Waters small grants grantees in education and outreach of green infrastructure**, wetland recitation, and awareness of the Lake Pontchartrain ecosystem in Louisiana.

Region 8

- Continue working on **incorporating climate resiliency into Colorado flood recovery efforts**, including water/wastewater infrastructure and river/watershed planning support based on resiliency, sustainability, green infrastructure, climate adaptation, and smart growth principles.

Office of Research and Development Projects and Initiatives

- EPA's Office of Research and Development and NOAA will produce a final report based on stormwater and climate change workshops held in the Great Lakes and Chesapeake Bay. The report focuses on lessons learned about the **impacts of climate and land-use change on water quality and precipitation-driven flooding, and the implications for stormwater management**. The report explores stormwater adaptations, particularly green infrastructure or other low-impact development strategies; and identifies information gaps and other barriers preventing local-level consideration and implementation of these strategies. The report will be final in 2015.

Goal 5: Watershed protection practices incorporate source water protection to protect drinking water supplies

Goal
5

- ❖ Strategic Action 14: Encourage States to update their source water delineations, assessments or protection plans to address anticipated climate change impacts.
- ❖ Strategic Action 15: 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.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- A Headquarters/Region team will continue to review options related to inclusion of **climate change considerations in the Safe Drinking Water Act Sanitary Survey program** which provides for on-site review of drinking water systems on a three year rotating basis. The workgroup will consult with States on a draft **updated Sanitary Survey Learners Guide**, including weather-related resiliency aspects, and have a final revised Guide to share with EPA Regions and States for training purposes by the end of the fiscal year. (OGWDW)
- The Office of Water will review opportunities to **enhance Drinking Water Mapping Application for Protecting Source Waters (DWMAPS) with updated FEMA floodplain maps** and with assessments of streamflow based on precipitation models or scenarios. These tools could assist States and public water systems plan for potential climate change effects on their water resources. (OGWDW)
- The Office of Water will seek opportunities to encourage federal agencies, States, and public water systems (PWSs) to **include climate change adaptation in state or local source water protection initiatives, and to include source water protection in climate change adaptation initiatives**, pending availability of funding. (OGWDW)

Headquarters/Region
Climate Project Team:
Sanitary Surveys

Regional Program Actions

Region 1

- Promote integration of Clean Water Act/Safe Drinking Water Act (CWA/SDWA) and understanding of climate change impacts through a **regional pilot to map impaired waters against drinking water sources in New Hampshire** and coordination with other water programs (e.g. 319/Nonpoint Source).

- Advance state-wide **Source Water Protection Collaboratives** in Maine and Connecticut.
- Continue partnerships with U.S. Department of Agriculture National Resources Conservation Service (USDA-NRCS) and U.S. Forest Service **to support source water protection in priority watersheds.**
- Coordinate with Region 1 emergency preparedness and enforcement programs to implement **key actions of the Merrimack River Initiative to protect source water quality** including GIS mapping of contaminant threats, outreach to underground storage tank owners, healthy community grants, water utility coordination, and emergency preparedness workshops.

Region 3

- Work with States and source water protection partners to raise awareness of climate change impacts and encourage the **incorporation of climate adaptation actions into source water assessments and protection plans.**
- Work with States to **increase CWA and SDWA collaboration for source water protection.**
- Support the efforts of the **Source Water Collaborative.**

Region 5

- **Target highly vulnerable public water systems for source water protection by:**
 - Continuing to revise guidance/process document to include climate change considerations in source water assessments and protection plans. Begin implementing the revised guidance through technical assistance and outreach:
 - Reference the updated methodology in the Wisconsin Community Action Program (WISCAP), Midwest Assistance Program (MAP), and Inter-Tribal Council of Michigan (ITCMI) renewed contracts to direct technical assistance providers to use the revised methodology and conduct adaptation activities with climate-related resources when assisting Tribes with source water protection projects.
 - Providing outreach/education on climate readiness and Source Water Protection to systems vulnerable to impacts of climate change.
 - Revising State Annual Resource Deployment Plan encouraging State Source Water Protection (SWP) programs to consider climate change in updated assessments and protection activities.



Region 7

- Work with States to **increase CWA and SDWA collaboration for source water protection** and reduction of non-point source pollution.
- Work with States during **SRF set-aside workplan reviews to encourage source water delineations**, assessments or protection plans.

Region 8

- Provide funding through the Region 8 Nonpoint Source Program **for fire-afflicted communities to improve source water protection**. The State of Colorado set aside \$400,000 funding in 2013 for nonpoint source-eligible activities and will continue to work in 2015 with that funding to address recovery from the Waldo Canyon and High Park fires.

Office of Research and Development Projects and Initiatives

- Develop **decision support tool and technical guidance on aquifer storage and recovery (ASR) practices** with the goal of improving sustainability of water resources under future climate and land use conditions.

Goal 6: Incorporate climate change considerations into the wetlands program, including the Clean Water Act 404 program

Goal
6

- ❖ Strategic Action 16: Consider the effects of climate change, as appropriate, when making significant degradation determinations in the Clean Water Act (CWA) Section 404 wetlands permitting and enforcement program.
- ❖ Strategic Action 17: 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.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- OW and ORD are working in collaboration on a **framework and inventory of relative wetland vulnerabilities at multiple scales**, based on integration of information on vulnerability assessment methods and wetlands classification systems. The results are intended to support efforts of OW programs (e.g., Clean Water Act Section 404 Program, Healthy Watersheds Initiative, and National Wetlands Condition Assessment) and other stakeholders to integrate climate change considerations into wetlands programs and activities. A stakeholder workshop consisting of experts from EPA and other federal and state agencies, the Association of State Wetland Managers, academia, consulting firms, and non-governmental organizations was held in January 2015 to obtain feedback on the approach and preliminary results. A draft of the framework and inventory, examining wetlands attributes of extent and community composition, will be ready for review in the autumn of 2015. (OWOW)
- OW will continue the analysis and implementation phase of the Clean Water Act **Section 404 Program Assessment** in cooperation with the USACE which may include evaluating the potential to propose one or more climate change action items as an area of joint work. (OWOW)

Regional Program Actions

Region 1

- Establish a **climate working group with Resource Agencies and the USACE to identify actions that integrate climate change considerations into CWA Section 404** and Section 10 permits.

- Continue partnership with the USACE to **promote low-impact development (LID) in CWA Section 404 projects** through the pre-application process.
- Provide **priority points in the Wetland Program Development Grants Competition for projects targeting climate change adaptation.**

Region 4

- **Consider effects of climate change as appropriate when evaluating Least Environmentally Damaging Practicable Alternatives (LEDPA) in the context of CWA Section 404 Wetlands Permitting.**
- **Ensure water conservation and efficiency measures are considered, where appropriate, as part of wetlands 404 permitting** before new water resource projects are approved.

Region 7

- Work with the USACE and Clean Water Act Section 404 programs to **incorporate climate change impacts in permits, compensation plans and draft Environmental Impact Statement (EIS) documents.**



Regional
Climate
Innovation

Region 10

- Continue to include **climate change analyses in Environmental Impact Statements (EISs) under EPA Region 10's National Environmental Policy Act (NEPA) and Section 404** programs related to water issues.

Goal 7: Improve baseline information on wetland extent, condition and performance to inform effective adaptation to climate change

Goal
7

- ❖ Strategic Action 18: Expand wetland mapping by supporting wetland mapping coalitions and training on use of the new federal Wetland Mapping Standard.
- ❖ Strategic Action 19: Produce a statistically valid, ecological condition assessment of the nation's wetlands.
- ❖ Strategic Action 20: Work with partners and stakeholders to develop information and tools to support long term planning and priority setting for wetland restoration projects.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- The **Wetlands Program Development Grants are supporting** projects relevant to developing information and tools related to climate change and long term planning and priority setting for wetland restoration projects. To increase coastal resiliency, EPA is supporting two projects that will **enhance appropriate use and understanding of living shorelines**:
 - Via a Wetland Program Development Grant, Restore America's Estuaries will develop and operate a **Living Shorelines Academy** to advance the use of living shorelines by providing targeted outreach and training to a range of stakeholders. The Academy will include a web-based national data repository, regional training workshops, and a national technology transfer meeting.
 - The Delaware Center for Inland Bays and Partnership for the Delaware Estuary will **conduct marine contractor trainings on the proper use and installation of living shorelines** as an alternative to traditional erosion control structures such as bulkheads and seawalls. Contractors in Delaware, Maryland, and New Jersey will be invited. (OWOW)
- In 2015, EPA expects to complete its analysis of the data and **release the results of the first National Wetland Condition Assessment (NWCA) for public comment**. The NWCA is a statistical survey of the quality of our Nation's wetlands. This assessment data will help provide a baseline of wetland condition that will help understand changes in wetland condition over time as a result of climate change and other factors. (OWOW)
- EPA is currently supporting a number of **Regional Wetland Program Development Grants to support updating the National Wetlands Inventory** to ensure that mapping efforts are current. (OWOW)

Regional Program Actions

Region 1

- Continue to **work with Massachusetts Office of Coastal Zone Management (CZM) and Department of Environmental Protection (DEP) to address the threats of sea level rise to coastal wetlands.** CZM is generating site-specific information and maps to identify and communicate vulnerability, risk, and impacts to Massachusetts's coastal wetlands under various scenarios of sea level rise. The data and information generated will result in more accurate and informed forecasting of coastal wetland changes, including areas of loss, areas where marsh migration may be supported, and areas that are predicted to undergo changes in wetland types.
- Continue to **work with the Maine Department of Conservation's Natural Areas Program to start identifying sites with high resilience to climate change** for targeted protection efforts, based on the results of the "Conservation Planning for Tidal Marsh Migration Due to Sea Level Rise" project. The goal of this project is to minimize net loss of tidal marsh habitat and its incumbent functions and values by identifying and initiating conservation planning for landscapes that will be needed to accommodate marsh migration.

Region 3

- Continue to actively engage with ORD's National Center for Environmental Assessment/Global Change Impacts & Adaptation Program's Wetland/Climate Vulnerability Assessment Project. **The project aims to identify wetlands and functions sensitive to climate change impacts and assess approaches for integrating climate science into OW programs (e.g., CWA Section 404 and Healthy Waters Initiative) practices.** The Mid-Atlantic has been selected as a case study due to the comprehensive wetland database available for this work. The project and its resultant framework and inventory will be an important resource for the Region's climate change adaptation program.
- Work collaboratively with **state partners to build their capacity to develop and implement wetland monitoring and assessment programs to establish current wetland condition.** Region 3 has several States with comprehensive wetland monitoring programs. Collection of wetland condition data will help States to predict and adapt to future climate changes. Region 3 affectively using the Wetland Program Development Grants to do this work incorporating climate adaptation priorities in the Request for Proposals.

Region 8

- Emphasize importance of preservation, restoration and management of wetlands and riparian natural resources as potential tools in response to climate change impacts to land use decision makers by **focusing the Enhanced State and Tribal Program on pilot communities who would be receptive to using tools developed through the wetlands grants program to identify priority wetlands** for protection.



Office of Research and Development Projects and Initiatives

- **Develop an inventory of wetland vulnerabilities based on integration of vulnerability assessment methods, resilience theory, and wetlands classifications.** This includes characterizing resilience and vulnerability across a range of spatial scales; analyzing vulnerability assessment and adaptation methodologies through the use of case studies; and providing information on vulnerabilities and potential adaptation responses for EPA wetland regulatory programs.

C) Coastal and Ocean Waters

Vision Statement: 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

**Goal
8**

- ❖ Strategic Action 21: 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.
- ❖ Strategic Action 22: 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.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- Climate Ready Estuaries will **publish its fourth lessons learned document**; featuring the work of National Estuary Programs. Work will begin on the fifth document in the series. (OWOW)
- Protection of coral reefs from the impacts of climate change requires federal, state, and territory governments to form partnerships with other key players, including industry, to reduce the rates of greenhouse gas emissions. As coral reefs continue to decline globally, reef managers must strengthen efforts to build resilience into their ecosystems by working with communities to address local threats. **Through involvement with the United States Coral Reef Task Force Climate Change Working Group, EPA will continue support the development of these efforts.** (OWOW)

- **EPA will participate in a range of interagency efforts** to coordinate climate change adaptation efforts of various federal agencies including:
 - National Ocean Policy implementation plan and related working groups; and
 - Interagency Ocean Acidification Working Group. (OWOW)

- EPA is working with other federal agencies to identify the carbon sequestration benefits associated with coastal wetlands. This **“blue carbon” ecosystems** are significant in national greenhouse gas (GHG) accounts and are being lost at an alarming rate. These ecosystems also provide benefits such as habitat, storm protection, water quality and recreation. (OWOW)

- In Fiscal Year 2014, EPA funded its first blue carbon pilot project, with Tampa Bay National Estuary Program (NEP). Tampa Bay project will quantify GHG reductions from acres of blue carbon ecosystems protected and restored by the NEP over past 10 years. In 2015, EPA will work with NEPs to **develop potential blue carbon projects**. Examples of potential NEP pilot projects:
 - assessment and feasibility studies, including mapping
 - on-the-ground validation of inventory methods
 - cost/benefit analyses
 - documentation and sharing of best practices
 - outreach and education (OWOW)

Regional Program Actions

Region 1

- As federal co-chair for the Northeast Regional Ocean Council (NROC) in 2015, and co-chair of NROC’s Ocean and Coastal Ecosystem Health Committee, EPA Region 1 will continue to **participate in a wide range of interagency efforts to collect and disseminate data** on ocean uses and natural resources that will support climate change vulnerability assessments and adaptation planning (see www.northeastoceandata.org).

- Region 1 and NROC partners will complete **marsh migration guidance material for coastal managers** based on analysis of various models and a highly successful workshop in December 2014. EPA also will continue to help coordinate the marsh migration “community of practice” that’s evolved out of this effort to advance a regional approach on marsh migration management and policy implications.

- Region 1 will continue to co-chair steering committee that’s leading a joint effort by NROC and the Northeastern Regional Association of Coastal and Ocean Observing Systems to develop an **Integrated Sentinel Monitoring for Climate Change in**

Northeastern Marine and Estuarine Ecosystems “science and implementation plan” by April 2015. The plan will be used to help secure additional funding to develop a regional strategy and establish a sentinel monitoring network.

Region 3

- The Region will continue to collect water quality information in the Delaware Estuary and in the Mid-Atlantic Bight (a coastal region running from Massachusetts to North Carolina). Once this information has been analyzed, the data will be released to the Mid-Atlantic States to **assist and contribute to sound environmental management decisions regarding climate change and the associated effects of climate change**. This information, and the methodologies associated with collecting this information, is being coordinated with ORD.

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

Goal
9

- ❖ Strategic Action 23: Work with the National Water Program's larger geographic programs to incorporate climate change considerations, focusing on both the natural and built environments.
- ❖ Strategic Action 24: Address climate change adaptation and build stakeholder capacity when implementing National Estuary Program Comprehensive Conservation and Management Plans and through the Climate Ready Estuaries Program.
- ❖ Strategic Action 25: 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.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- Encourage the National Estuary Programs and other watershed managers at the state and local level to use the **Watershed Climate Change Adaptation Planning Workbook** developed by the National Estuary Program. (OWOW)
- EPA will work with National Estuary Programs to include **climate risk vulnerability in Comprehensive Conservation and Management Plans (CCMPs)** as these plans are revised and updated over the next several years. (OWOW)
- Climate Ready Estuaries will **provide technical assistance to NEPs and grant funding to demonstrate** how climate change adaptation can improve habitat and water quality. (OWOW)
- Climate Ready Estuaries will be supporting the National Estuary Programs so they **can create risk-based climate change vulnerability assessments**. These will be among the first risk-based plans in the country and will serve as national examples of how to assess climate change risk. (OWOW)

National
Priority
Action

Regional Program Actions

- **Action Common to All Regions**

- **Promote Use of Tools from CRWU and CRE:** Work with municipal and private water utilities to promote the use of CREAT to recognize and respond to climate change risks, and with National Estuary Program partners to promote the use of the new Climate Ready Estuaries Vulnerability Assessment Handbook to develop local climate resilience plans.

- ***Additional Regional Actions***

Region 1

- Work with the Department of Homeland Security (DHS) on their **Casco Bay Maine Climate Change Adaptation Project as part of their Regional Resiliency Assessment Program** that is focusing on critical infrastructure, including wastewater and drinking water.
- Work with ORD and the Buzzards Bay National Estuary Program to **initiate RARE (Regional Applied Research Effort) and RESES (Regional Sustainable Environmental Science) climate change projects for the Mattapoisett Water System** and other watershed communities in Massachusetts
- Work with the six New England National Estuary Programs to scope out **a joint project to conduct vulnerability assessments for their respective Comprehensive Conservation and Management Plans under a single contract**, as required by new national program guidance.
- The Long Island Sound Study and Mass Bays Program will **incorporate actions to address climate change in their respective updated Comprehensive Conservation Management Plans (CCMP)**.
- The Buzzards Bay National Estuary Program will work with state and local partners to **implement its recently completed vulnerability assessment of water infrastructure and environmental justice communities in the New Bedford Harbor** area funded under the Climate Ready Estuaries program.

Region 2

- The **Peconic Estuary Program (PEP)** received funding from the **Climate Ready Estuaries** program to update beginning in 2015 the **Critical Lands Protection Strategy** to include lands that are vulnerable to climate change impacts.
- The **Peconic Estuary Program** will be working on an action plan called **“Actions Now and for the Future”** that will describe specific projects and their timelines to be taken over the next five years. **Climate change is included as a key subject**, and the document describes PEP’s strategy and intended actions on incorporating climate change into the Program. Goals that will be achieved over time include providing tools to local

governments and other stakeholders to mitigate the impacts of climate change on the Peconic Estuary, ensuring climate change is considered in prioritizing and selecting PEP projects, educating stakeholders about the impacts of climate change on estuary resources.

- The **Barnegat Bay Program** is continuing to promote and develop climate adaptation strategies and tools in support of the Climate Ready Estuaries program, including providing technical assistance to the Ocean County Office of Emergency Management in their multi-jurisdictional **natural hazards mitigation plan** and Ocean County Department of Planning in **the Long Term Community Recovery plan**.

Region 3

- With the Partnership for the Delaware Estuary, **continue to provide resources and information to municipalities within the Delaware Estuary regarding climate change** adaptation efforts and working through hurdles. The Partnership for the Delaware Estuary, a Climate Ready Estuary, will continue to find resources to conduct living shoreline pilot installations and maintenance within the Estuary.
- Support the **Maryland Center for Inland Bays and the Delaware Inland Bays National Estuary Programs in their climate change adaptation efforts**, through activities including: incorporation of climate change and sea level rise in public outreach and communications; including climate change considerations in comprehensive conservation management plans (CCMPs); and convening partners to consider climate change adaptation across watersheds.
- The Chesapeake Bay Program (CBP) has an active collaboration with several climate change researcher teams using the CBP's integrated airshed, watershed, and estuary models of the Chesapeake. **The work is providing the CBP information for a 2017 assessment of the influence of climate change on the Chesapeake TMDL** (Total Maximum Daily Load). Collaborators include Penn State, U.S. Geological Survey (USGS), EPA's Global Change Research Program, and the University of Maryland. Products to date include progress on an optimized watershed management for the Patuxent that estimates additional management needed to offset climate change impacts, and a case study application in the Chesapeake Bay Program addressing water quality management decisions in the face of climate change and other relevant uncertainties.

Region 4

- Promote the **Climate Ready Estuaries program in Region 4 NEPs** and work with the NEPs to **revise and update the NEP Comprehensive Conservation and Management Plans (CCMPs) to address vulnerabilities to climate change**.

Region 5

- **Great Lakes National Program Office (GLNPO) will continue to restore and maintain the chemical, physical, and biological integrity of the Great Lakes ecosystem in the face of climate change by:**
 - Adjusting long-term monitoring program schedules and methodologies, as appropriate.
 - Integrating climate change into Great Lakes Restoration Initiative-funded projects and other GLNPO funding mechanisms to ensure that the latest science informs project design.
 - Directing necessary revisions to Great Lakes strategic implementation documents, while working with federal, state, tribal and binational partners, using the latest climate change information.

Region 6

- Support the Coastal Bend Bays and Estuaries Program project as they **conduct a programmatic climate change vulnerability assessment, develop adaptation strategies, and educate stakeholders** about projected climate change impacts in coastal marsh habitats in the Coastal Bend area of Texas. The projects results will be disseminated more broadly through the Climate Ready Estuaries program.
- Support the efforts of three NEPs (Coastal Bend Bays and Estuaries Program, Galveston Bay Estuary Program, and Barataria-Terrebonne National Estuary Program) along the Gulf of Mexico in their efforts to **develop sea level rise adaptations and to support coastal natural resource and community resiliency.**
- Provide project engineering and design, project management, ecological science technical services, and public outreach support in the ongoing efforts of the interagency **Coastal Wetlands, Planning, Protection and Restoration Act program to restore coastal wetland habitat in Louisiana.**

Region 9

- “As part of the *Making a Visible Difference in Communities* initiative, Region 9 is working with **American Samoa on climate change resiliency.** The effort will include long-term infrastructure planning, potentially using CREAT (late Fiscal Year 2015 – Fiscal Year 2016), and assessing coral reef vulnerability as a result of ocean acidification and nonpoint source and stormwater pollution.”
- Update the **Coral Reef Strategy for Hawaii and the Pacific Islands** to highlight accomplishments from the 2013 strategy and lay out actions for the next year to reduce pollution threats to coral reefs. This work will include coordination of coral reef programs (e.g. Coral Reef Task Force, local watershed projects, local coral management

efforts), and integration of coral reef protection with EPA programs across divisions at Region 9 and at Headquarters. The Region will provide leadership on ocean acidification and impacts to coral reefs within EPA and to the Coral Reef Task Force.

Region 10

- Work with the Puget Sound National Estuary Program to continue funding projects that promote and **support adaptation and resiliency to climate change impacts.** Draft and/or incorporate grant assistance agreement criteria - consistent with regional and national programs- to integrate climate adaptation and resiliency into Puget Sound Geographic Program funded projects.

Goal 10: Address climate driven environmental changes in coastal areas and ensure that mitigation and adaptation are conducted in an environmentally responsible manner

Goal
10

- ❖ Strategic Action 26: Support coastal wastewater, stormwater, and drinking water infrastructure owners and operators in reducing climate risks and encourage adaptation in coastal areas.
- ❖ Strategic Action 27: Support climate readiness of coastal communities, including hazard mitigation, pre-disaster planning, preparedness, and recovery efforts.
- ❖ Strategic Action 28: Support preparation and response planning for diverse impacts to coastal aquatic environments.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- Complete development of initial screening criteria to identify **water and wastewater facilities on the Atlantic and Gulf Coasts that may be at risk of inundation** in the event of a storm surge comparable to Hurricane Sandy and work with utilities to address risks. (OW/IO, OGWDW, and Region 1, 2, 3, 4 and 6)
- Work with NOAA and the National Hurricane Center to **develop an interactive web-based Storm Surge Inundation Map that illustrates storm surge inundation scenarios** based on FEMA flood plain maps and sea, lake, and overland surge from hurricanes (SLOSH) models. Map launched on EPA website in January 2015. An additional layer which displays historical hurricane strike data in coastal counties will be added to the map in 2015. All map data will be incorporated into CREAT. (OGWDW)
- **Host at least one webinar in coordination with NOAA on the water sector and climate change.** Session will include a presentation on CREAT and pilots. (OGWDW)
- Promote the **Extreme Events Workshop Planner** designed to provide everything a utility needs to plan, customize, and conduct a workshop focused on planning for more frequent and more intense extreme events. Five extreme event scenarios are included in the Workshop Planner: flooding; drought; sea level rise; wildfire; and reduced snowpack. (OGWDW)

National
Priority
Action

Regional Program Actions

Region 2

- **The Delaware Estuary Science & Environmental Summit**, entitled “Balancing Progress and Protection”, was held in January in Cape May, New Jersey with about 250 people will be in attendance and additional on-line participants. Region 2 presented on tidal wetland monitoring and ecosystem valuations. The summit featured over 120 presentations on subjects including: climate change and resilience of ecosystems, water quality, wetland assessment methods, living shoreline techniques, stormwater management, nitrogen management for lawns, green infrastructure at school yards, and green jobs for youth and education and outreach to schools.
- Region 2 has been participating in the newly created **Jamaica Bay Science and Resilience Institute Public Agency Council** which has worked on assisting the U.S. Army Corps of Engineers with its Rockaway/Jamaica Bay Reformulation Study. The Council will begin long term planning work which would initially focus on evaluation and integration of existing computer models for the bay.
- In early 2015, the **scientific journal Ecological Indicators will make available in its online edition an article by members of Long Island Sound Study's Sentinel Monitoring for Climate Change program**. The article describes how the multi-state work group collaborated to develop a program that would provide warning of climate change impacts to the Long Island Sound estuarine and coastal ecosystems. The Sentinel Monitoring program started in 2008 with a goal to facilitate timely management decisions and adaptation responses to climate change impacts. The article describes a novel approach for strategic planning that combines available regional-scale predictions and climate drivers (top down) with local monitoring information (bottom up) to identify candidate sentinels of climate change. The article discusses how six high priority sentinels were identified for inclusion in pilot-scale monitoring programs from a list of 37 sentinel indicators.
- Work in collaboration with FEMA, NOAA, New York State, and Suffolk and Nassau Counties on piloting the use of **CommunityViz** (a scenario planning tool), Health Impact Assessments, and Ecosystem Services Assessments in the recovery process. These tool will incorporate important climate data such as sea level rise. Region 2 participated in a week-long CommunityViz training in January 2015 along with 30 participants from federal, state, and local agencies. Participants learned about how to incorporate data from EPA’s Environmental Justice (EJ) Screen, FEMA’ HAZUS and NOAA’s Digital COAST tools into CommunityViz and also were educated about a range of sustainable community planning tools.



Region 3

- Region 3 is supporting the **Hampton Roads Sea Level Rise Adaptation Pilot** as it moves forward by providing the science and tools necessary to respond to the impacts of climate change. This is a two year “whole government” initiative aimed at bringing the full force of coordinated government and the community together to address sea level rise and other climate induced changes expected in the Hampton Roads region.

Region 4

- Promote the beneficial use of **suitable dredged material to support environmentally sound projects to protect from sea level rise and storm surge.**
- Develop 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 will work with EPA Headquarters in the development of **screening criteria to identify water and wastewater facilities on the Atlantic and Gulf Coasts** that may be at risk of inundation in the event of a storm event and storm surge comparable to Hurricane Sandy.
- Continue to **cooperate with FEMA on implementing the Memorandum of Agreement signed in 2010** on the use of smart growth approaches in communities that have been impacted by disasters, and to provide information to communities that are planning to minimize weather-related impacts.
- Work with EPA Headquarters in **piloting Regional Flood Resilience Pilot Project for groups of water and wastewater utilities in Florida.**



Region 6

- Promote the beneficial use of suitable dredged material to **support environmentally sound projects to provide protection from sea level rise and storm surge.**
- Promote landscape scale coastal protection by constructing and **providing technical and planning assistance for coastal restoration and adaptation projects.**

Office of Research and Development Projects and Initiatives

- Complete **an assessment of the vulnerability of near coastal species and habitats to climate change for the Pacific Coast, including Alaska.** This project applies a generalized rule-based and modeling framework to predict species and habitat vulnerability based on generally available data. Relative vulnerability predictions are

based on species' biogeographic distributions and life history attributes and habitat exposures; synthesize climate projections over regional scales; and enhance the Sea Level Affecting Marshes Model (SLAMM).

Goal 11: Ocean environments are protected by EPA programs that incorporate shifting environmental conditions and other emerging threats

Goal
11

- ❖ Strategic Action 29: Consider climate change impacts on marine water quality in National Water Program ocean management authorities, policies, and programs.
- ❖ Strategic Action 30: 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.
- ❖ Strategic Action 31: Support the evaluation of sub-seabed sequestration of CO₂ and any proposals for ocean fertilization.
- ❖ Strategic Action 32: Participate in interagency development and implementation of federal strategies through the National Ocean Council (NOC) and the NOC Strategic Action Plans.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- EPA will continue participation in the **Resiliency and Adaptation to Climate Change and Ocean Acidification Subcommittee of the National Ocean Council** to develop and implement Action Plans, including interagency initiatives related to climate change. (OWOW)
- As part of EPA's ongoing efforts to assess the current state of the science regarding ocean and coastal acidification, the Agency will continue to **collaborate with the West Coast Ocean Acidification and Hypoxia Science Panel and the Northeast Coastal Acidification Network (NECAN)**. Moving forward in 2015, the Agency will be seeking to expand our collaborations to include other regional scientific groups, interested States, and other stakeholders. (OWOW)
- EPA will continue to examine the role that the Clean Water Act and existing voluntary programs could play in addressing ocean and coastal acidification. The Agency will also **assess how lessons learned from efforts to address ocean and coastal acidification might be transferable amongst regions** of the US encountering ocean and coastal acidification. (OWOW)
- EPA will continue to work with other agencies and the international community to **provide technical guidance on sub-seabed carbon sequestration and marine geo-engineering** and coordinate with federal partners in addressing proposals for carbon sequestration in the sub-seabed or other proposals, such as potential fertilization of the ocean. (OWOW)

- Collaborate with EPA 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). (OWOW)
- Partner with Washington State Department of Ecology to **develop models to determine relative contributions of land-based pollution sources to acidification** conditions in Puget Sound. (OWOW)

Regional Program Actions

Region 1

- Continue to participate on the **Northeast Coastal Acidification Network (NECAN) Steering Committee to help coordinate research and management of coastal acidification issues**, including two publications summarizing findings of the April 2014 “State of the Science” workshop; a series of stakeholder engagement workshops; and working with EPA Headquarters, the Casco Bay Estuary Partnership, and University of New Hampshire to establish a new ocean acidification monitoring station in Casco Bay.

Region 3

- Region 3, along with Region 2, is a member of in the Mid-Atlantic Regional Planning Body. This group was created as a result of the National Ocean Policy and an Executive Order to collaborate more effectively and efficiently with state and tribal governments regarding ocean planning. The Charter for the Mid-Atlantic Regional Planning Body (Mid-Atlantic RPB) was signed in 2014. The Mid-Atlantic RPB is currently working on finalizing the outline of a Regional Ocean Action Plan. **The objective of the Regional Ocean Action Plan is to set forth clear goals and objectives associated with sound decision making regarding ocean planning while considering the effects of anthropogenic (i.e. offshore drilling) and natural (climate change) activities.**

Region 10

- Work with the States of Washington and Oregon, NOAA, and the University of Washington **to better coordinate activities and research related to ocean acidification in the Pacific Northwest.** Also, Region 10 will complete a Regionally Applied Research Effort to examine isotopic analyses of nitrogen to look at how eutrophication interacts with acidification in Puget Sound.



D) Water Quality

Vision Statement: 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

Goal
12

- ❖ Strategic Action 33: Encourage States and communities to incorporate climate change considerations into their water quality planning.
- ❖ Strategic Action 34: Encourage green infrastructure and low-impact development to protect water quality and make watersheds more resilient.
- ❖ Strategic Action 35: Promote consideration of climate change impacts by National Pollutant Discharge Elimination System permitting authorities.
- ❖ Strategic Action 36: Encourage water quality authorities to consider climate change impacts when developing wasteload and load allocations in TMDLs where appropriate
- ❖ Strategic Action 37: Identify and protect designated uses that are at risk from climate change impacts.
- ❖ Strategic Action 38: 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.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- Continue to engage outside partner groups and nonprofits through the **Green Infrastructure Collaborative**. Facilitated by EPA’s Green Infrastructure Team, this group will work closely together to align public and private knowledge and resources to promote the multiple benefits of green infrastructure. (OWM)
- **Provide green infrastructure technical assistance to 25 communities for projects including green infrastructure** design, cost-benefit assessments, and integration of green infrastructure into resiliency planning efforts. (OWM)

- Hold **green infrastructure design charrettes in 4-6 communities in 2015**. Workshops will focus on leveraging green infrastructure to build community resiliency. (OWM)

- Complete a mobile application version of the Stormwater Calculator, including the **Climate Change Extension component as a way to** enhance its utility and promote its use. (OST/ORD)

National
Priority
Action

- **Continue working with the National Research Council on their Beneficial Use of Graywater and Stormwater: An Assessment of Risks, Costs, and Benefits study** as they look at the potential role of green infrastructure and graywater reuse in improving the quality of water in urban watersheds. A final report is expected to be issued around March 2015. (OWM)

- A Headquarters/Regional team will review issues related to climate change in Clean Water Act **water quality criteria and standards** and identify possible options for addressing climate change in the context of the Water Quality Standards Program. (OST)

Headquarters/Region
Climate Project Team:
Water Quality Criteria
and Standards

- Draft a white paper providing information States and Tribes can use to **protect aquatic life from negative effects associated with alteration of hydrologic conditions**, including potential effects from climate change. (OST)

National
Priority
Action

- A Headquarters/Regional team will develop a **Frequently Asked Questions (FAQs) document to address incorporation of climate change into water quality standards**. (OST)

- A Headquarters team will **research the impacts of low (critical) flows on temperature to better protect aquatic life from thermal impacts during low flows**. (OST)

- A Headquarters/Regional team will work to identify ways to **better integrate climate change considerations into water quality management planning projects and processes** and develop an initial report. This project will include cooperation with state organizations to identify state agency best practices for climate change adaptation for clean water and drinking water programs. (OW/IO)

National
Priority
Action

Headquarters/Region
Climate Project Team:
Water Quality
Management Planning

- EPA and the National Resources Conservation Service are developing **an Interagency Agreement to collaborate on the promotion of sustainable agricultural practices to protect and improve water quality and enhance climate resilience and mitigation**

approaches. The Interagency Agreement will go into effect during 2015 and will guide a variety of projects where both organizations have common interests, including the effects of climate on agriculture.

- EPA will continue working on a **NPDES Strategy to develop the means to incorporate climate change considerations into the NPDES program.** This includes: improving tools and methods to account for increased variability in stream flow, receiving water temperatures and precipitation, encouraging prevention and treatment technologies such as green infrastructure and water and energy efficiency, increasing awareness among permit writers of the climate vulnerabilities of wastewater treatment facilities, and working with partners such as USDA to evaluate the risk of Concentrated Animal Feeding Operation (CAFO) wastewater discharges associated with climate change. (OWM)

Regional Program Actions

Region 1

- Continue to serve on the steering committee of the U.S. Geological Survey (USGS) Northeast Climate Science Center to **identify key research needs for effects of climate induced changes on thermal regimes.**

Region 2

- New Jersey Futures, New Jersey Department of Environmental Protection, and EPA will have a series of workshops in early 2015 focusing on the **appropriate use of green infrastructure in Combined Sewer Overflow (CSO) long-term control plans and financing options.** The first workshop, **Reinvesting in Urban Water Infrastructure through Combined Sewer Overflow Long Term Control Plans** was held on January 8, 2015 in Newark, New Jersey. These workshops will supplement the workshop held in September 2014 with New Jersey CSO permittees on how to develop acceptable Long-Term Control Plans (LTCPs) as required under their draft permits. The workshop will include sessions on financing water infrastructure upgrades, green infrastructure and community involvement.

Region 3

- **Continue support the Green Streets, Green Jobs, Green Towns (G3) Initiative** as a peer-to-peer support network and capacity building program for communities interested in adopting green infrastructure. Continue research on identification of effective GI technologies related to stormwater, flooding, and resilience.
- Work actively with state partners **to develop meaningful water quality standards for wetlands** that can be used to better understand and manage wetlands that may be impacted by changing climatic conditions.

Region 4

- Use the **Triennial Review of state water quality standards to work with States on changes in stream use classification or standards**, where necessary, due to climate change induced increasing temperatures or changes in stream flow.
- Encourage States to develop **explicit criteria for low flow protection**.
- Encourage States to **update fact sheets at permit reissuance to include the most up-to-date critical low flow as possible** and to calculate reasonable potential based on those values.
- Continue to work with States on the **incorporation of green infrastructure components in MS4 permitting**.
- Work with States to include **climate change adaptation provisions in the state's revised Nonpoint Source Management Plans** to provide flexibility to fund programs and projects to assess, evaluate, plan and implement climate change adaptations.
- Work with **urban and environmental justice communities to promote and implement green infrastructure into the communities** to reduce flooding, combined sewer overflows, and water quality impairments in these urban communities.
- Region 4 **will promote the use of the Stormwater Management Model with the Climate Adjustment Tool (SWMM-CAT)** to utilities doing planning on improvements to their stormwater infrastructure.



Regional
Climate
Innovation

Region 5

- Continue encouraging the use of green infrastructure and integrate efforts with Region 5's Sustainability and Communities Team.
- **Streamline and standardize water quality standards decision-making processes to ensure timely, protective decisions by:**
 - Determining, in consultation with EPA Headquarters, the flexibility allowed to change designated uses in surface waters that are adversely impacted by climate change and communicate clear guidance to States and Tribes;
 - Identifying "best practices" among States and Tribes to streamline variance and use designation change submissions.

Region 6

- Promote use of green infrastructure and continue recognition of green infrastructure projects in the Region including addressing **new opportunities in designing parking lots to use trees to manage stormwater and urban heat** (see Regional Sustainability Environmental Sciences Research Program Project: Parking Lot Strategies to Mitigate Storm Water Quality/Volume and Urban Heat Island Effect Using Trees in Green Infrastructure).



Regional
Climate
Innovation

Region 7

- Co-chair EPA Headquarters/Regional project team working to identify ways to **better integrate climate change considerations into water quality management planning projects and processes.**
- Work within region and outside agencies to promote **low impact development practices** (i.e.; green infrastructure, water conservation practices, and energy conservation). These actions include Green Infrastructure Technical Assistance to communities, integrated planning in Springfield, Missouri and Lawrence, Missouri and municipal separate storm sewer system (MS4) annual reports from Kansas City, Missouri, Kansas City, Kansas, St. Louis, Muscatine, Iowa, and Omaha, Nebraska.
- Highlight one Clean Water Act **Section 319 watershed project from each State that incorporates the use of green infrastructure.**
- Annually **track the implementation of green infrastructure best management practices in watershed projects funded and leveraged through the Clean Water Act Section 319 program.**

Region 8

- Continue education and outreach on the use of green infrastructure and implementation of green infrastructure in planning and construction and **integrate efforts with the Urban Partnership and the Partnership for Sustainable Communities.**

Region 9

- Promote the inclusion of climate change and asset management planning requirements for sanitary and storm sewer systems in NPDES permits. The region launched a website (<http://www.epa.gov/region9/water/npdes/asset-mgmt/index.html>) in the first quarter of Fiscal Year 2015 to provide recommendations and **examples of how to include asset management provisions in NPDES permits, including a focus on climate change.** Region 9 will begin drafting relevant language in EPA-issued permits in Guam

by the end of Fiscal Year 2015 and will work with the California State and Regional Water Boards on possible inclusion of relevant provisions in state permits.

Region 10

- Follow-up from the two-day workshop held in November 2014 on **the impacts of climate change on stream temperature on cold-water fisheries in the Pacific Northwest**. The planning committee will be putting together a summary of the meeting and other materials to communicate the findings of the group.
- Work with the USACE and the Climate Impacts Group on a project called the Time of Emergence. The project will **identify the time at which a distinctive trend due to climate change is projected to emerge from the noise of natural climate variability**. This concept, referred to as “time of emergence,” can help guide the prioritization and timing of climate change adaptation activities. The project is expected to be completed in the spring of 2015.



Office of Research and Development Projects and Initiatives

- Publish final reports from the ORD Science to Achieve Results (STAR) grantees on research results examining the **consequences of global change for water quality**, including a bibliography of the research reports and articles published by grantees.
- Finalize a report on the **use and applicability of Robust Decision Making (RDM) methods to selected Office of Water programs, focusing on TMDL program**. This project examines how RDM approaches can be applied by OW and others in a decision making process that accounts for the deep uncertainties posed by climate change.
- Develop information on suburban watershed nitrogen retention, specifically to **estimate the effectiveness of stormwater management structures**. This effort will incorporate the projected impacts of climate change to understand how water quality management approaches may be affected.

Goal 13: As the Nation makes decisions to reduce its greenhouse gas emissions and develop alternative sources of energy and fuel, the National Water Program will work to protect water resources from unintended adverse consequences

**Goal
13**

- ❖ Strategic Action 39: Continue to provide perspective on the water resource implications of new energy technologies.
- ❖ Strategic Action 40: Provide assistance to States and permittees to assure that geologic sequestration of carbon dioxide (CO₂) is responsibly managed.
- ❖ Strategic Action 41: Continue to work with States to help them identify polluted waters, including those affected by biofuels production, and help them develop and implement Total Maximum Daily Loads (TMDLs) for those waters.
- ❖ Strategic Action 42: Provide informational materials for stakeholders to encourage the consideration of alternative sources of energy and fuels that are water efficient and maintain water quality.
- ❖ Strategic Action 43: 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.

[Note: Text above from *2012 Strategy: Response to Climate Change*]

2015 Implementation Actions

National Program Actions

- To ensure protection of underground sources of drinking water (USDWs), OGWDW worked with co-regulators, industry, and other stakeholders to develop draft technical guidance clarifying Underground Injection control Class II permitting requirements for hydraulic fracturing with diesel fuels (DFHF). The draft guidance explained the Agency's interpretation of the SDWA statutory term "diesel fuels" for permitting purposes and **provided guidance recommendations for the EPA's permit writers to consider when establishing permitting requirements for DFHF activities. EPA released the draft guidance on February 12, 2014.** Final guidance will be published in 2015. (OGWDW)
- In 2014, EPA issued an interpretive memorandum and revised technical guidance for DFHF permitting (see note above). Permitting recommendations in the technical guidance were written for EPA permit writers but States with primary enforcement authority will find them useful in protecting USDWs in their individual states and programs. Throughout 2015, OGWDW **will work with co-regulators and other stakeholders to encourage best practices and ensure that oil and gas development occurs safely and responsibly, in a way that protects drinking water resources.** (OGWDW)

- OGWDW is working with the carbon dioxide (**CO2**) sequestration permit applicants to evaluate and approve **Class VI permits for Geologic sequestration projects**. (OGWDW)

Regional Program Actions

Region 7

- With EPA Headquarters assistance, review and process anticipated **Class 6 underground injection control (UIC) permit application**.
- Through Wichita State University Environmental Finance Center grant **encourage energy efficiency and alternate sources of energy during workshops and energy assessments**.

Region 8

- **Continue to participate in the Geological Sequestration (GS) workgroup** to develop guidances, share permitting experiences, resources, and technical information, to facilitate implementation of CO2 geological sequestration final rules designed to protect drinking water resources, while encouraging successful deployment of commercial scale sequestration projects. Work with States (notably Montana, Wyoming and North Dakota) to help them obtain primacy for the Class VI UIC program, and issue permits for projects where state primacy has yet to be established.

Office of Research and Development Projects and Initiatives

- Develop an assessment of possible future regional water usage for energy production. The study is examining **how energy system water demands might change under different scenarios that constrain greenhouse gas emissions and water use limits**, and is evaluating some of the environmental implications for the different scenarios.

Goal 14: Collaborate to make hydrological and climate data and projections available

Goal
14

- ❖ Strategic Action 44: Monitor climate change impacts to surface waters and ground water.
- ❖ Strategic Action 45: 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.
- ❖ Strategic Action 46: Enhance flow estimation using National Hydrography Dataset Plus (NHDPlus).

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- A Headquarters and Region team will review options related to inclusion of **climate change consideration in the NPDES permit program. This project includes** collaborative work with USGS to complete multiple improvements to DFLOW, a statistical tool that calculates critical flow statistics used in developing water quality based effluent limits. The tool is expected to be available for use by mid-2015. (OWM)
- Work to **complete Phase I of the U.S. Geological Survey (USGS) national Monthly Water Balance Model (MWBM)**, upon which the initial core modeling is done; coordinate with launch of the USGS web portal. (OWOW)
- In 2015, EPA will incorporate the ability to **evaluate climate impacts in the new Hydrologic and Water Quality System (HAWQS) model**. HAWQS will include the ability to allow modelers to modify parameters to conduct 'what-if' evaluations both with user generated data and with pre-set scenarios using CMIP-3 (phase 3 of the Coupled Model Intercomparison Project). A user's guide will accompany the new features. (OW/IO)

Headquarters/Region
Climate Project Team:
NPDES Permits

Regional Program Actions

Region 2

- EPA Region 2 received funding to conduct ambient monitoring and to pay for repairs to EPA facilities and vessels damaged during Hurricane Sandy. The purpose of this two year effort is to evaluate the effects of Sandy on water quality in coastal zones. **The work was done to determine the effects of Sandy on levels of contaminants in sediments and receiving waters of sub-basins impacted by combined sewer overflows, sanitary sewer overflows, bypassing of wastewater treatment plants, and runoff or**

discharge from hazardous waste sites. Most of the sampling was done in 2013 and most of the sample analysis and quality assurance was completed in 2014. EPA is currently working on data analysis in 2015. The information will be used to determine whether additional action or monitoring may be needed. A longer term purpose will be to develop a monitoring plan that can serve as a model for future storm response.

- Region 2 will be conducting field sampling activities in summer and autumn 2015 to support **future requirements for denitrification and outfall relocation at the Bay Park sewage treatment plant in Nassau County, New York.** The Bay Park facility was heavily impacted by Hurricane Sandy and is being reconfigured in order to be more resilient to storm surges and sea level rise and also reduce the impact of its effluent on the water quality of Reynolds Channel by building a deep ocean outfall. The results of this field study could also be used in the System-Wide Eutrophication Model (SWEM) for broader considerations such as long term impacts on other areas of the New York Bight.

Region 4

- Evaluate Region 4 States' current monitoring and assessment practices to encourage the **capturing of extreme low flow or other climate related conditions**, including: 1) appropriate biological monitoring and assessment techniques, and 2) water monitoring system design.
- Work with States and other water monitoring partners to help establish a long term monitoring program to **track potential changes in temperature, flow, aquatic biological communities, habitat, and chemical constituents that are occurring over time at important sentinel reference sites in the Southeast Region.**

Region 5

- **Improve information on climate change impacts on surface water quality and quantity available and used for regulatory and assistance actions by:**
 - Identify key climate change data sources and parameters for monitoring different waterbody types. Determine what data are not currently being collected by state and tribal monitoring programs.
 - Provide to States and Tribes information to consider when updating their monitoring strategies, specifically water quality data gaps and incorporate climate change considerations into updated monitoring strategies, where possible.
 - Work with States to further refine biological monitoring tools (e.g., indices) (Illinois, Indiana) and to develop biological criteria (Minnesota, Wisconsin) that can capture evidence of nonattainment of aquatic life uses that may be due to climate change.

- Present options/recommendations regarding potential for a regional monitoring network to facilitate data collection on climate change impacts to surface water.

Office of Research and Development Projects and Initiatives

- Incorporate the capability to **estimate the effects of climate change on water temperature into linked atmospheric, hydrologic, watershed and ecosystem models.** This project will assess and develop appropriate connections between a coupled meteorological/atmospheric/hydrology model set and ecosystem models and benefit cost models to support multi-media, multi-pollutant and health and welfare benefit/cost assessments of management strategies.

E) Working With Tribes

Vision Statement: 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

**Goal
15**

- ❖ Strategic Action 47: Through formal consultation and other mechanisms, incorporate climate change as a key consideration in the revised National Water Program Tribal Strategy and subsequent implementation of CWA, SDWA, and other core programs.
- ❖ Strategic Action 48: Incorporate adaptation into tribal funding mechanisms, and collaborate with other EPA and federal funding programs to support sustainability and adaptation in tribal communities.

[Note: Text above from *2012 Strategy: Response to Climate Change*]

2015 Implementation Actions

National Program Actions

- Continue to support the EPA National Water Program **State and Tribal Climate Change Council** as a vehicle for sharing information and hearing the views of States and Tribes on climate change issues. (OW/IO)
- Include a presentation on tribal climate change recommendations and findings at the **Tribal Lands and Water Forum, co-sponsored by EPA and the Institute for Environmental Professionals**, planned for August 2015. (OW/IO)
- Develop a **summary of approaches that to date, Tribes have taken to develop climate change vulnerability assessments and adaptation plans**, and supporting tools and resources that Tribes have used. (OW/IO)
- Identify climate change activities as a **priority in the new EPA Office of Water Tribal Strategy**, which will be developed over the course of 2015. (OW/IO)

Regional Program Actions

Region 1

- Facilitate a federal-tribal communications collaborative, which will involve **dialog among tribal environmental directors and regionally-based federal tribal liaisons on climate change** and other cross-cutting issues. A steering committee will develop the framework for the collaborative and will set agendas and strategies.

Region 4

- Work with two Tribes to perform **energy management initiative assessments** of water and wastewater system.
- Coordinate with the Indian Health Service on **energy efficiency analysis tools** that can be used when designing water system modifications.

Region 7

- Through Tribal Set-Aside infrastructure dollars for CWA and SDWA, **evaluate infrastructure projects utilizing climate change considerations.**

Region 9

- Utilize revised project ranking criteria for the Fiscal Year 2015 **Drinking Water State Revolving Fund Tribal Set-Aside grant program to give higher priority to tribal systems experiencing serious drought impacts** (i.e. systems with water supply deficiencies that present a serious health risk). The revised criteria also incentivize water conservation by requiring a higher cost share for projects from systems where water usage is greater than 150 gallons/person/day.



Regional
Climate
Innovation

Region 10

- Work with Tribes receiving **Indian Environmental General Assistance Program funds** to identify possible projects to make communities more resilient to climate change.

Office of Research and Development Projects and Initiatives

- Conduct research to evaluate associations between extreme weather events and health endpoints using existing health and weather databases. This work includes waterborne disease; how weather events associated with climate change alter the risk of waterborne and infectious disease; and **the sub-populations at increased risk of disease associated with climate change.**

Goal 16: Tribes Have Access to Information on Climate Change for Decision-making

Goal
16

- ❖ Strategic Action 49: Collaborate to explore and develop climate change science, information, and tools for Tribes, and incorporate local knowledge.
- ❖ Strategic Action 50: Collaborate to develop communication materials relevant for tribal uses and tribal audiences.

[Note: Text above from 2012 Strategy: Response to Climate Change]

2015 Implementation Actions

National Program Actions

- Continue to support the EPA National Water Program **State and Tribal Climate Change Council** as a vehicle for sharing information and hearing the views of States and Tribes on climate change issues. (OW/IO; see also Goal 17)

Regional Program Actions

Region 1

- Coordinate with U.S. Army Corps of Engineers and other federal agencies in providing support and developing a path forward for addressing **shoreline erosion** as a result of higher intensity storms which is threatening tribal homes and the Tribe's wastewater treatment facility at the Passamaquoddy Tribe – Pleasant Point reservation.

Region 9

- Continue to provide **technical assistance to Tribes for evaluating drought mitigation options and drought contingency planning**. For example, during the second half of Fiscal Year 2015 the Region will hold several drought workshops around the California to help participants initiate a water auditing process using American Water Works Association's (AWWA) Free Water Audit Software. We will ensure that a portion of the drought mitigation funding provided to any tribe will be dedicated to promoting water system and supply resiliency to anticipated future droughts.
- In January 2015, **convene a drought interagency meeting among federal and state agencies (including California Area Indian Health Service, HUD, USDA, Bureau of Indian Affairs, California Office of Emergency Services, and others)** to identify and coordinate sources of funding to develop sustainable drought mitigation projects. Region 9 will review/consider eligible projects under our current infrastructure program authorities and guidance (Drinking Water Tribal Set-Aside and Clean Water Indian Set-Aside) to support sustainable and drought related projects.

Region 10

- Work with tribal consortium in the Pacific Northwest (e.g., Northwest Indian Fisheries Commission) to better understand tribal needs related to water. EPA Region 10 will **hold three calls in FY 2015 to share information and discuss possible collaborative activities.**

F) Cross-Cutting Program Support

The cross-cutting program support element of the 2012 Strategy includes three goals:

- Goal 17: Communicate, Collaborate, and Train;
- Goal 18: Track Progress and Measure Outcomes; and
- Goal 19: Identify Climate Change and Water Research Needs.

Specific actions to be implemented in 2015 in support of these goals are described below.

Goal 17: Communicate, Collaborate, and Train

- ❖ Strategic Action 51: Continue building the communication, collaboration, and training mechanisms needed to effectively increase adaptive capacity at the federal, tribal, state, and local levels.

[Note: Text above from *2012 Strategy: Response to Climate Change*]



Goal
17

2015 Implementation Actions

National Program Actions

- Engage key stakeholders in climate change adaptation work by continuing to support the EPA National Water Program **State and Tribal Climate Change Council** that advises the National Water Program and engaging additional stakeholders using a range of forums and mechanisms. (OW/IO)
- **Update the National Water Program climate change website** to improve communication of climate change and water information. (OW/IO)
- Revise **the training module on climate change and water programs** included within the internet-based modules that constitute the Watershed Academy. (OW/IO)
- Work with federal interagency groups to develop **technical training on climate change and water issues** through the University Corporation on Atmospheric Research (UCAR). (OW/IO)
- Serve as Co-chair of the interagency **Federal Water Resources and Climate Change Workgroup** charged with implementing the *National Action Plan: Priorities for Managing Freshwater Resources in a Changing Climate*. (OW/IO)
- Serve as Co-chair of the climate resilience workgroup of the **Advisory Committee on Water Information**. (OW/IO)



National
Priority
Action

- Support development and implementation of interagency climate adaptation actions related to water resources called for in ***Report to the President*** by the State, Local, and Tribal Leaders Task Force on Climate Preparedness and Resilience and in the ***Priority Agenda: Enhancing Climate Resilience of America's Natural Resources***. (OW/IO)

Regional Program Actions

- ***Program Actions Common to All Regions***

- **Participate in the National Water Program Climate Change Workgroup:** Maintain current participation in the EPA National Water Program Climate Change Workgroup, including identifying a single point of contact for the regional water program.
- **Support the EPA Office of Water Climate Change Adaptation Implementation Plan:** Help to develop and implement the EPA-wide Climate Change Adaptation Implementation Plan (and coordinate between the National Water Program *2012 Strategy* and the EPA regional climate change adaptation implementation plans.
- **Build Internal Climate Change Communications:** After the completion of the EPA Climate Change Adaptation Implementation Plan, draw on materials developed by the Office of Water to provide training for regional water program staff on the challenges that climate change poses for water programs and familiarize them with the National Water Program *2012 Strategy* and regional climate adaptation plans through a variety of means such as “all hands” meetings, webinars, seminars, and dissemination of the plans.
- **Build External Climate Change Communications:** Support national program efforts to inform and educate water program managers in the public and private sectors on climate change and water issues through a variety of means such as identifying key stakeholders and expanding professional networks, improving educational outreach efforts on national and regional EPA climate change websites and in other media, and disseminating clear and credible messaging on climate change science and impacts.
- **Address Climate Change in Meetings with States and Tribes:** In program meetings with States and Tribes in 2015, include discussion of ongoing Agency and regional climate change adaptation planning, the National Water Program *2012 Strategy*, and climate change activities related to state water programs as appropriate.
- **Support Coordination among Federal Agency Regional Offices:** Coordinate with the Regional offices of other federal agencies on climate change adaptation matters and participate, where appropriate, with related interagency cooperative and collaborative efforts to address climate change challenges on a regional scale.

- **Additional Regional Actions**

Region 1

- Beta test and update Region’s **new Resilience and Adaptation in New England (RAINE) data base for Region 1 intranet site.**
- Finalize region’s **Vulnerability Assessment Tool data base for Region 1 intranet site.**

Regions 1, 2, and 3

- Region 1 has been working with NOAA to develop the www.NEClimateUS.org website, which will be a **website where regional climate change related documents will be made available to the public.** Region 1 will work to engage other Northeast EPA Regions to continue to populate the website with regional climate change related document, tools, reports and data.

Regions 2 and 3

- In 2013, fifteen federal agencies formed **Federal Climate Partners, an interagency, working group to address climate change issues in the Mid-Atlantic region** – from New York to Virginia. During the first year, the group held three conference calls, where EPA was able to learn from each department/agency about their climate change work. During 2015, the Federal Climate Partners will continue to network, share information, and begin to leverage efforts to better prepare the Region for the impacts of climate change.



Region 5

- The Region will engage the **Midwest Natural Resources Group of federal agency senior managers to promote cooperation on climate change adaptation** and to implement “Guiding Principles for Adapting to Climate Change for the Midwest Natural Resources Group.”

Region 6

- Provide training for regional staff and managers on climate change adaptation.
- Meet with tribal and environmental justice communities at least once a year to provide training on climate science and adaptation opportunities and practices.

Region 7

- **Work with state partners and other organizations to:**

- Promote Water and Climate Change Adaptation Training for Water Program Staff;
- Be a WaterSense Partner;
- Promote Use of CREAT by Local Water Utilities;
- Adapt SRFs to Climate Change;
- Implement Updated NPDES Permit Tools and Training Related to Changes in Flows and Water Temperature; and
- Address Climate Change in the Public Water System Supervision (PWSS) program Capacity Development Program.

Region 8

- Develop a **Region 8 website that is linked with the National Water Program Climate Change website**, as well as other sites such as the Western Water Assessment, the Western State Water Council, and the U.S. Drought Portal.
- Conduct **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 instance, Region 8 will work with the Wyoming Association of Rural Water Systems to conduct a day-long sustainability workshop for drinking water systems in Lander, Wyoming in February 2015.

Goal 18: Tracking Progress and Measuring Outcomes

Goal
18

- ❖ Strategic Action 52: Adopt a phased approach to track programmatic progress towards Strategic Actions; achieve commitments reflected in the Agency *Strategic Plan*; and work with the EPA Workgroup to develop outcome measures.

[Note: Text above from *2012 Strategy: Response to Climate Change*]

2015 Implementation Actions

National Program Actions

- The National Water Program will publish a report describing **highlights of progress** in implementing the *2012 Strategy* in 2014. This report includes the 2014 assessment of progress using the seven phases of implementation described in the *2012 Strategy*. (OW/IO)
- The National Water Program will publish a **workplan describing the actions that national water program offices and regional offices will** implement in 2015 to advance the *2012 Strategy*. (OW/IO)
- The National Water Program will work with States and stakeholders to develop **measures relating to progress in adapting water programs to climate change to be including in the *Fiscal Year 2016-17 National Water Program Guidance***. (OW/IO)

Goal 19: Climate Change and Water Research Needs

Goal
19

- ❖ Strategic Action 53: Work with the Office of Research and Development (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 providing the decision support tools needed by water resource managers.

[Note: Text above from *2012 Strategy: Response to Climate Change*]

2015 Implementation Actions

National Program Actions

- The National Water Program and ORD will conduct a “Water Quality Assessment” (WQA), to review and **synthesize available scientific information on the potential effects of climate change on water quality**. The goal of this effort is to make scientific information about climate change more useful and accessible to EPA Program Offices and Regions to support mainstreaming climate concerns into all aspects of the national water program. This effort involves three parts: 1) science syntheses; 2) program links; and 3) web portal.

The science syntheses will be summaries of the science literature relevant to selected issues of concern to the EPA water program. The Program Links will be short summaries of relevant scientific information specifically tailored to the needs of different EPA water programs and activities. A web portal will make this information accessible and will be updated over time. ORD and OW expect to have most if not all of these reports complete in 2015.

Office of Research and Development Projects and Initiatives

- Working with EPA Office of Water, Office of Air and Radiation, Office of Policy, and Regions, identify **EPA-wide climate adaptation priority science needs as part of the EPA Climate Adaptation Plan actions**. This effort is expected to identify cross-cutting issues such as understanding climate data sources and limitations.

Appendix 1: National Water Program Priority Actions

The *Office of Climate Change Adaptation Implementation Plan* released in 2014 identified “Priority Actions” to be implemented by national water program offices.

1. Encourage water utilities to use the **Climate Resiliency Evaluation and Awareness Tool (CREAT)** and develop Version 3.0 of this tool.
2. Promote use of an **Extreme Events Workshop Planner** designed to provide everything a water sector utility needs to plan, customize, and conduct a workshop focused on planning for extreme events including flooding, drought, sea level rise and storm surges, wildfire, and reduced snowpack.
3. In cooperation with EPA Regional offices, expand the number of **WaterSense partners** nationally and in each Region, with a goal of a 150 additional partners annually.
4. Encourage the Clean Water and Drinking Water **State Revolving Funds** to incorporate climate change considerations into their processes.
5. Encourage the National Estuary Programs and other watershed managers at the state and local level to use the Watershed **Climate Change Adaptation Planning Workbook** developed by the EPA National Estuary Program.
6. Complete development of initial screening criteria to identify water and wastewater facilities on the Atlantic and Gulf Coasts that may be at **risk of inundation in the event of a storm surge** comparable to Hurricane Sandy and work with utilities to address risks.
7. Complete technical development of the **Climate Change Extension within the Stormwater Calculator** and identify and implement enhancements to improve its utility.
8. Work with EPA Regional office counterparts to identify ways to better integrate climate change considerations into **water quality management planning** projects and processes and develop an initial report.
9. Draft a white paper providing information States and Tribes can use to protect aquatic life from negative effects associated with **alteration of hydrologic conditions**, including potential effects from climate change.
10. Engage key stakeholders in climate change adaptation work by continuing to support the **EPA National Water Program State and Tribal Climate Change Council** that advises the National Water Program and engaging additional stakeholders using a range of forums and mechanisms.

Appendix 2: EPA Regional Water Programs: Climate Change Common Priority Actions

The Office of Water *Climate Change Adaptation Implementation Plan* identifies climate change adaptation activities that each Regional water program will attempt to carry out in 2014 and following years.

- 1. Participate in the National Water Program Climate Change Workgroup:** Maintain current participation in the National Water Program Climate Change Workgroup, including identifying a single point of contact for the regional water program.
- 2. Support the EPA Office of Water Climate Change Adaptation Implementation Plan:** Help to implement the EPA-wide Climate Change Adaptation Implementation Plan (and coordinate between the National Water Program *2012 Strategy* and the EPA regional climate change adaptation implementation plans).
- 3. Build Internal Climate Change Communications:** After the completion of the EPA Climate Change Adaptation Implementation Plan, draw on materials developed by the Office of Water to provide training for regional water program staff on the challenges that climate change poses for water programs and familiarize them with the National Water Program *2012 Strategy* and regional climate adaptation plans through a variety of means such as “all hands” meetings, webinars, seminars, and dissemination of the plans.
- 4. Build External Climate Change Communications:** Support national program efforts to inform and educate water program managers in the public and private sectors on climate change and water issues through a variety of means such as identifying key stakeholders and expanding professional networks, improving educational outreach efforts on national and regional EPA climate change websites and in other media, and disseminating clear and credible messaging on climate change science and impacts.
- 5. Address Climate Change in Meetings with States and Tribes:** In program meetings with States and Tribes in 2015, include discussion of ongoing Agency and regional climate change adaptation planning, the National Water Program *2012 Strategy*, and climate change activities related to State water programs as appropriate.
- 6. Support Coordination among Federal Agency Regional Offices:** Coordinate with the Regional offices of other federal agencies on climate change adaptation matters and participate, where appropriate, with related interagency cooperative and collaborative efforts to address climate change challenges on a regional scale.
- 7. Promote Community Engagement on Climate Resilience Using Tools from the Climate Ready Water Utilities (CRWU) Initiative and Climate Ready Estuaries (CRE) Program:** Work

with municipal and private utilities to promote use of CREAT to recognize and respond to climate change risks and support communities in building climate resilience using tools such as the new workbook for developing risk-based climate adaptation plans developed by the National Estuary Program.

- 8. Develop Regional WaterSense Partners:** Work with States, Tribes, municipalities, non-profit organizations and businesses to promote the WaterSense Program in the region.
- 9. Work with State Revolving Loan Fund Programs to recognize climate change impacts.**

APPENDIX 3

EPA Regional Water Programs: Climate Change Innovations

Water programs in EPA's ten Regional offices play an important role in adapting clean water and drinking water programs to a changing climate and are implementing a range of innovative programs and policies for climate change adaptation that respond to the specific challenges in that Region. These innovations are identified throughout the document and are summarized below by the goal that they support.

A) Water Infrastructure

1. Establish an **inter-state water mutual aid** program for New England water utilities (Region 1)
2. Encourage **State Capacity Development** programs to include energy efficiency in their workplans (Region 3)
3. Work with the WaterSense program and [Stop Waste.org](http://StopWaste.org) to include WaterSense products in Quantity Quotes, an **on-line bulk purchasing platform** (Region 9)

B) Watersheds and Wetlands

4. Target highly vulnerable public water systems for **source water protection** (Region 5)
5. Work with USACE to **incorporate climate change impacts in permits**, compensation plans, and draft Environmental Impact Statement (EIS) documents (Region 7)
6. Focus on pilot communities interested in using tools to **identify priority wetlands** for protection (Region 8)

C) Coastal and Ocean Waters

7. In collaboration with partners pilot use of **CommunityViz**, a scenario planning tool that incorporates important climate data such as sea level rise (Region 2)
8. Pilot **Regional Flood Resilience project** for groups of water and wastewater utilities in Florida (Region 4)
9. Work with States, NOAA, and the University of Washington to coordinate activities and research related to **ocean acidification** in the Pacific Northwest (Region 10)

D) Water Quality

10. Work with States to include **climate change adaptation provisions in the state's Nonpoint Source Management Plans** (Region 4)
11. Promote use of green infrastructure and continue recognition of green infrastructure projects in the Region including addressing **new opportunities in designing parking lots to use trees to manage stormwater and urban heat** (Region 6)
12. Design project to identify the time at which a distinctive trend due to climate change is projected to **emerge from the noise of natural climate variability** (Region 10)

E) Working with Tribes

13. Utilize revised project ranking criteria for the **Drinking Water State Revolving Fund Tribal Set-Aside** grant program to give higher priority to tribal systems experiencing serious drought impacts (Region 9)

F) Cross-cutting Program Coordination

14. Fifteen federal agencies formed **Federal Climate Partners**, an interagency, working group to address climate change issues in the Mid-Atlantic region (Regions 2 and 3)

Appendix 4
Potential State Agency
Clean Water and Drinking Water
Climate Change Adaptation Actions

#	Actions for Climate Change Adaptation	State Water Quality Agency	State Drinking Water Agency
1	Promote Water and Climate Change Adaptation Training for Water Program Staff: Encourage State staff implementing water programs to take online training addressing the challenges that a changing climate poses for meeting clean water and drinking water goals.	❖	❖
2	Be a WaterSense Partner: Promote water use efficiency by wastewater treatment plants and drinking water systems in the State by joining the WaterSense program as a partner and participating in a State water conservation program.	❖	❖
3	Promote Use of Climate Resilience Evaluation and Awareness Tool by Local Water Utilities: Support wastewater treatment plants and drinking water systems in use of the CREAT tool to assess the vulnerability of plants to a changing climate and identify response actions.	❖	❖
4	Adapt State Revolving Loan Funds (SRFs) to Climate Change: Adopt climate change considerations in management of SRF drinking water and clean water SRF programs.	❖	❖
5	Consider Climate Change Impacts in Triennial Review of State Water Quality Standards: Work collaboratively with Regions to consider if there is the need to begin to address climate change impacts in water quality standards.	❖	

6	<p>Report Climate Change Related Impacts on Waters of the State in Integrated Reports Under Clean Water Act Section 303(d) and 305(b): Discuss and identify the possibility of States' abilities or inabilities to include in integrated reports under Sections 303(d) and 305(b) assessment of trends in water conditions related to a changing climate, including water temperature, in-stream flow, and pH, and the likely impact of future climate change on waters, including attainment of water quality standards generally.</p>	❖	
7	<p>Update State Water Quality Management (WQM) Plans to Address a Changing Climate: Consider the need to revise and update State Water Quality Management Plans developed under 40 CFR 130.6 to describe how core clean water program components addressed in the plans could be adapted to recognize the anticipated long-term changes in water conditions in the State as a result of a changing climate.</p>	❖	
8	<p>Update Clean Water Act Section 401 Certification Processes to Address Climate Change: Review existing certification procedures under section 401 of the Clean Water Act to identify how climate change impacts on waters, including expected changes in stream flow and water temperature, could be considered in reviews of federal permits or licenses for under section 401, including reviews of major construction projects such as dams.</p>	❖	
9	<p>Implement Updated NPDES Permit Tools and Training Related to Changes in Precipitation and Water Temperature: Where available, apply updated models and practices for assessing vulnerability of water quality to increasing variability of precipitation, in-stream flows (high and low) and warming water temperature; apply updated models and practices in fit-for-use green infrastructure approaches.</p>	❖	
10	<p>Address Climate Change in Community Water System Sanitary Surveys: Identify elements of the sanitary surveys for community water systems that address the risks to drinking water systems posed by climate change and address these risks as part of sanitary surveys on a 3/5 year basis.</p>		❖

Note: EPA recognizes that some state water programs may have competing needs that may impede their ability to undertake these actions.

Appendix 5

National Water Program Climate Change Workgroup

Principal Members

EPA Headquarters

Office of Water: Immediate Office – Mike Shapiro, Jeff Peterson, Karen Metchis, Elana Goldstein, Nathan Sell (ORISE)

Office of Ground Water and Drinking Water – Curt Baranowski, Mike Muse

Office of Science and Technology – Rachael Novak

Office of Wastewater Management – Veronica Blette, Sarita Hoyt, Lynn Stabenfeldt

Office of Wetlands, Oceans, and Watersheds – Michael Craghan, Kathleen Kutschenreuter

EPA Regions

Region 1 – Mel Cote

Region 2 – Alexandre Remnek

Region 3 – Regina Poeske, Jennie Saxe

Region 4 – Robert Burns

Region 5 – Kate Balasa

Region 6 – Jim Brown, Barbara Keeler, Robert Todd

Region 7 – Mary Mindrup, Amy Shields

Region 8 – Brent Truskowski

Region 9 – Suzanne Marr, John Kemmerer

Region 10 – Paula Van Haagen, Mike Cox, Krista Mendelman



United States
Environmental Protection
Agency

1200 Pennsylvania Avenue N.W.
Office of Water (4101M)
Washington, D.C. 20460

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