



# 6

## Climate Change **Action Plan**

The Action Plan summarizes the actions, potential impact areas that the action will address, identifies the responsible DEP Bureau(s) for leading and implementing the task, the Bureau(s) that would be involved in the task, funding issues, if any, and the current status of implementation.



# ACTION PLAN

**BCIA** Bureau of Intergovernmental Affairs  
**BCS** Bureau of Customer Services  
**BEC** Bureau of Engineering Design and Construction  
**BEDC** Bureau of Environmental Compliance  
**BEPA** Bureau of Environmental Planning and Analysis  
**BLA** Bureau of Legal Affairs  
**BWS** Bureau of Water Supply  
**BWSO** Bureau of Water and Sewer Operations  
**BWT** Bureau of Wastewater Treatment

**TASKS AND ACTIONS** »

**TASK 1** Work with Climate Scientists to Improve Regional Climate Change Projections

	POTENTIAL IMPACTS ACTION WILL ADDRESS				BUREAUS IMPACTED	
	Water Supply Quantity, Quality, and/or Demand	Street, Basement, and/or Coastal Flooding	Wastewater Treatment Process Disruptions	Harbor Water Quality Impairment	Responsible Bureaus	Involved Bureaus
Work with the scientific community and others to develop more refined regional climate change projections. As part of this action DEP will:	✓	✓	✓	✓	BEPA	BWS BWT BEDC BWSO
■ Assemble a comprehensive suite of regional climate projections						
■ Apply a Regional Climate Model to the New York City Watershed Region						
Work with other agencies on the PlaNYC initiative to ensure the City's 100 year flood plain maps are updated		✓	✓	✓	BEPA	BWS BWT BEDC BWSO BLA
Identify additional data and monitoring stations needed to track climate changes	✓	✓	✓	✓	BWS BWT BEDC BWSO	BEPA
Support development of climate model data needed for use as input to run DEP management and operation models	✓	✓	✓	✓	BEPA	BWS BEDC
Track improvements in climate change science, climate models, and estimates of changes in the severity, duration and frequency of weather events	✓	✓	✓	✓	BEPA	

**TASK 2** Quantify Potential Climate Change Impacts on NYC Water Systems

Conduct a phased integrated modeling project to quantify the potential impacts of climate change on drinking water quality, supply, and demand.	✓				BWS BEPA	
■ Phase I: Initial sensitivity tests and model integration using initial regional climate projection data to identify quantity and quality changes with existing modeling tools	✓					
■ Phase II: Model enhancements based on needs identified in Phase I and use of more refined climate projection data for more accurate results and analyses of operational issues	✓					
Undertake a project to quantify the potential impacts of climate change induced sea level rise, coastal flooding and precipitation changes in City infrastructure and harbor water quality		✓	✓	✓	BWT BEDC BWSO BEPA	
■ Identify the flooding impacts of changes in sea level and storms by 1) identifying the elevations of all outfalls and the critical flood elevations at all major DEP facilities, 2) identifying and mapping the current and potential range of future sea levels and 100-year flood plain areas at DEP facilities, and 3) comparing the outfall and critical flood elevations with the updated sea levels and inundations areas		✓			BWT BEDC BWSO	BEPA
■ Develop estimates of changes in rainfall intensities under climate change scenarios based on state of current science					BEDC BWSO	BEPA
■ Evaluate to what extent street and basement flooding and CSOs may be exacerbated by climate change		✓	✓	✓	BEPA BEDC BWSO	BWT
■ Estimate the costs that may be incurred due to potential damage to DEP's in-City infrastructure		✓	✓	✓	BWT BEDC BWSO	BEPA
■ Estimate changes in groundwater levels due to sea level rise and changing precipitation patterns and the potential for greater infiltration or inflow of groundwater into the wastewater conveyance system	✓	✓	✓	✓	BWSO BEDC	BWT BEPA
■ Estimate the potential rise in harbor water temperature and assess the associated impacts on dissolved oxygen levels and other harbor water quality indicators				✓	BEPA BEDC	BWT BWSO
Establish a uniform Department-wide system for documenting the occurrence, levels, and impacts of flooding and other extreme weather incidents on DEP's systems	✓	✓	✓		BEDC BWSO BWT BWS	BEPA
Conduct more detailed interviews with system operators; catalog all known system vulnerabilities	✓	✓	✓	✓	BEPA	ALL
Update impact studies to quantify impacts as needed based on long-term developments in climate change science	✓	✓	✓	✓	BEPA	ALL

TASKS AND ACTIONS »	POTENTIAL IMPACTS ACTION WILL ADDRESS				BUREAUS IMPACTED	
	Water Supply Quantity, Quality, and/or Demand	Street, Basement, and/or Coastal Flooding	Wastewater Treatment Process Disruptions	Harbor Water Quality Impairment	Responsible Bureaus	Involved Bureaus
NOTE: TASK 3 IS ORGANIZED BY RESPONSIBLE BUREAU/ AGENCY						
<b>TASK 3 Determine and Implement Appropriate Adjustments to NYC's Water Systems</b>						
<b>BCS's Ongoing Actions that increase water systems resiliency</b> Launch an effort to reduce City-wide water consumption by 60 mgd by 2012 through rebate programs*	✓				BCS	BEPA BWS BLA
<b>BWT's Ongoing Actions that increase water systems resiliency</b> Continue maintenance and upgrade programs for WPCPs, tide gates, and other infrastructure		✓	✓	✓	BWT	
<b>BEPA's Ongoing Actions that increase water systems resiliency</b> ■ Expand, track, and analyze new BMPs for runoff and CSO control*		✓		✓	BEPA	BWSO BEDC
■ Investigate low-impact development strategies on individual tax lots*		✓		✓	BEPA	BWSO
■ Implement the Jamaica Bay Watershed Protection Plan		✓		✓	BEPA	BWSO BEDC BLA
<b>BEPA's Planned Actions to address climate change</b> ■ Create a methodology for the City Environmental Quality Review process so that potential climate change impacts are assessed before decisions are made	✓	✓	✓	✓	BEPA	ALL
<b>BWS's Ongoing Actions that increase water systems resiliency</b> ■ Enhance the Watershed Protection Program, including investing \$300 million in land acquisition in the watershed*	✓				BWS	BLA
■ Maximize water supply from existing facilities such as the groundwater system and the New Croton Aqueduct*	✓				BWS	BWSO BEDC
■ Continue to coordinate with the National Weather Service and River Forecast Centers	✓				BWS	
■ Continue working with the Delaware River Basin Commission to implement a broad, basin-wide flood mitigation strategy	✓	✓			BWS	BLA
■ Continue the ongoing development of the watershed modeling system	✓				BWS	BEDC
<b>BWS's Ongoing Actions that increase water systems resiliency</b> Evaluate, assess cost and implement potential adaptation strategies based on the findings of climate change integrated modeling project. These could include operational, structural and tracking measures and/or new projects and modifications to the water supply system.	✓				BWS	BEPA BEDC
<b>BWSO's Ongoing Actions that increase water systems resiliency</b> ■ Expand the Staten Island Bluebelt program*		✓		✓	BWSO	
■ Convert certain combined sewers into High Level Storm Sewers (HLSS) and integrate HLSS into major new developments, especially on the waterfront		✓		✓	BWSO	BEPA
■ Expand use of the groundwater system*	✓	✓			BWSO	
■ Identify locations for stormwater management in the Bronx River Watershed*		✓		✓	BWSO	BEPA

\* Denotes PlaNYC affiliated actions



# ACTION PLAN

**TASKS AND ACTIONS »**
**TASK 3 (Continued)**

TASKS AND ACTIONS »	POTENTIAL IMPACTS ACTION WILL ADDRESS				BUREAUS IMPACTED	
	Water Supply Quantity, Quality, and/or Demand	Street, Basement, and/or Coastal Flooding	Wastewater Treatment Process Disruptions	Harbor Water Quality Impairment	Responsible Bureaus	Involved Bureaus
<b>BWSO's Ongoing Actions that increase water systems resiliency</b> <ul style="list-style-type: none"> <li>Continue ongoing spray cap, hydrant lock, and enforcement programs</li> </ul>	✓				<b>BWSO</b>	
<ul style="list-style-type: none"> <li>Accelerate sewer and outfall cleaning and repair</li> </ul>		✓			<b>BWSO</b>	
<ul style="list-style-type: none"> <li>Build out sewer systems</li> </ul>		✓		✓	<b>BWSO</b>	
<ul style="list-style-type: none"> <li>Improve drainage systems in accordance with updated zoning</li> </ul>		✓		✓	<b>BWSO</b>	<b>BEPA</b>
<ul style="list-style-type: none"> <li>Maximize the installation of separately sewer systems</li> </ul>		✓		✓	<b>BWSO</b>	
<b>BWSO's Planned Actions to address climate change</b> <ul style="list-style-type: none"> <li>Consider estimates of the range of future sea and tide levels in sewer design and siting of outlets</li> </ul>		✓	✓		<b>BWSO</b>	<b>BEPA</b>
<ul style="list-style-type: none"> <li>Implement changes to sewer design criteria to respond to potential climate change impacts if warranted based on the results of Task 2 studies</li> </ul>		✓	✓	✓	<b>BWSO</b>	<b>BEPA</b>
<b>BEDC's Ongoing Actions that increase water systems resiliency</b> <ul style="list-style-type: none"> <li>Construct the Catskill/Delaware Ultraviolet Light Disinfection Facility*</li> </ul>	✓				<b>BEDC</b>	<b>BWS</b>
<ul style="list-style-type: none"> <li>Construct the Croton Filtration Plant*</li> </ul>	✓				<b>BEDC</b>	<b>BWSO</b>
<ul style="list-style-type: none"> <li>Establish a connection between the New Croton and Delaware Aqueducts for emergency needs*</li> </ul>	✓				<b>BEDC</b>	<b>BWS</b>
<ul style="list-style-type: none"> <li>Continue the Catskill Turbidity Control Study</li> </ul>	✓				<b>BEDC</b>	<b>BEDC</b>
<ul style="list-style-type: none"> <li>Construct the Brooklyn Queens Aquifer Station 6 Water Treatment Plant</li> </ul>	✓	✓			<b>BEDC</b>	<b>BWS</b> <b>BWSO</b>
<ul style="list-style-type: none"> <li>Develop and implement CSO Long-Term Control Plans for all drainage areas*</li> </ul>		✓		✓	<b>BEDC</b>	<b>BEPA</b>
<ul style="list-style-type: none"> <li>Expand wet weather capacity at the Newtown Creek and 26th Ward WPCPs*</li> </ul>			✓	✓	<b>BEDC</b>	<b>BWT</b>
<ul style="list-style-type: none"> <li>Construct the Shellbank Basin Destratification Facility</li> </ul>				✓	<b>BEDC</b>	<b>BWT</b>
<b>BEDC's Planned Actions to address climate change</b> <ul style="list-style-type: none"> <li>Add climate change as a factor in DEP's Risk Prioritization project</li> </ul>	✓	✓	✓	✓	<b>BEDC</b>	<b>ALL</b>
<ul style="list-style-type: none"> <li>Update flood protection design criteria for DEP facilities</li> </ul>		✓	✓	✓	<b>BEDC</b>	

TASKS AND ACTIONS »

**TASK 3** (Continued)

POTENTIAL IMPACTS ACTION WILL ADDRESS

BUREAUS IMPACTED

TASKS AND ACTIONS »	Water Supply Quantity, Quality, and/or Demand	Street, Basement, and/or Coastal Flooding	Wastewater Treatment Process Disruptions	Harbor Water Quality Impairment	Responsible Bureaus	Involved Bureaus
	<p><b>BEDC's Planned Actions to address climate change</b></p> <ul style="list-style-type: none"> <li>Identify equipment that is vulnerable to flood damage and integrate flood prevention measures into the capital upgrade cycle (most immediately at Rockaway, Hunts Point, and Tallman Island WPCPs)</li> </ul>		✓	✓	✓	BEDC
<ul style="list-style-type: none"> <li>Examine changes in the maximum probable flood and other dam safety criteria</li> </ul>	✓				BEDC	BEPA BWS
<p><b>Multi-Bureau Ongoing Actions that increase water systems resiliency</b></p> <ul style="list-style-type: none"> <li>Evaluate new water sources and projects for helping to meet a shortfall during shutdown of the Delaware Aqueduct for repair*</li> </ul>	✓				BEDC BEPA	BWS BWSO
<ul style="list-style-type: none"> <li>Capture some benefits of the City's open space plan, which will expand the amount of green, permeable surfaces across the City*</li> </ul>		✓		✓	BWSO BEPA	
<ul style="list-style-type: none"> <li>Incorporate BMP designs into the reconstruction of the Belt Parkway bridges*</li> </ul>		✓		✓	BWSO BEPA	
<ul style="list-style-type: none"> <li>Identify City property for opportunities to convert impervious pavement to porous pavement*</li> </ul>		✓		✓	BWSO BEPA	
<ul style="list-style-type: none"> <li>Continue to modernize in-City distribution by completing Water Tunnel No. 3 and a backup tunnel to Staten Island, and by accelerating the replacement of old water mains*</li> </ul>	✓				BEDC BWSO	BWS
<p><b>Multi-Bureau Planned Actions to address climate change</b></p> <ul style="list-style-type: none"> <li>Weigh the costs and benefits and develop a long-term plan to implement recommended additional structural and non-structural measures for mitigating damage to DEP infrastructure components, flooding throughout the drainage system, and harbor water quality impacts from climate change</li> </ul>		✓	✓	✓	BEDC STRUC-TURAL BEPA NON-STRUC-TURAL	BWSO BWT
<ul style="list-style-type: none"> <li>Identify "indicators" that may trigger the planning or implementation of specific adaptations</li> </ul>		✓	✓	✓	BEDC BWT BWSO	BEPA
<ul style="list-style-type: none"> <li>Develop design, implementation schedule and a process for monitoring the effectiveness of adaptations</li> </ul>		✓	✓	✓	BEDC BWT BWSO	BEPA
<ul style="list-style-type: none"> <li>Develop a procedure for providing the resources needed to operate infrastructure systems when damaged during a storm and for rapidly restoring full services after the storm recedes</li> </ul>	✓	✓	✓	✓	BEDC BWT BWSO	ALL
<ul style="list-style-type: none"> <li>Propose modifications to current DEP and City-wide stormwater management programs based on analyses of Task 2</li> </ul>		✓		✓	ALL	
<p><b>Other Ongoing City Agency Actions that increase water systems resiliency</b></p> <ul style="list-style-type: none"> <li>Develop a comprehensive policy for protecting and managing the remaining wetlands in the City*</li> </ul>				✓	DEPART-MENT OF PARKS & RECREATION	BWSO BEPA
<ul style="list-style-type: none"> <li>Develop an interagency approach to stormwater control to maximize stormwater capture at its source*</li> </ul>		✓		✓	PLANYC	BEPA BWSO
<ul style="list-style-type: none"> <li>Pilot promising BMPs: create a mollusk habitat pilot program, plant trees with pits that have below-grade water catchments, create vegetated ditches along highways, pilot vegetation and infiltration techniques for treating and capturing stormwater from parking lots, and create tax incentives to offset the installation cost of green roofs*</li> </ul>		✓		✓	PLANYC	BEPA BWSO

\* Denotes PlaNYC affiliated actions



# ACTION PLAN

**TASKS AND ACTIONS »**
**POTENTIAL IMPACTS ACTION WILL ADDRESS**
**BUREAUS IMPACTED**
**TASK 4** Inventory and Reduce Greenhouse Gas Emissions

	Water Supply Quantity, Quality, and/or Demand	Street, Basement, and/or Coastal Flooding	Wastewater Treatment Process Disruptions	Harbor Water Quality Impairment	Responsible Bureaus	Involved Bureaus
Conduct a feasibility study for GHG inventory					<b>BEPA</b>	<b>BWT</b>
Identify opportunities for digester gas capture and use at the WPCPs					<b>BWT</b>	
Investigate producing and use of biofuels at the WPCPs					<b>BWT BEPA</b>	
Complete a comprehensive baseline emissions inventory and develop a process for yearly updates	✓	✓	✓	✓	<b>BEPA</b>	<b>ALL</b>
Develop a Department-wide GHG management plan with facility-specific management plans that are integrated with the capital improvement programs	✓	✓	✓	✓	<b>BEDC</b>	<b>BWT BWSO BWS BEPA</b>
Review current and proposed construction and equipment replacement contracts to identify opportunities for energy efficiency improvements and switching to cleaner burning fuels	✓	✓	✓	✓	<b>BEDC</b>	<b>BWT BEPA</b>
Accelerate the replacement of aging infrastructure with equipment that will minimize GHG emissions, when the benefits outweigh the costs	✓	✓	✓	✓	<b>BEDC BWT</b>	<b>ALL</b>
Reduce methane leaks from sewage processing equipment and expand the use of digester gas for on-site energy production at the WPCPs	✓	✓	✓	✓	<b>BWT</b>	<b>BEDC BEPA</b>
Continue to support City efforts to seek judicial and administrative relief from injuries to the City caused by the uncontrolled emissions of GHGs nationally	✓	✓	✓	✓	<b>BLA</b>	<b>ALL</b>

**TASK 5** Improve Communication and Tracking Mechanisms

Develop a plan for staff and consultant resources necessary for the continued success of DEP's Climate Change Program. The first two steps will be to:		✓	✓	✓	<b>BEPA</b>	<b>ALL</b>
■ Establish a senior-level climate change steering committee within DEP	✓	✓	✓	✓	<b>EXECUTIVE OFFICE</b>	<b>ALL</b>
■ Establish a Climate Change Office within BEPA	✓	✓	✓	✓	<b>BEPA</b>	
Develop a Climate Change intranet site at DEP	✓	✓	✓	✓	<b>BCIA</b>	<b>ALL</b>
Develop a reporting mechanism that sets performance benchmarks and establishes key indicators for tracking and quantifying progress	✓	✓	✓	✓	<b>BEDC BWS BWSO BWT</b>	<b>BEPA</b>
Participate in the NYC Climate Change Task Force and the NYC Best Management Practices Task Force	✓	✓	✓	✓	<b>BEPA BWSO</b>	<b>ALL</b>
Foster relationships with other water supply and wastewater organizations in order to exchange ideas, pool resources, and formulate research agendas	✓	✓	✓	✓	<b>BEPA</b>	<b>ALL</b>