

# **National Water Program Strategy: Response to Climate Change**

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# Overview

- **Brief review: Effects of Climate Change on Water Resources**
  - What it means to New England
- **What it means to programs within EPA's purview**
  - Opportunities for Mitigation in the Water Sector
  - Options for Adaptation to Impacts
- **Where we go from here**



# Effects of Climate Change on Water Resources



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# Effects of Climate Change on Water Resources

- Warmer Air and Water Temperature
  - May alter distribution of aquatic species (cold water vs. warm water species)
  - Influence microbes/pathogens
- Increased Intensity of Precipitation
  - Increase stream channel erosion & sedimentation
  - Increase pollutants from urban and agricultural stormwater runoff
  - Potential benefit of *increased* dilution



# Impacts of Climate Change on Water Resources (continued)

- Increased Intensity of Drought
  - Lower flows reduce dilution, concentrate pollutants, reduce dissolved oxygen
  - Reduced surface waters, less groundwater recharge, more demand
  - Raises risk of wildfires and concomitant impacts to watersheds
- Less snow pack, more high altitude rain instead of snow
  - affects seasonal flows; loss of 'storage'
- Wider Variability
  - “Stationarity is Dead”
  - Demands a new paradigm for planning and managing water infrastructure



# Impacts of Climate Change on Water Resources (continued)

- Sea Level Rise & Salt Water Intrusion
  - Can impair drinking water sources
  - Can influence distribution of marine/estuarine species
  - Saltwater wetlands may replace freshwater coastal wetlands
- Potential Increases in Tropical Storm Intensity & Storm Surge
  - Damage to water infrastructure
- Changes in Coastal/Ocean Characteristics
  - Ocean acidification can impact coral reef ecosystems and the marine food chain



# *And in New England.....*

- **Increases in annual precipitation**
  - Generally adequate water supplies, but limited reserve capacity
- **More rain coming in extreme events**
  - Floodplains in the region are heavily populated
- **Greater warming in winter than in summer**
  - Shifts in fish species distributions, migration patterns
- **Decreased snow cover amount & duration**
  - Changes in timing of ice freeze-up/break-up; spring flooding
  - Possible large reduction in streamflow
- **Sea Level Rise:**
  - Coastal erosion, saline intrusion into coastal aquifers



*What does this mean to the programs within EPA's Purview?*



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*The water sector can play a role  
in mitigation of greenhouse gas  
emissions*



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# ***Energy Conservation & Efficiency***

- Drinking water & wastewater facilities use ~ 3% of U.S. energy consumption (EPRI 1999).
- Opportunities for Energy Efficiency and Alternative Energy at Utilities
  - **Performance benchmarking –ENERGY STAR Performance Rating System for water utilities**
  - **Energy audits**
  - **Use of solar, hydro, wind, Combined Heat & Power systems**
  - **Explore conversion of methane to marketable energy and fuel**



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# ***Water Conservation & Efficiency: Save Water – Save Energy!***

- **Water conservation**
  - preserves water for needed uses
  - reduces energy used to treat & transport water
- **WaterSense**
  - Water efficient residential and commercial products
- **Distribution System Leak Detection & Repair**
- **“Green Infrastructure” and LID designs**



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# Sequestering Carbon

- **Geologic sequestration**
  - Capture carbon at the source for long-term storage in deep underground formations
  - Rulemaking under the Safe Drinking Water Act *Underground Injection Control Program*
    - Plan to propose the rule in July 2008
- **Biological sequestration**
  - Explore the potential to market nonpoint source projects as carbon credits



*How is the EPA National  
Water Program adapting to  
climate change?*



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# In many cases, CWA and SDWA programs are flexible

- **Key frameworks include periodic updates, e.g.,**
  - Drinking Water Contaminant Candidate List
  - 303(d)/TMDL listings
  - Water Quality Standards
  - NPDES Discharge Permit Conditions
- **Others designed to respond to changing needs**
  - Watershed approach to planning
  - 319/nonpoint source grants
  - State Revolving Fund loans



# Challenge is paradigmatic

- **There are larger questions about how society values, uses and manages water.**
- **This is an evolving dialogue**
- **Meanwhile, here is what EPA can do right now....**



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# Aquatic Habitat

- **Wetlands Protection**
  - Identify opportunities to use the 404 framework
  - Accelerate completion of wetlands mapping
- **Climate Ready Estuaries**
  - Provide leadership and support local actions
- **Coral Reef Task Force**
  - Raise climate change as new priority
- **Nonpoint Source Programs**
  - Review and, if needed, revise guidelines
  - 2/3 of TMDLs are all, or partly, due to NPS



# Water Quality: Standards & Criteria

- **Understand microbial/pathogen changes**
  - warming waters can promote the migration and growth of tropical and subtropical pathogens in temperate zones.
- **Understand sedimentation and flow changes**
  - droughts, higher flows, greater storm intensities will result in flow and sedimentation changes.
- **Develop biological indicators and methods**
  - need to be able to detect modifications to biology due to climate change.



# Water Quality: Standards & Designated Uses

- **Increase program efforts to meet current WQ standards**
- **Modify criteria to protect current uses in sensitive environments**
- **Monitor need to revisit “designated uses” in the future**



# Water Quality: Effluent Limits

- **Technology-based pollution control**
  - Existing industries with effluent guidelines
    - Review new pollutant control technologies
    - Evaluate efficiencies in water conservation & reuse
  - New industrial sectors (including biofuels)
    - Evaluate water quality impacts of alternate energy sources
    - Consider whether new guidelines are necessary for alternate energy sources



# Water Quality: NPDES Permits

- Evaluate Impacts on Wet Weather Program
- Adapt Permit Tools for Climate Change
- Expand Technical Assistance
- Address Climate Impacts at Animal Feeding Operations



# Water & Wastewater Infrastructure

- How do we protect and adapt wastewater, and water, infrastructure?
  - Vulnerability Assessments
    - Bottom-up
    - Top-down
  - Review Options for Emergency Response Planning



# Water & Wastewater Infrastructure

- Improving system resilience
  - Sustainable infrastructure
  - Green infrastructure
  - State Revolving Fund loans



# Management of the Water Program

- **Research:**
  - Integrate EPA's Water Program research and Global Change Research Program
- **Education & Outreach:**
  - Outreach & Collaborate with Partners and Stakeholders
  - Include Climate in Existing Water Program Training
- **Program Management:**
  - Include Climate Change in *Agency Strategic Plan*
  - Establish Federal Agency Water/Climate Coordination Group



*Where do we go from here?*



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# *Where do we go from here?*

- **Most State/local action focus on reducing GHGs**
  - IPCC and others suggest society must also take early action to adapt - to improve resilience - to likely impacts
- **Most adaptation focus is on water *supplies***
  - Esp. in western regions affected by snow melt & drought
  - Not so much being done on water *quality*
- **Move water quality & infrastructure into the dialogue**
  - Develop information and tools that are useable in the near term for water and wastewater program managers

