


“Of all the potential threats posed by climatic variability and change, those associated with water resources are arguably the most consequential for both society and the environment.”

Water – the Nation’s Fundamental Climate Issue:
A White Paper on the U.S. Geological Survey Role and Capabilities
USGS Circular # 1347, 2010

Being Prepared: Water Infrastructure & Climate Change

NJ Climate Change Workshop
Rutgers University  New Brunswick
29 November 2011



Jessica Rittler Sanchez, PhD
Delaware River Basin Commission
& NJ Clean Water Council

Being Prepared:

Water Infrastructure & Climate Change

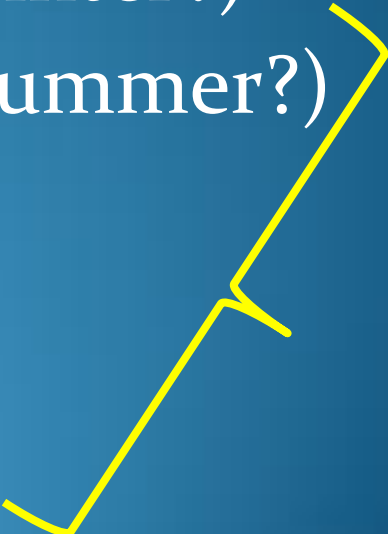
I. Climate-related threats to water & infrastructure: supply, waste & storm

- 2009 NJCWC Public Hearing
- NJ and DRBC concerns

II. Management Options

Water Infrastructure & Climate Change

What we can expect:

1. Greater variability/extremes in precipitation amounts & timing
 - a) More wet days/ storms (winter?)
 - b) More dry/drought days (summer?)
 2. Higher temperatures
 3. Sea level rise
 4. **Synergistic effects**
- 

More frequent storms/wet days

- more stormwater/
more flooding in
vulnerable locations

3 record-breaking floods in 22 mos:
Sept 2004
April 2005
June 2006



- water quality
impairment (TSS,
nutrients, etc.)
- infrastructure impacts
- service disruption



Lambertville Sewage Treatment Plant: April 2005

Aerial photo used with permission of
www.elevated-images.com



Lambertville, N.J.

April 2005

New Hope, Pa.

Water Infrastructure & Climate Change

Source impairment, infrastructure disruption

Hurricane Irene - August 2011



The breach of the canal wall south of Lambertville.

This photograph was taken on August 28th, by Tim Kasony.

ICE PROGRAM

PANEL 206 OF 276

NAT FLOODIN

MAP NUMBER
34021C0206F



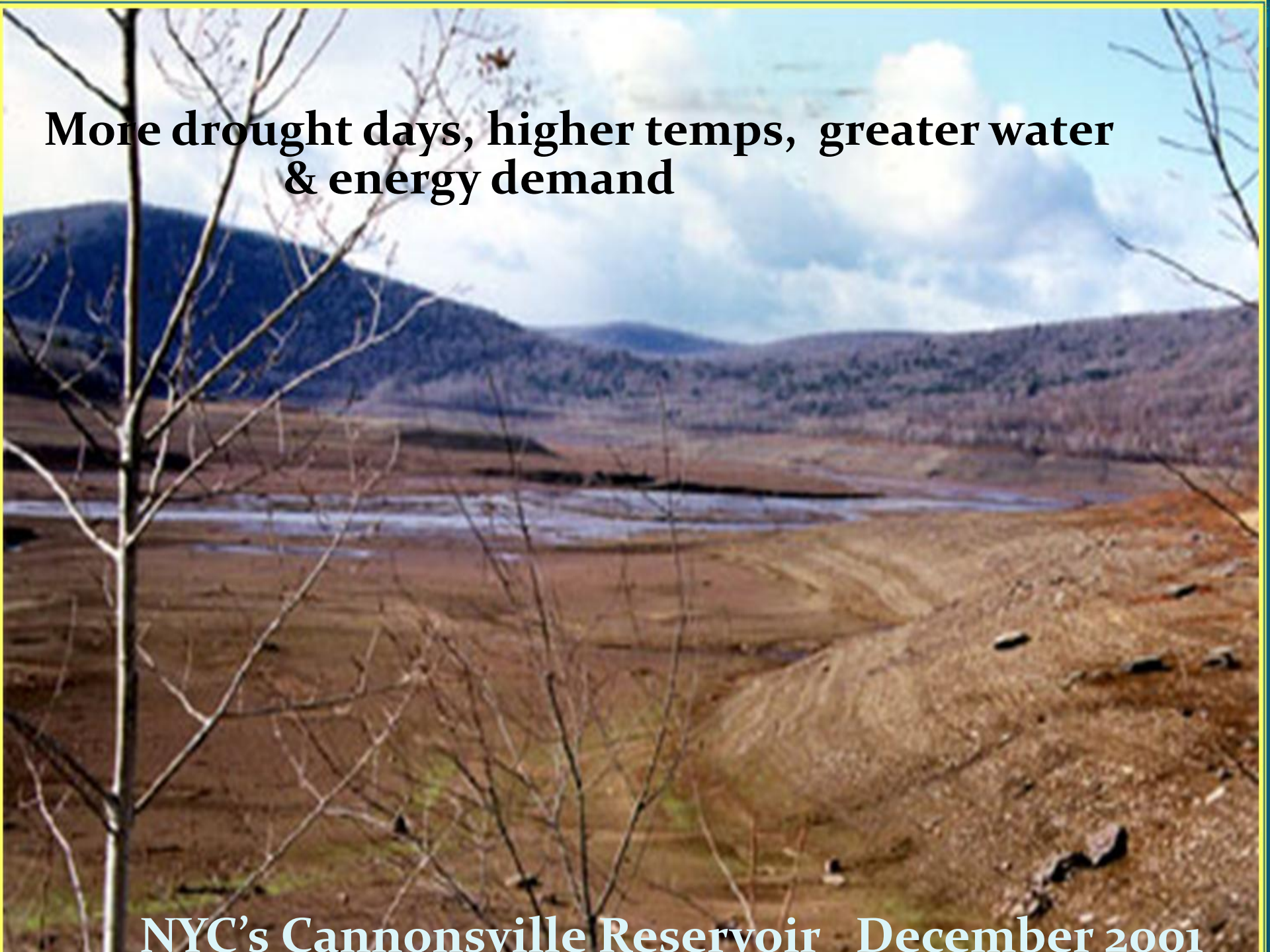
EFFECTIVE DATE



415000 FT

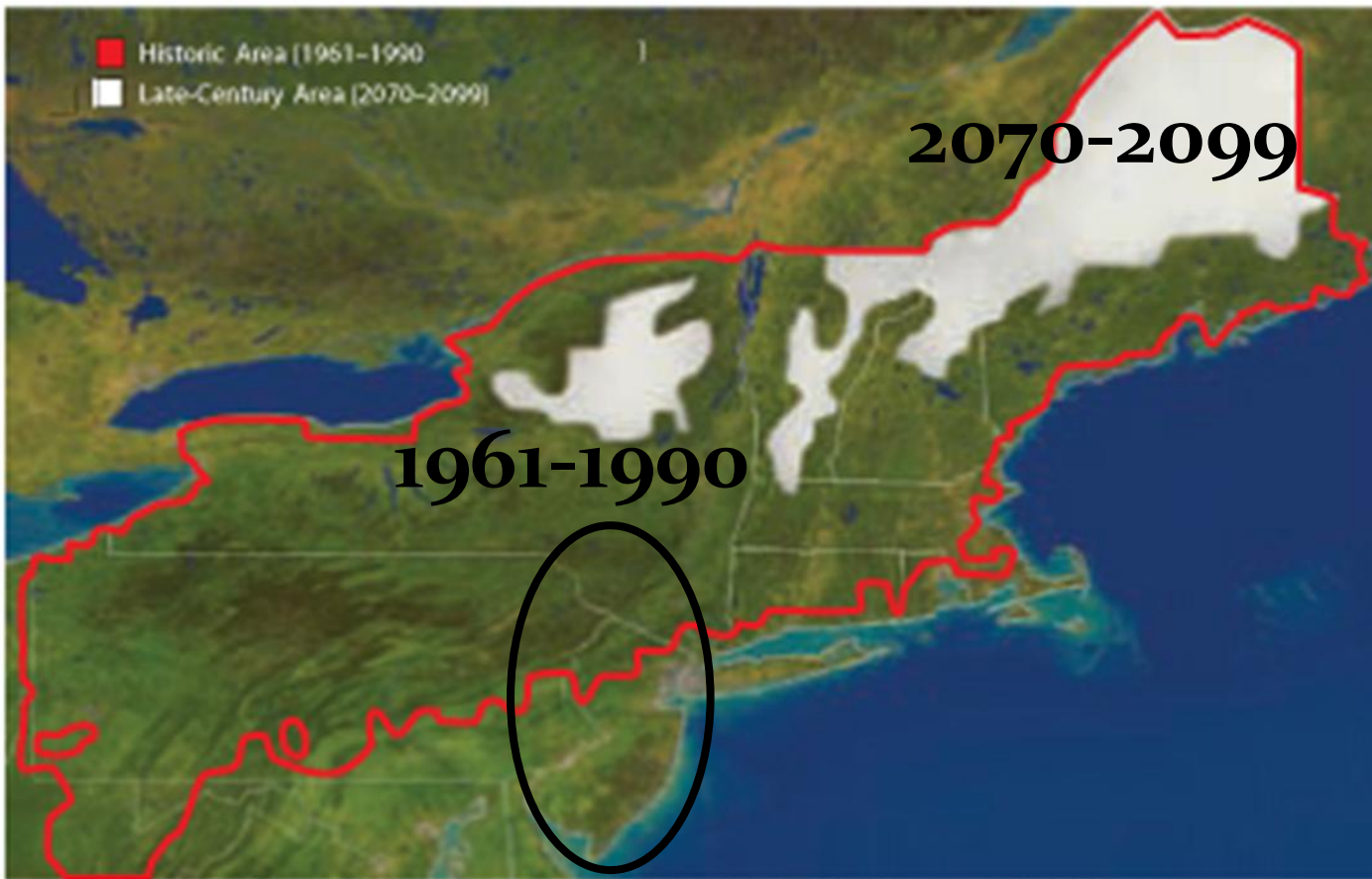
**More drought days, higher temps, greater water
& energy demand**

NYC's Cannonsville Reservoir December 2001



Seasonal Delivery Changes

The Changing Face of Winter - High Emissions Scenario



Implications for reservoir operations, instream flows, aquatic habitat, assimilative capacity, water quality.

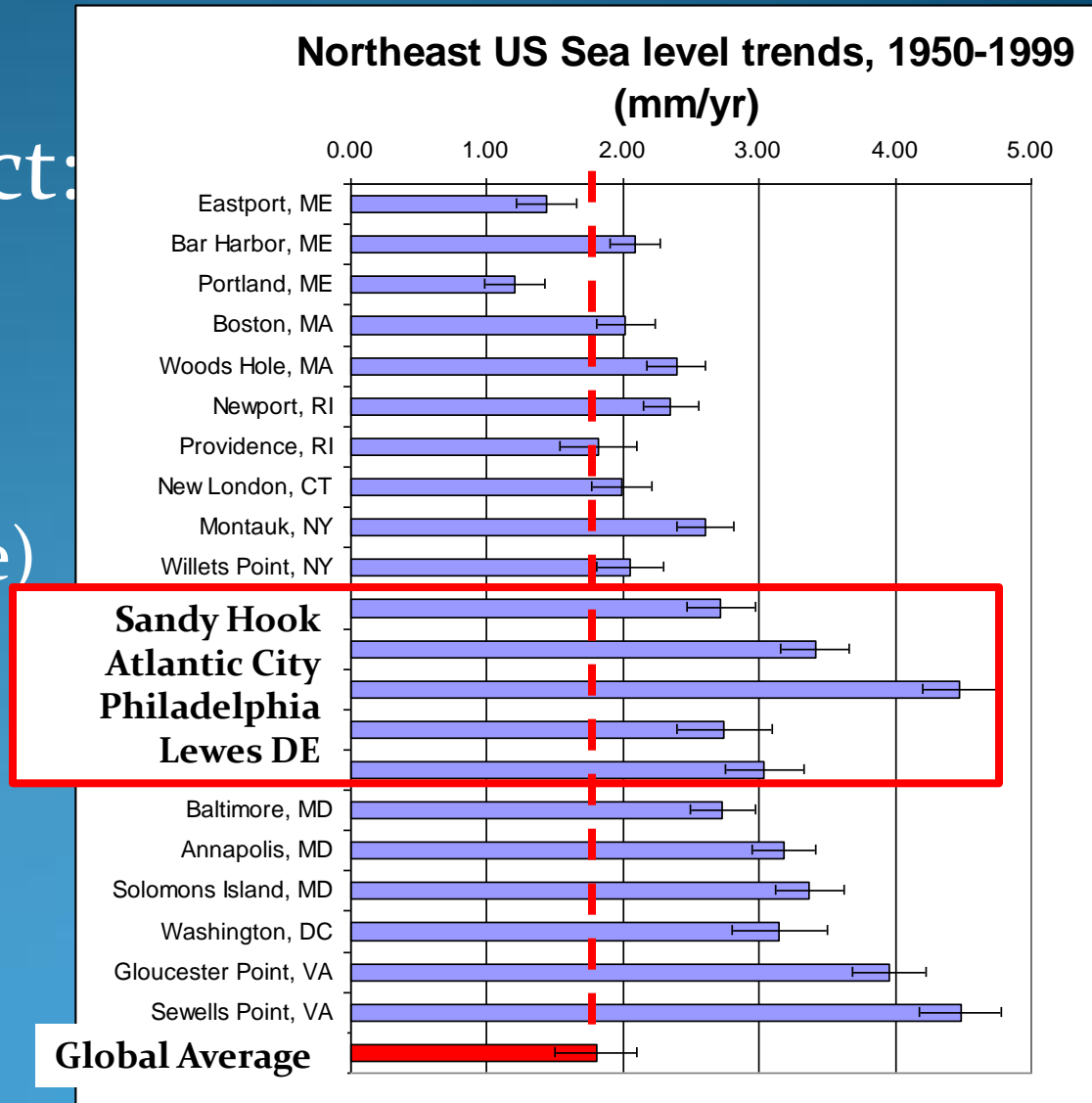
Water Infrastructure & Climate Change

Source – Ray Najjar

What we can expect:

3. Sea Level Rise

- Inundation:
(height & tidal range)
- Storm surge
- Salinity



What's vulnerable?

- All coastal & waterfront infrastructure
- Fresh water intakes on tidal rivers
- Unconfined aquifer wells (storm surge)
- Confined aquifer wells (saltwater intrusion)
- Systems in need of repair

Water Intakes at Risk

2008 PennDesign Studio:

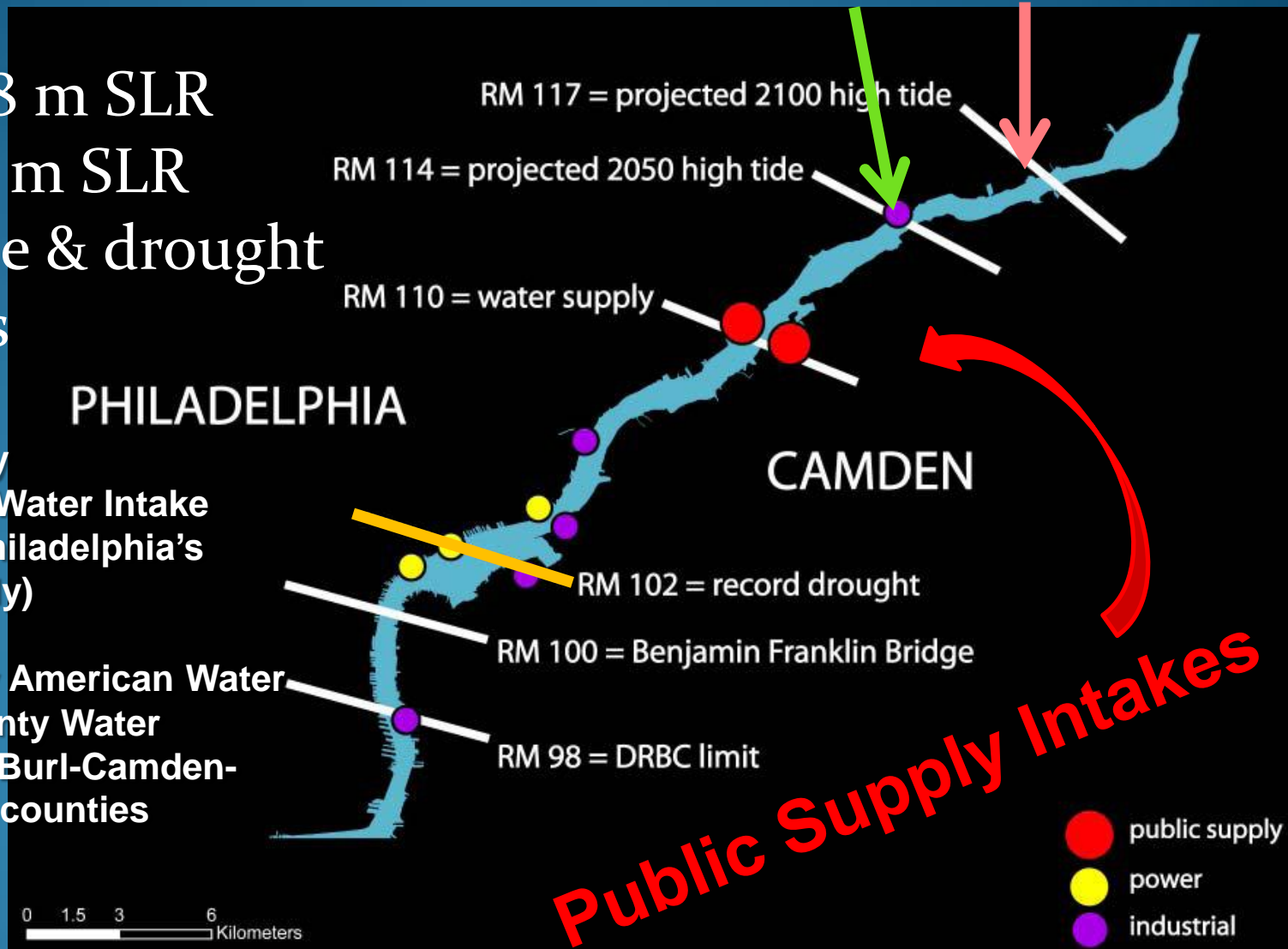
Projected locations of the salt line 2050 & 2100

2050 +0.48 m SLR

2100 +1.06 m SLR

at high tide & drought
conditions

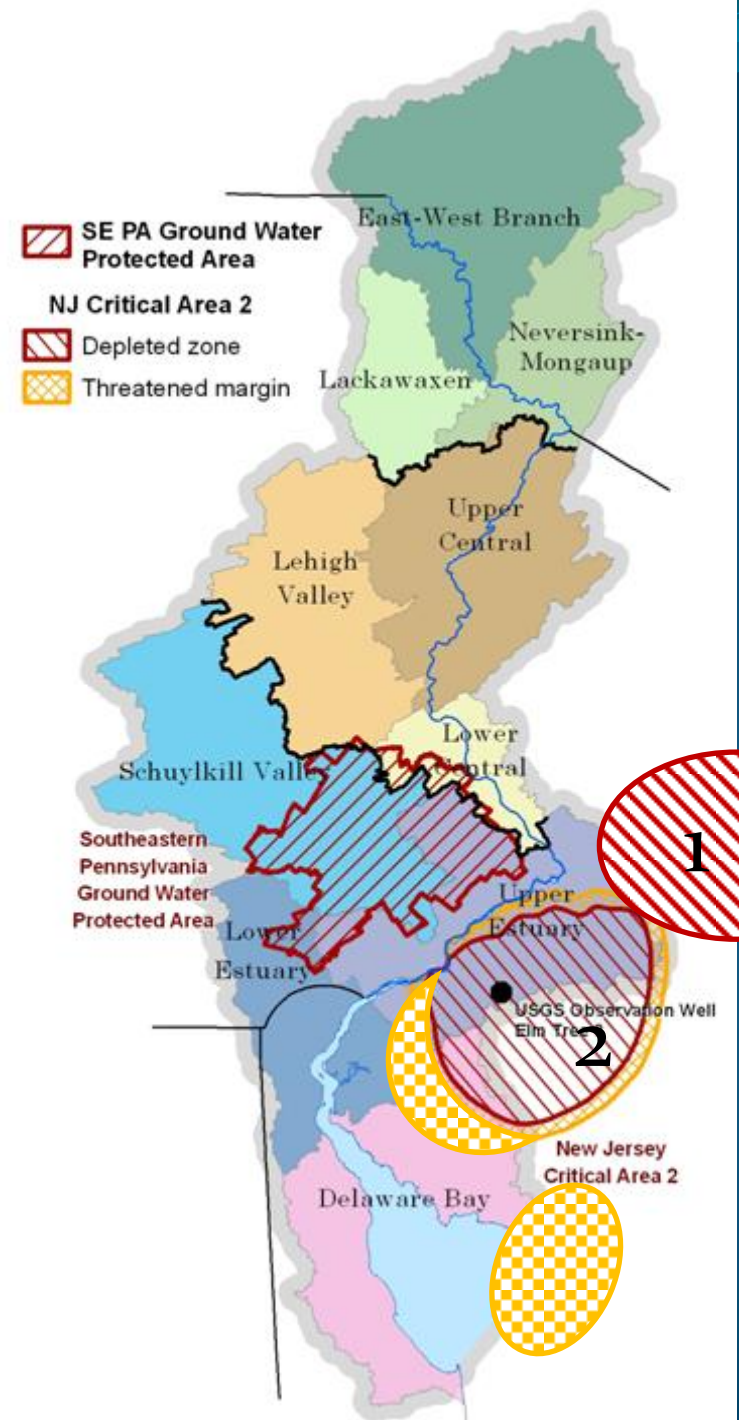
- Public Supply
 - Torresdale Water Intake (~60% of Philadelphia's water supply)
 - New Jersey American Water Co. Tri-County Water Treatment: Burl-Camden-Gloucester counties



Existing problem:

Critical Areas - Ground Water Supply

- 2 NJ Critical Areas plus additional areas of concern
- Emphasis on conjunctive use: surface water alternative is crucial
- Coastal wells vulnerable to saltwater intrusion & overwash



Existing problem:

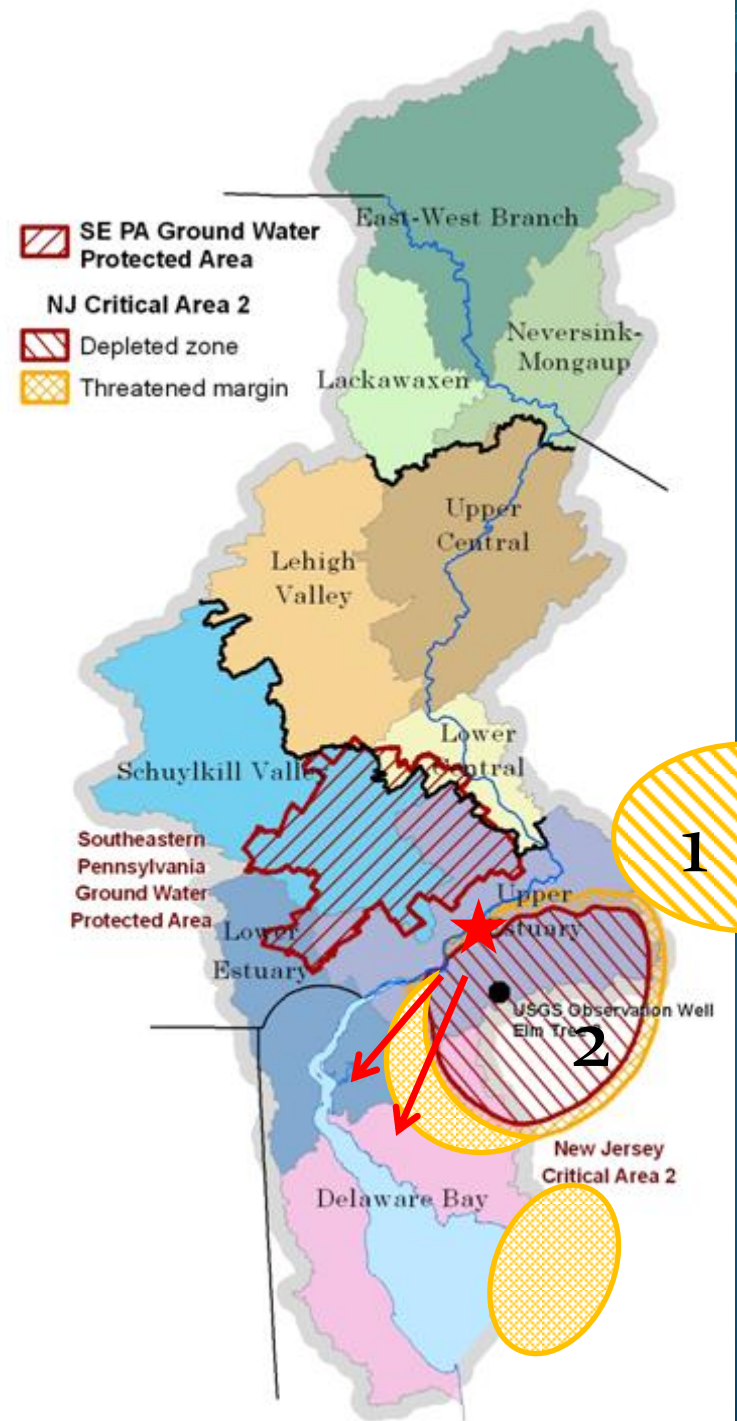
Critical Areas - Ground Water Supply

Planned alternative supply:

Delaware River water

Intake vulnerable to:

- SLR
- decreased flow from major tributaries
- (increased consumptive use)



2009 NJ Clean Water Council Public Hearing: Water Policy & Climate Change

The over-arching message :

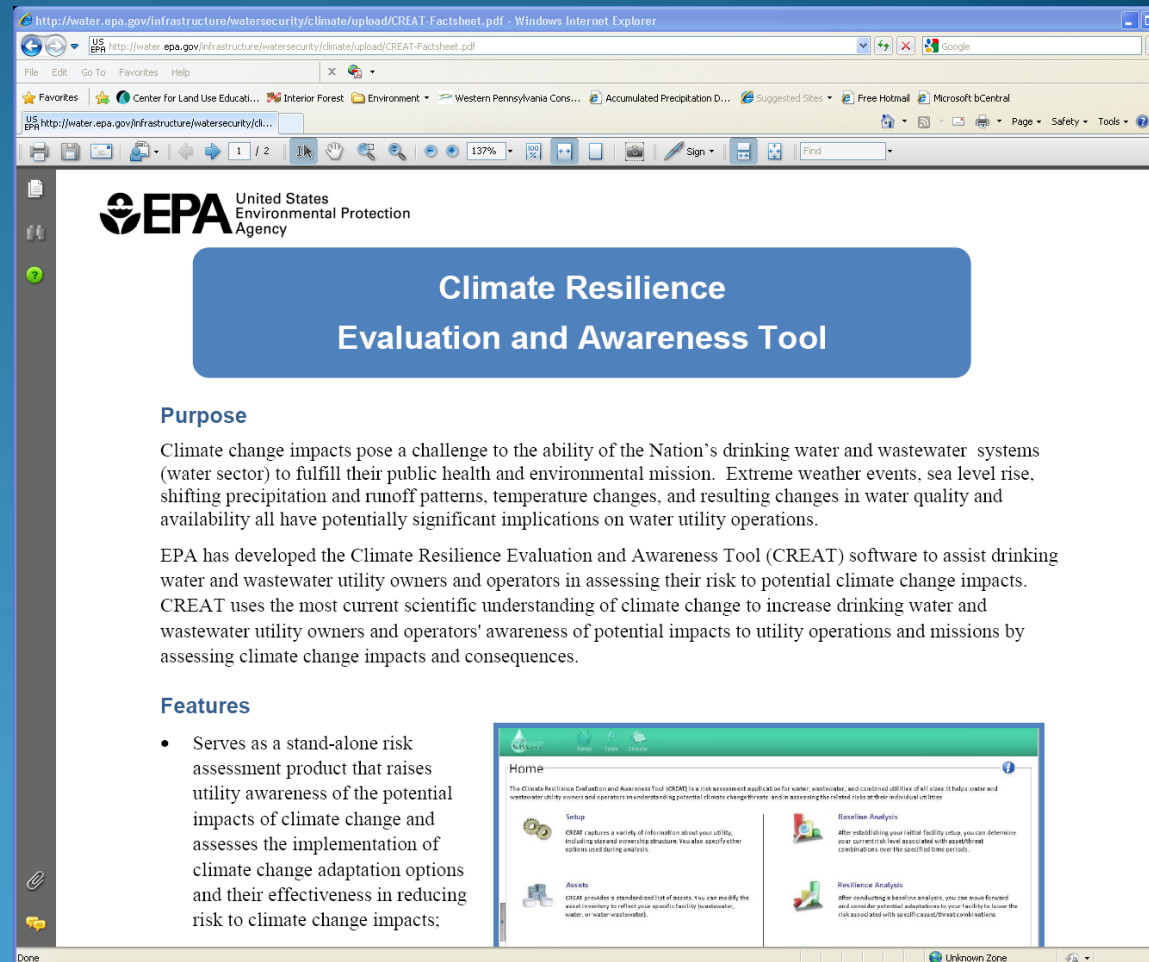
“New Jersey should **integrate** consideration of the effects of changing climatic conditions into its planning, assessment and regulatory programs to:

- increase program flexibility,
- avoid foreseeable negative impacts, and
- maximize programmatic and fiscal efficiency.”

<http://www.nj.gov/dep/cleanwatercouncil/>

EPA: CREAT for Utilities Climate Resilience Evaluation & Awareness Tool

- Assets
- Threats
- Adaptive Measures
- Baseline Analysis
- Resilience Analysis
- Implementation Planning
- Results & Reports



CREAT is available for download at
<http://water.epa.gov/infrastructure/watersecurity/climate/creat.cfm>

Water Infrastructure & Climate Change

21st Century water management



Aerial view of a typical wastewater treatment plant

Old paradigm

- Highly specialized
- Centralized
- Segregated
- Linear
- Extractive



New paradigm

- Multifunctional
- Decentralized
- Integrated
- Systemic
- Restorative
- Adaptive

Water Infrastructure & Climate Change

“Adaptation to climate change is now inevitable . . .
The only question is will it be by plan or by chaos?”

Roger Jones, CSIRO, Australia; Co-author of IPCC

4. Synergistic & systemic effects

