

# Advantages and Challenges of Basinwide Water Resource Management

**4<sup>th</sup> Annual Delaware River Watershed Forum**  
**Blue Bell, PA**

**Ken Najjar, Ph.D., P.E.**  
**Delaware River Basin Commission**

*September 20, 2016*

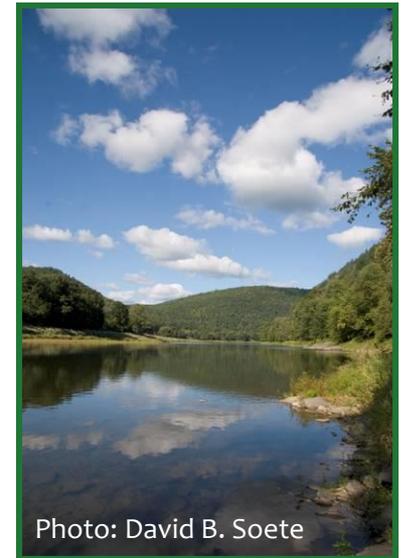


Photo: David B. Soete



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# Overview

- Basin Plan – A Common Vision for a Common Resource
- DRBC Comprehensive Plan
- Strategic Planning: Water Resources Program
- Water Supply/Use
- Water Conservation
- Water Quality
- Planning for the Future



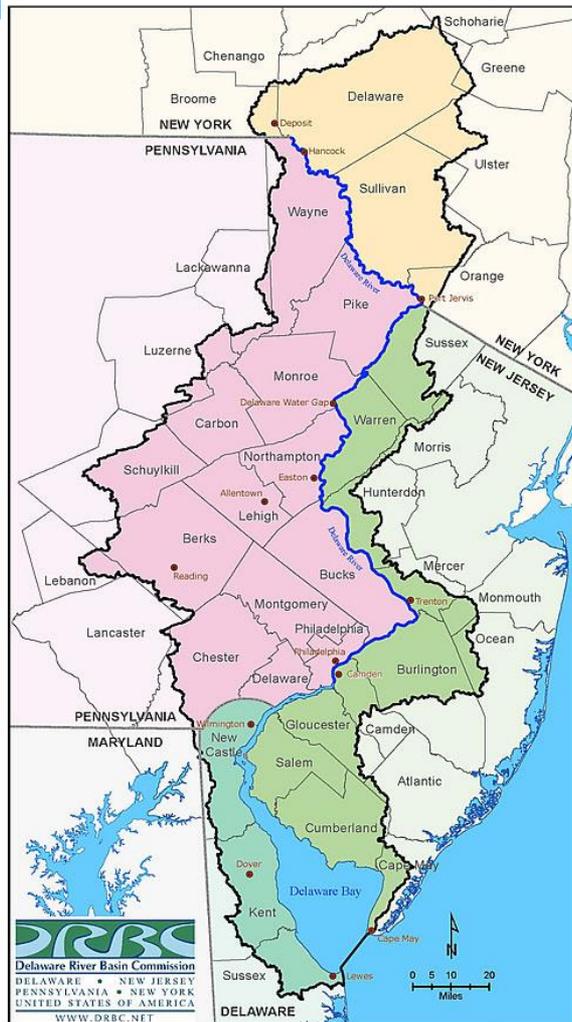
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# “A river is more than an amenity, it is a treasure”

– U.S. Supreme Court Justice Oliver Wendell Holmes



## Basin Facts:

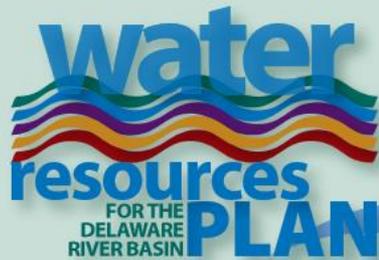
- Delaware River Main stem river is **330 miles long**
- **Drains 13,539 square miles** of watershed.
- **15+ million people** (about 5% of the U.S. population) rely on the waters of the Delaware River Basin
- **Water withdrawal** in the Basin = **8.3 billion gallons a day**
- **Contributes over \$21B** in economic value to the Region.



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# Basin Plan



**water**  
resources  
FOR THE  
DELAWARE  
RIVER BASIN  
**PLAN**



a common vision for a common resource a common vision for a common resource

SEPTEMBER 2004

- Broad and direction-setting
- Goal-based
- Consensus-based
- Created and implemented by ALL Stakeholders
- Facilitated process
- Adopted Sept. 2004
- 5 Key Result Areas (KRA's)
- 21 Goals, 102 Objectives



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# Comprehensive Plan

- Adopted, revised and modified per Compact sections 3.2 and 13.1.
- Commission to adopt the CP “after consultation with water users and interested public bodies, for the **immediate and long-range development and uses** of the water resources of the basin.”
- CP “shall include all **public and private projects** and facilities which are required ... for the optimum planning, development, conservation, utilization, management and control of the water resources of the Basin to meet **present and future needs.**”
- Includes “**statements of policies and programs** that the Commission determines are necessary to govern the proper development and use of the River Basin.”



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# Strategic Planning: Water Resources Program

- Required by Compact sections 3.2 and 13.2
- Updated **annually**, sets strategic plan for DRBC program direction “during the ensuing six years or such other reasonably foreseeable period” (lately, 3 years)
- Presented in two parts:
  - Section I – Conditions**
  - Section II – Work Program**
- FY2016-2018 plan adopted March 2016

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**Water Resources  
Program**

FY 2016-2018

March 16, 2016

# Water Supply



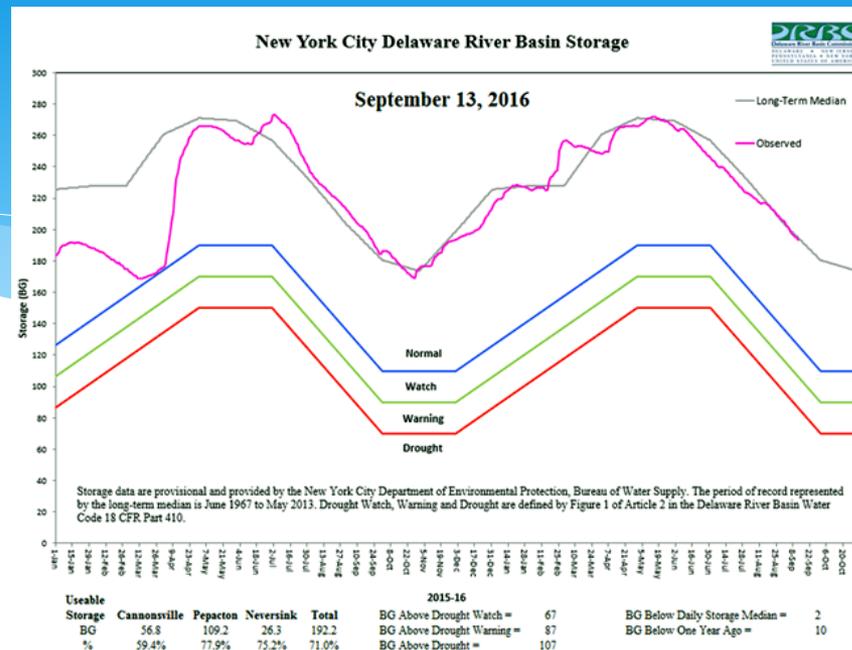
Photo: [www.robinson-real-estate.com](http://www.robinson-real-estate.com)

Cannonsville Reservoir



Photo: [www.merrillcreek.com](http://www.merrillcreek.com)

Merrill Creek Reservoir



D & R Canal

# Water Storage Facilities

NYC Delaware System

DRBC Storage in USACE Reservoirs

Emergency

Consumptive Use Make-Up



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# Water Use



Photo: Creative Commons by Zervas/flickr



Photo: PBF Energy

Public Water

Thermoelectric

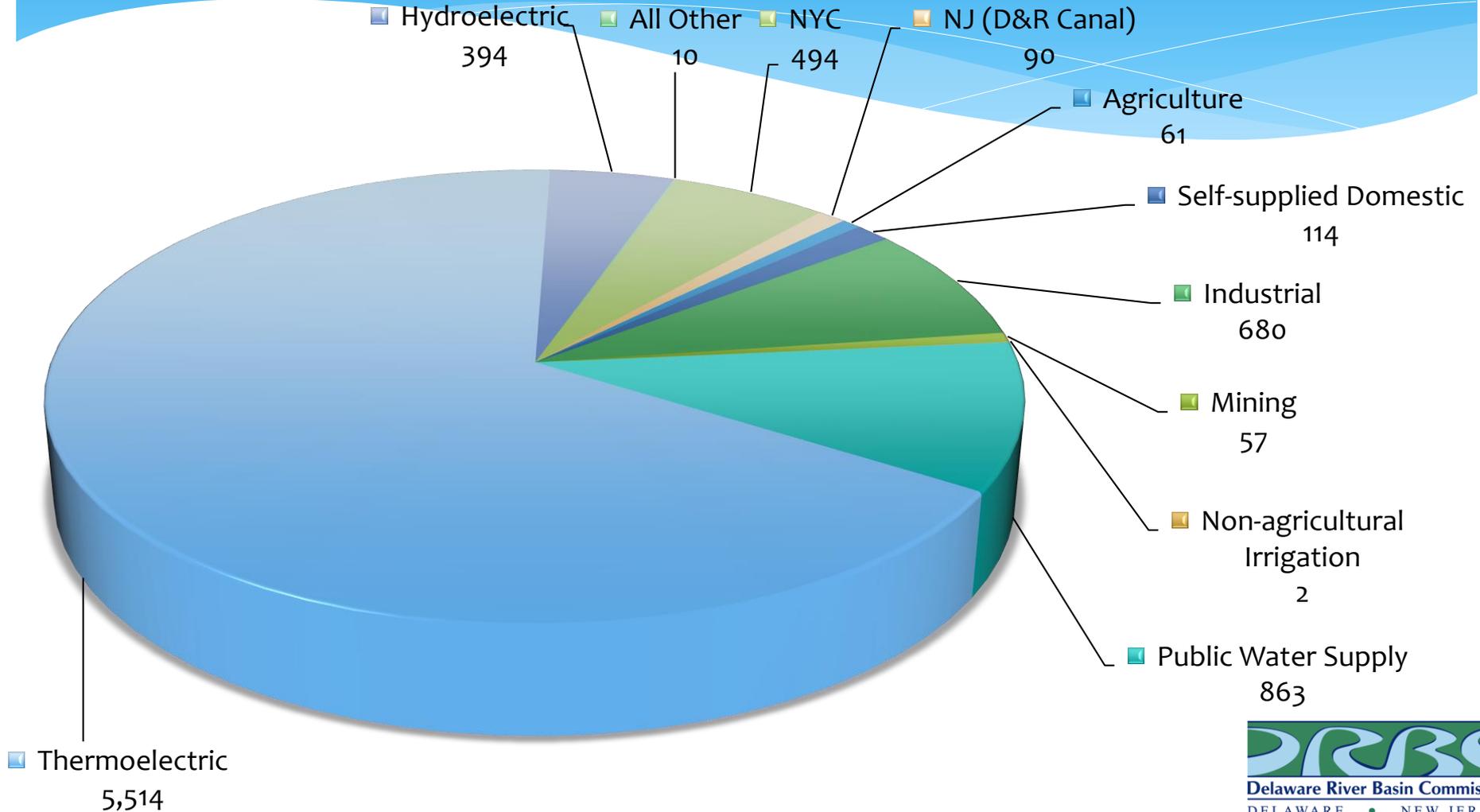


Photo: Power Plants Around the World

Industry

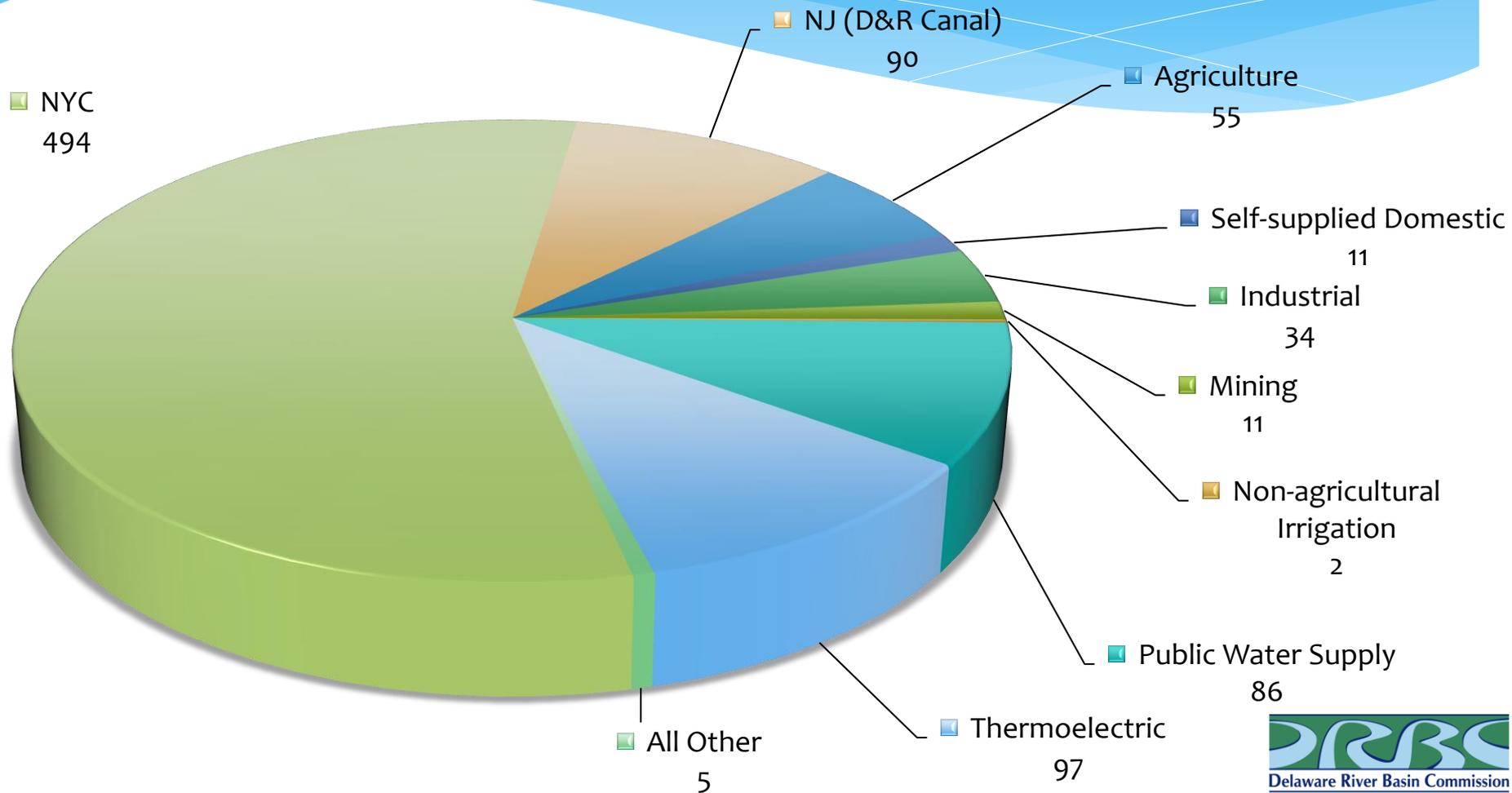
# DRB – Total Withdrawals

8,279 Million Gallons / Day



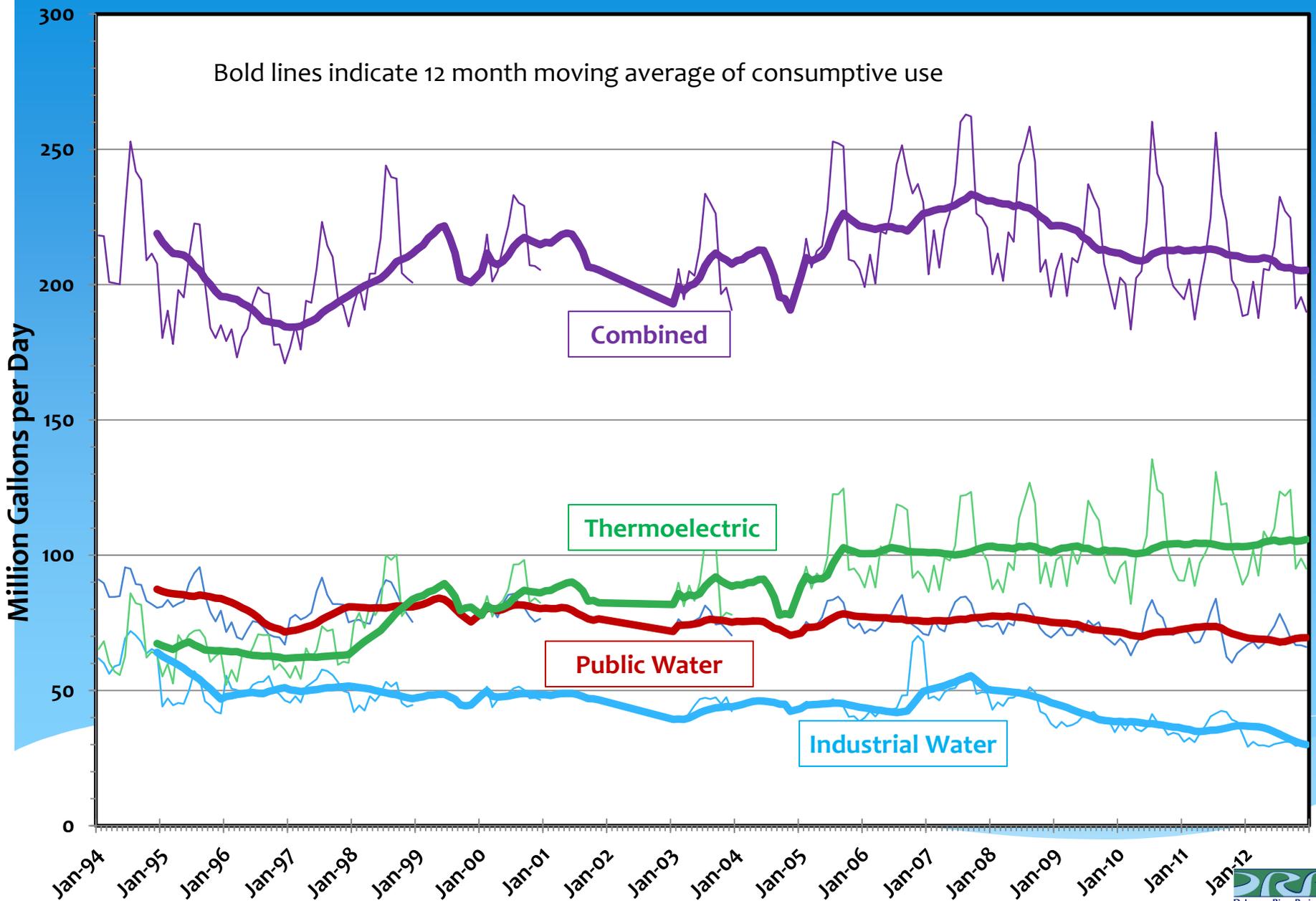
# DRB – Total Consumptive Withdrawals

886 Million Gallons / Day



# Consumptive Use Trends 1994 - 2012

Bold lines indicate 12 month moving average of consumptive use



# Sub-basins of the Delaware River

## UPPER REGION

- East-West Branch
- Neversink-Mongaup
- Lackawaxen

## CENTRAL REGION

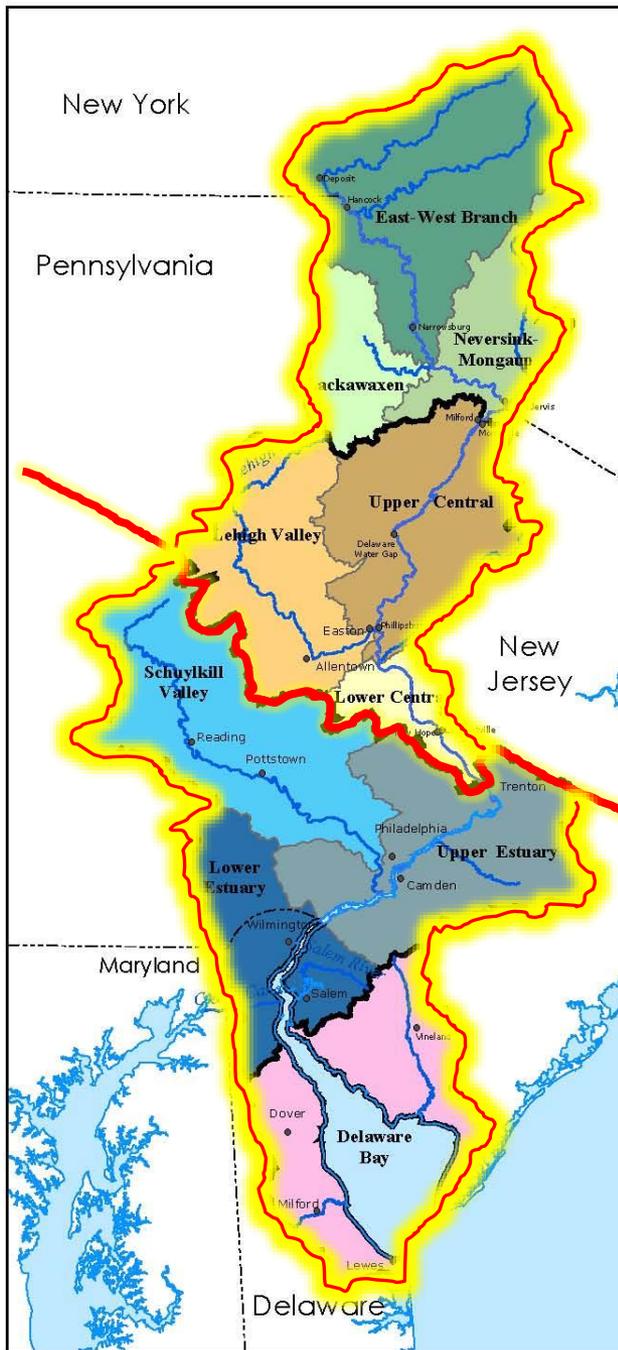
- Upper Central
- Lower Central
- Lehigh Valley

## LOWER REGION

- Upper Estuary
- Lower Estuary
- Schuylkill Valley

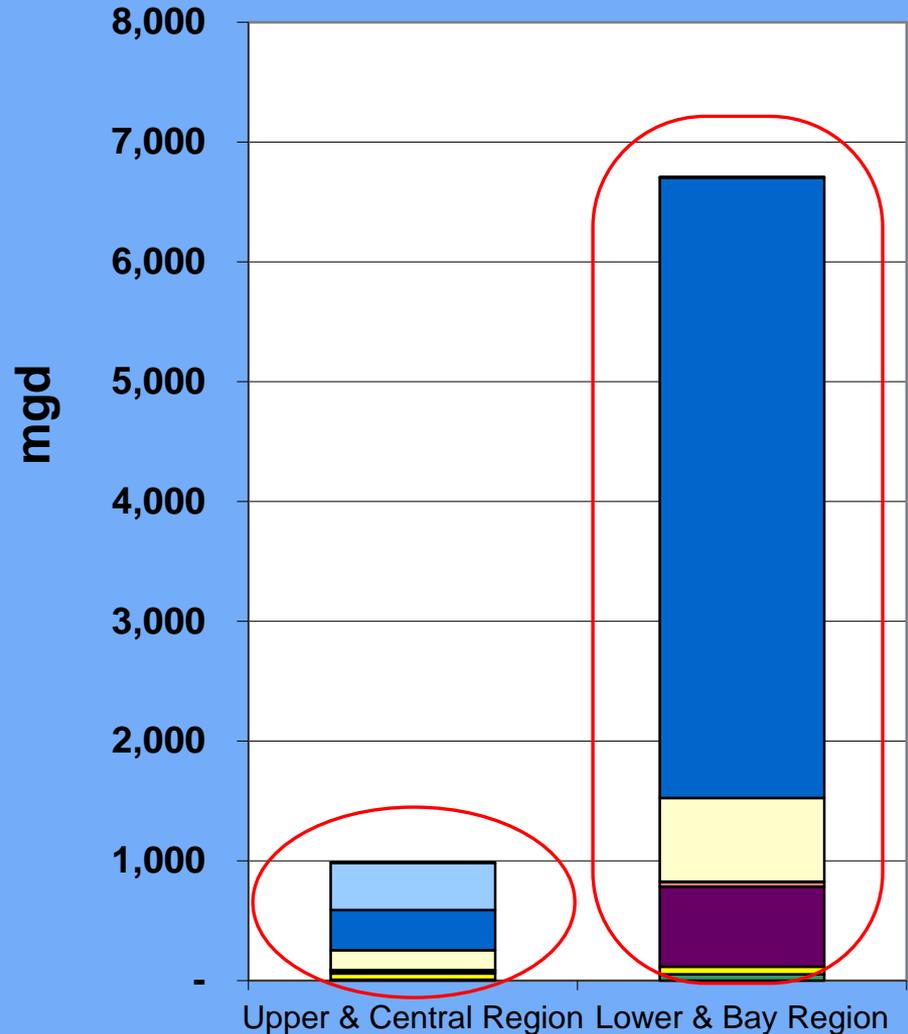
## BAY REGION

- Delaware Bay



# In-Basin Water Use

- All Other
- Hydroelectric
- Thermoelectric
- Public Water Supply
- Non-agricultural Irrigation
- Mining
- Industrial
- Self-supplied Domestic
- Agriculture



# Water Conservation

- 1986** Source & Service Metering
- 1987** Leak Detection & Repair
- 1988** Conservation Plumbing Standards
- 1992** Water Conservation Pricing
- 2006-9** Water Loss Accountability (Committee)
- 2009-11** “Water Audit” Rule/Outreach
- 2012** First year for new water audit format
- 2013** First water audit reports due

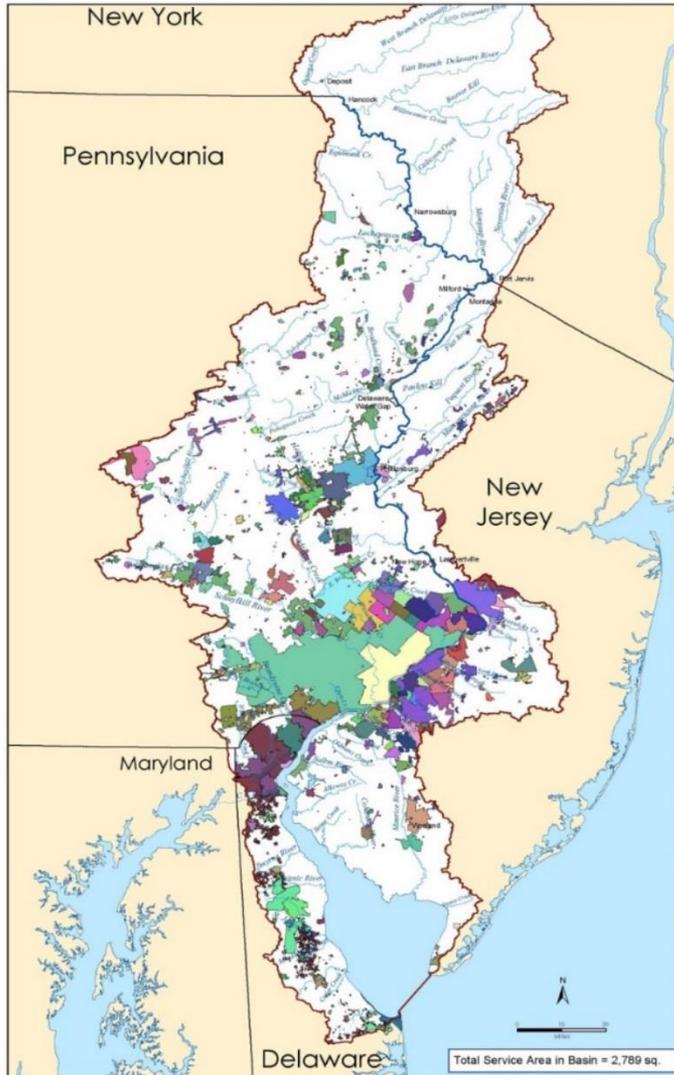


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# Public Water Supply Service Areas

Water Service Areas in the Delaware River Basin



- Total PWS withdrawals:  
**~863 MGD**
- 2<sup>nd</sup> largest water use sector in the Basin
- Approx. 21% of Basin covered by service area
- Serve 6.7 million customers (80% of basin residents)
- Approx. 306 systems subject to Water Audit Requirement

# Water Quality

The quality of Basin Waters shall be maintained for:

- Public drinking water (after reasonable treatment)
- Recreation
- Wildlife, fish and other aquatic life
- Regulated waste assimilation



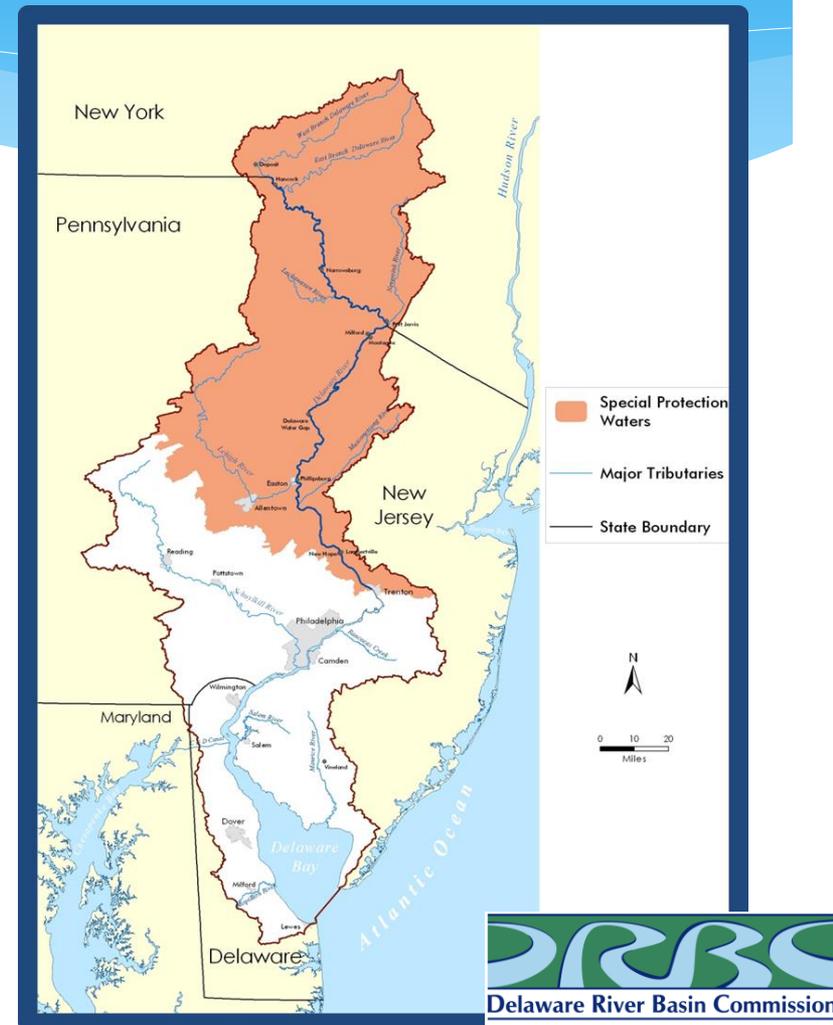
Photo: David B. Soete

# Water Quality

## Keeping Clean Waters Clean

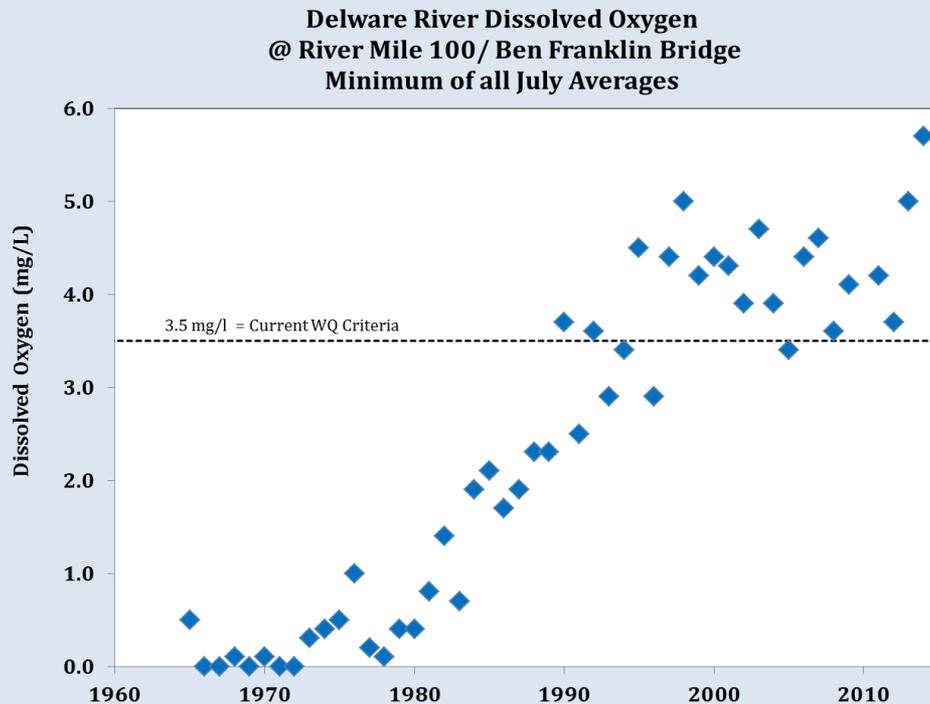
### Special Protection Waters

- Entire basin upstream from Trenton – 197 river miles.
- Believe to be the longest anti-degradation reach in the US
- It's more beneficial to “keep the clean waters clean” than to allow them to become degraded and attempt to restore them later.



# Water Quality

## Restoring Impaired Waters



## Delaware Estuary

- Criteria revisions (ammonia, nutrients, DO, temp)
- DELEP planning & implementation

# Planning for the Future

- **Demographics:** Changes and shifts in population
- **Climate Change:** Sea level rise, frequency and intensity of storms and droughts
- **Energy Water Nexus**
- Possible **Shale Gas** development
- **Landscape Changes:** Forest/riparian cover



Photo: Nicholas A. Tonelli



Brook trout © Freshwater Institute



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*Managing Our Shared Water  
Resources since 1961*