An Overview of the Delaware River Basin & the DRBC

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Our Shared WATERS

A LOOK AT THE DELAWARE RIVER BASIN

March 3, 2023

Presentation Outline

- An Introduction to the Delaware River Basin
- Overview of the Delaware River Basin Commission
- What Can You Do to be Water Smart
- Q and A

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Water Fast Facts

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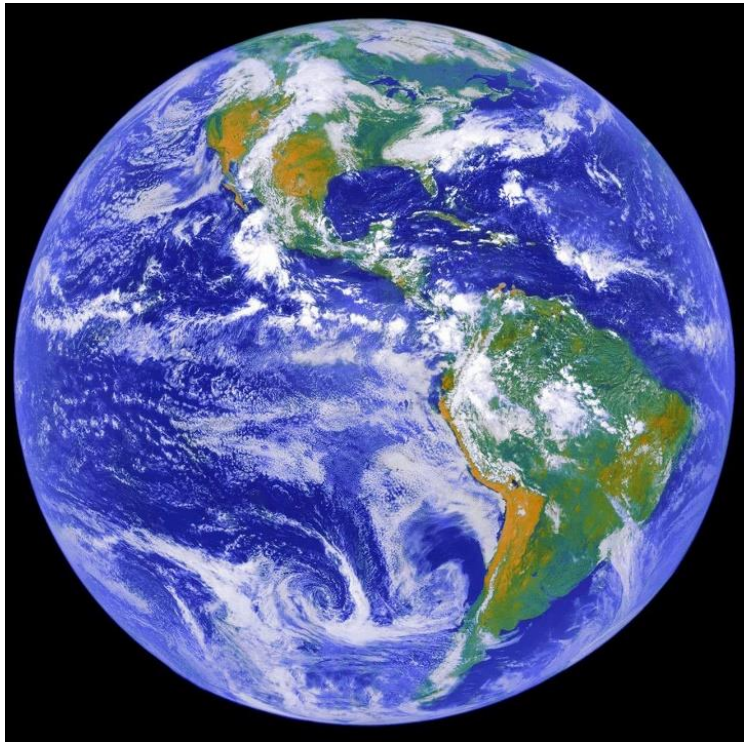
- **71%** of the Earth is covered in water
- **97%** of all water on the earth is salt water, which is not suitable for drinking.
- **Only 3%** of water on Earth is fresh water; **of that, ~0.5% is available for drinking.**
- The **other 2.5%** is locked in ice caps & glaciers, the atmosphere, soil, underground or is too polluted for consumption.



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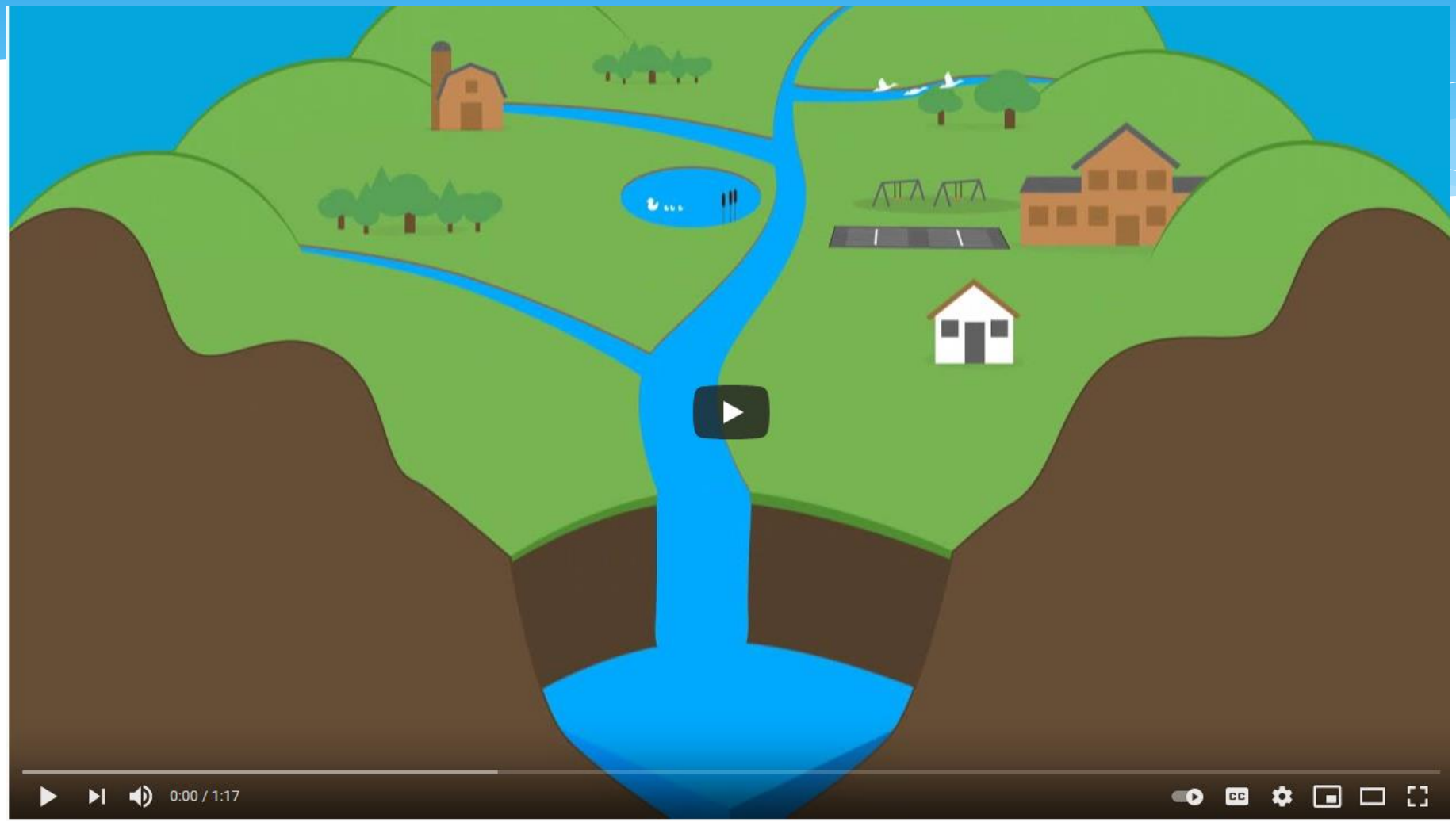
What is a Watershed?



Video courtesy of caringforourwatersheds.com: https://www.youtube.com/watch?v=QOrVotzBNto

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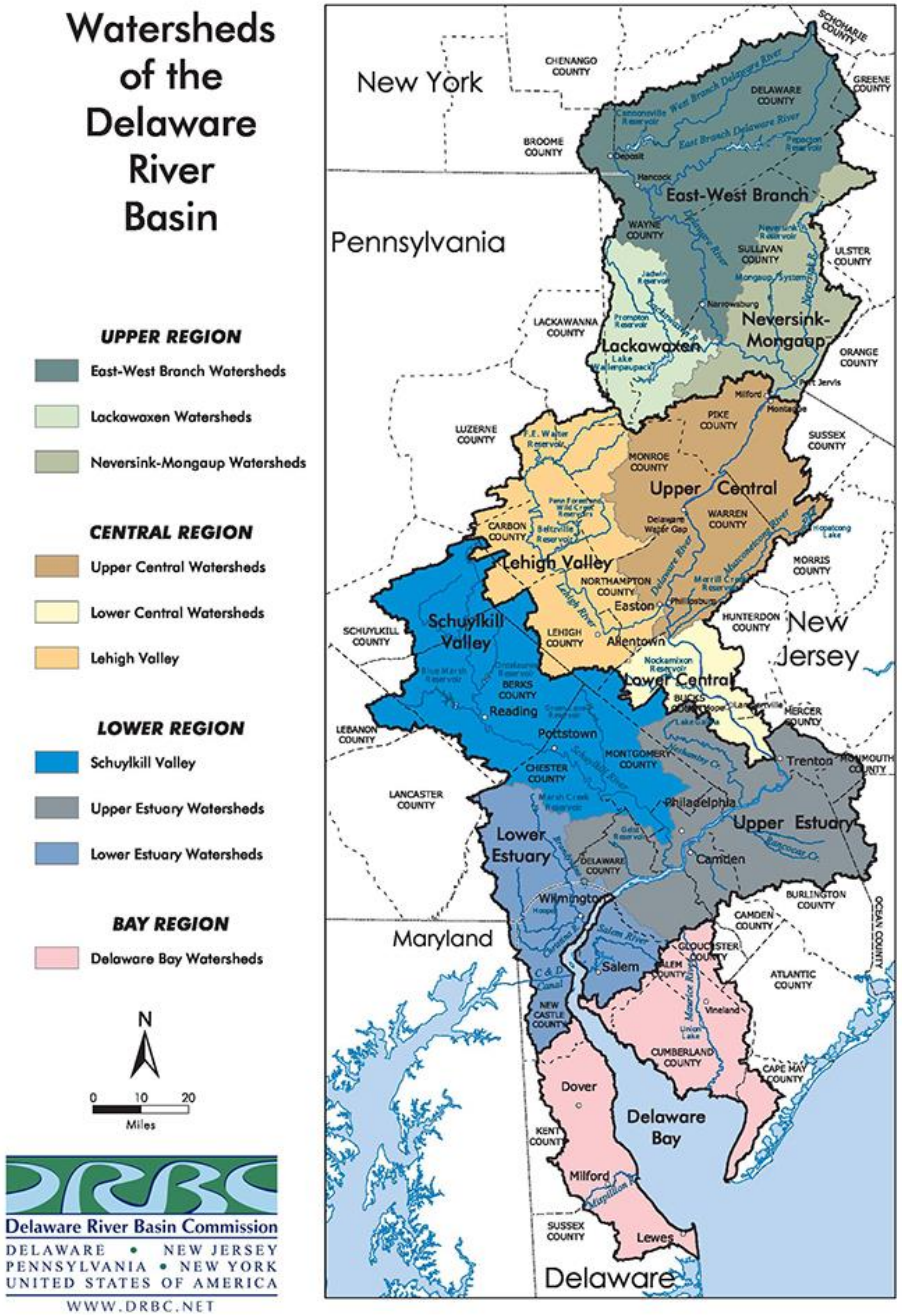
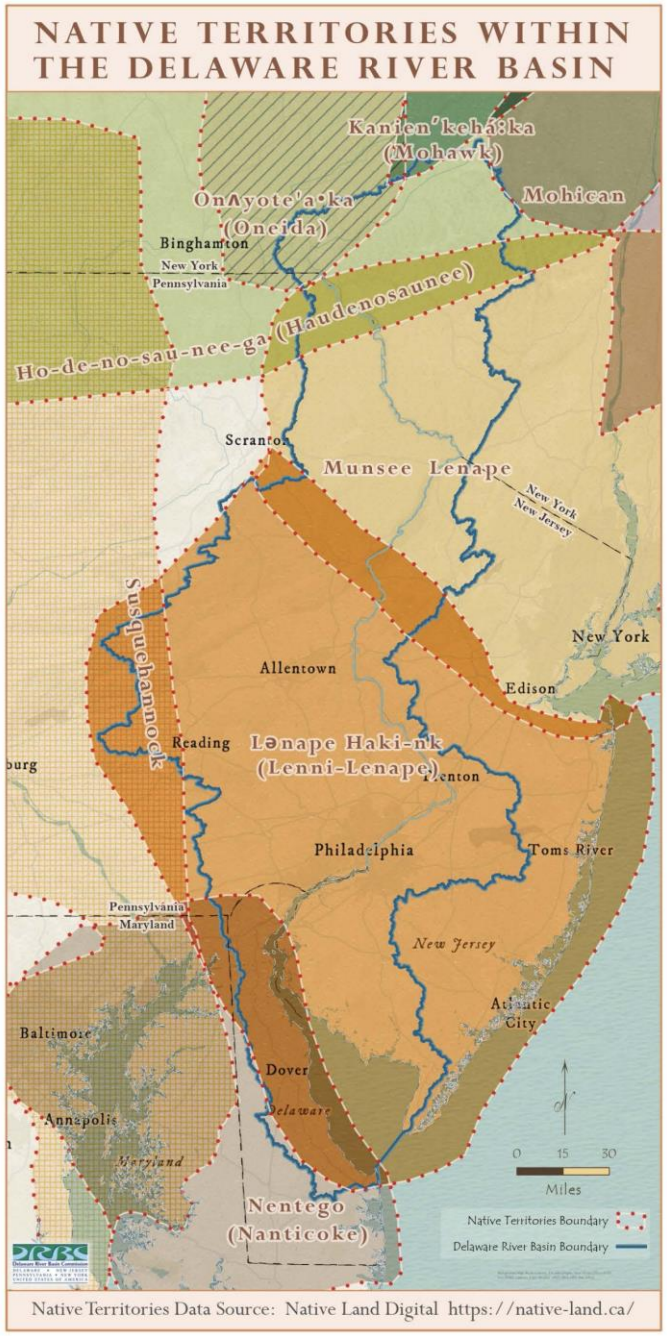
Watersheds & Basins



A Basin is a large watershed, made up of smaller watersheds. Think of it like nesting dolls

https://www.theodmgroup.com



Indigenous Populations

Historically, indigenous populations in the Delaware River Basin included:

- Lenni-Lenape
- Munsee Lenape
- Nanticoke
- Susquehannock
- Oneida

Delaware River Basin remains home to several native communities.

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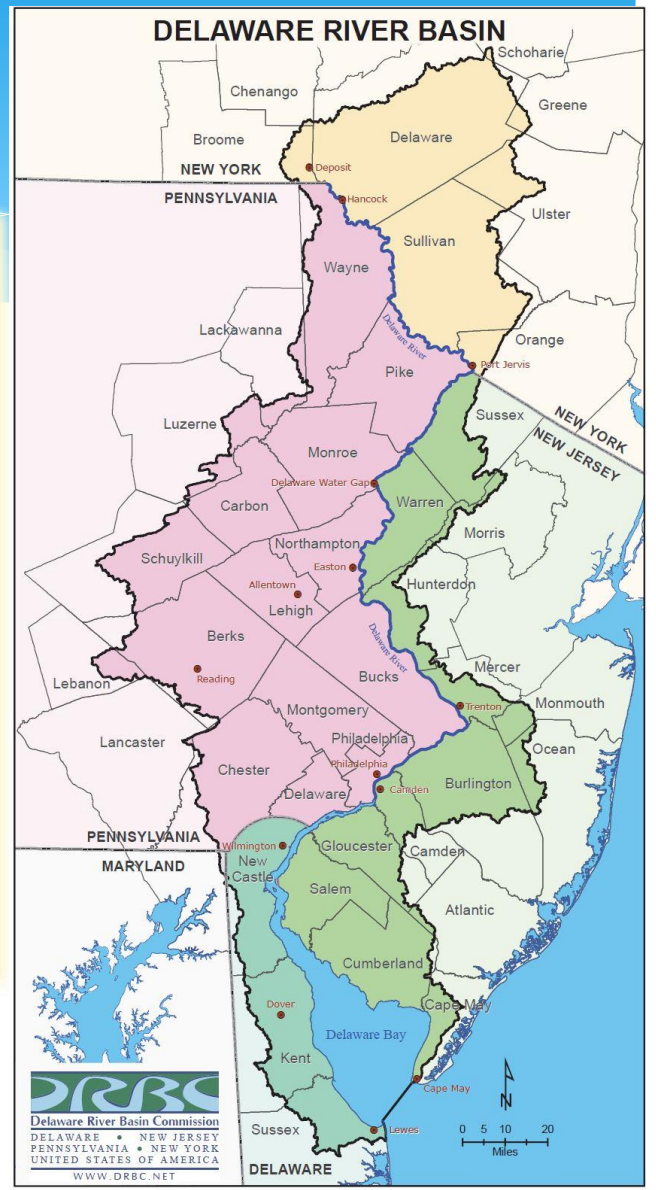
Our Delaware River Basin: Fast Facts

13,300,000 people served + **13,539** square miles + **2,000** tributaries + **868** municipalities

+ **330** miles of river + **42** counties + **4** states = **1** Delaware River Basin



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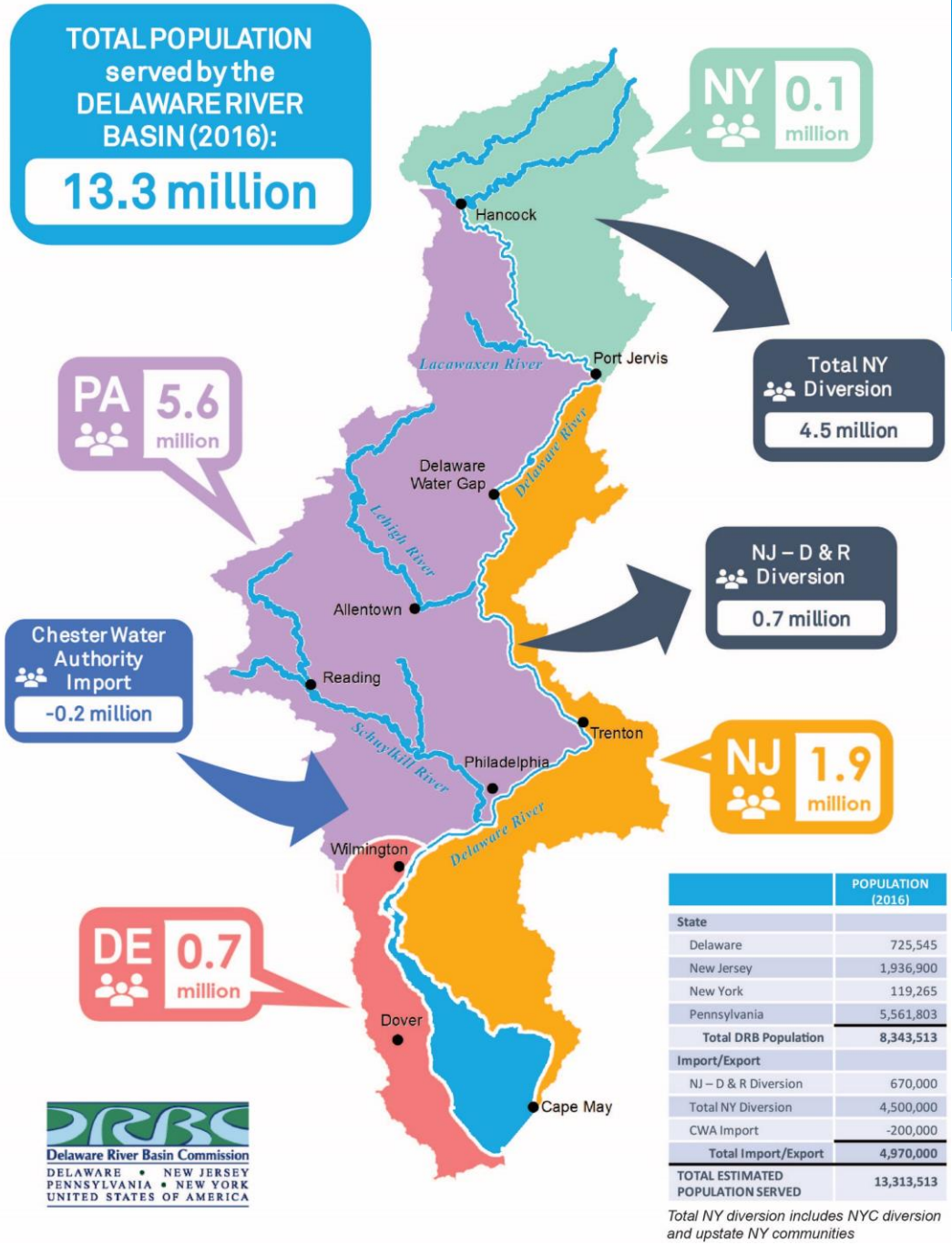
Delaware River Basin



	POPULATION (2016)
State	
Delaware	725,545
New Jersey	1,936,900
New York	119,265
Pennsylvania	5,561,803
Total DRB Population	8,343,513
Import/Export	
NJ – D & R Diversion	670,000
Total NY Diversion	4,500,000
CWA Import	-200,000
Total Import/Export	4,970,000
TOTAL ESTIMATED POPULATION SERVED	13,313,513

Total NY diversion includes NYC diversion and upstate NY communities

- About 4% of the U.S. population relies on its waters, incl. Philly & NYC
- Only drains 0.4% of the total land area of the continental U.S.
- 6.4 billion gallons are withdrawn every day (2020 data)
- Major Exports: NYC (up to 800 MGD) and N.J. (up to 100 MGD)
- Supports a water-based economy of over $20 Billion

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The Delaware River

- Interstate boundary its entire length
- Longest, un-dammed U.S. river east of the Mississippi (dams are located on tributaries, not the main stem Delaware)
- Tidal from Delaware Bay to Trenton, N.J. (130 mi) – Delaware River Estuary
- Non-Tidal from Trenton to Headwaters (200 mi)
- Largest tributaries: Schuylkill River & Lehigh River (Pa.)
- N.J. Tribs incl. Musconetcong, Assunpink, Rancocas, Cooper & Maurice

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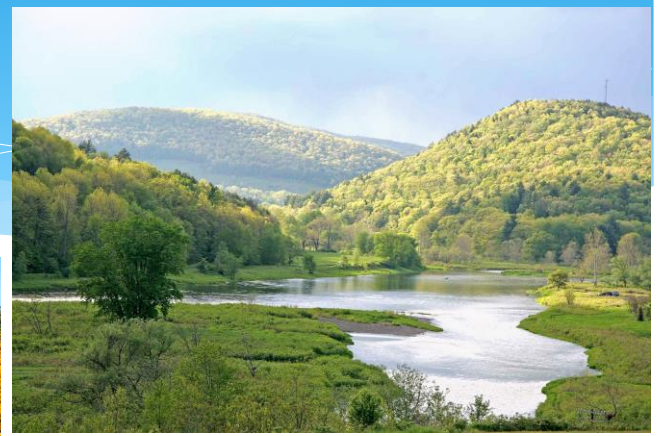
Upper Delaware River Corridor

- East & West Branches meet at Hancock, N.Y.
- From Hancock to Port Jervis = Upper Delaware Scenic and Recreational River
- A unit of the National Park Service; 73 Miles, border between N.Y. & Pa.
- Most land is privately owned, heavily forested and not very developed.
- Deepest Point = Big Eddy
- Roebling's Delaware Aqueduct
- Tri-State Monument



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Middle Delaware River Corridor

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- South of Port Jervis, flows ~40 miles downstream to Stroudsburg, Pa.
- Known as the Delaware Water Gap National Recreational Area, a unit of the National Park Service; also designated Wild & Scenic
- Most of the river corridor is federally owned and therefore not very developed
- The Water Gap is where the Delaware River cuts through a large ridge of the Appalachian Mountains. It began to form over 400 million years ago.

Lower Delaware River Corridor

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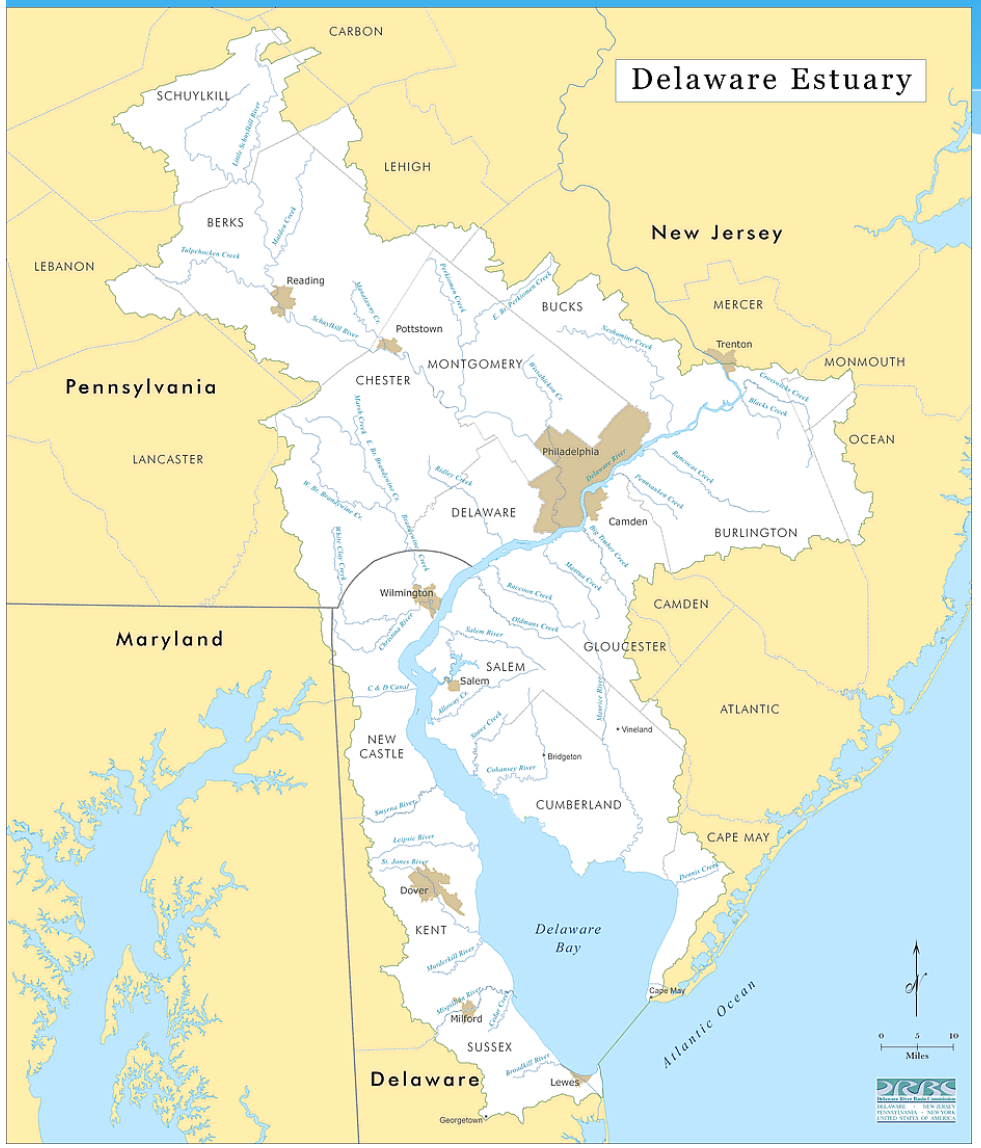
- South of the Water Gap to Washington Crossing, Pa.
- Parts of the Lower Delaware incl. in the National Wild and Scenic Rivers System – a stretch of the river & sections of several tributaries. Sections of the Musconetcong River – a N.J. tributary – are also incl.
- Southernmost section of the non-tidal river
- More suburban, developed – scenic/historic river towns of Riegelsville, Milford, Easton, Frenchtown, Stockton, Lambertville, New Hope

Delaware River Estuary



- South of Trenton, the river is tidal
- Delaware River Estuary; an estuary is where salt water and freshwater mix. Includes the Delaware Bay
- Tide ranges 6-10 feet (change between low & high tide)
- Major cities: Philadelphia, Camden, Chester & Wilmington
- Largest Freshwater Port in World
- National Estuary Program, 2 Tributaries designated Wild & Scenic

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Creatures of the DRB

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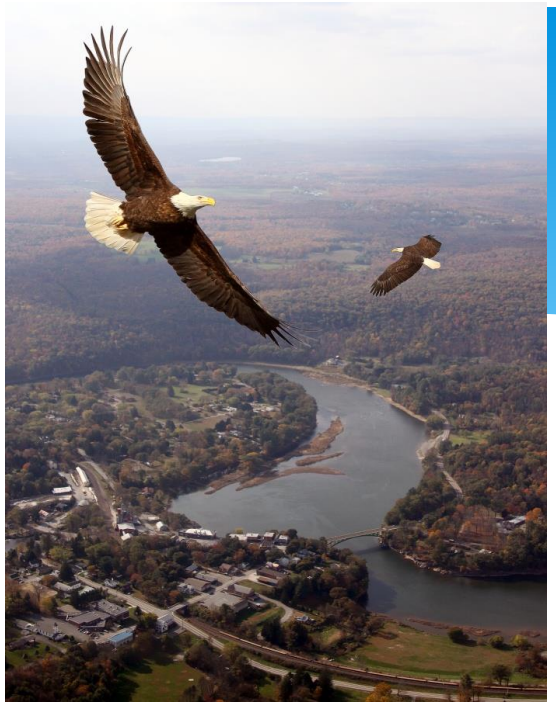

Why the Need for Basin-Scale Water Management?

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EDITORIAL PAGE

PHILADELPHIA RECORD

The War in Outline :: America Speaks :: Travel SUNDAY, MARCH 14, 1937 Screen :: Stage :: Music :: Art :: Radio :: Puzzles

WATER, WATER EVERYWHERE, BUT NOT A DROP FIT TO DRINK.

SCHUYLKILL

CHLORINE

PHILADELPHIA

DELAWARE RIVER

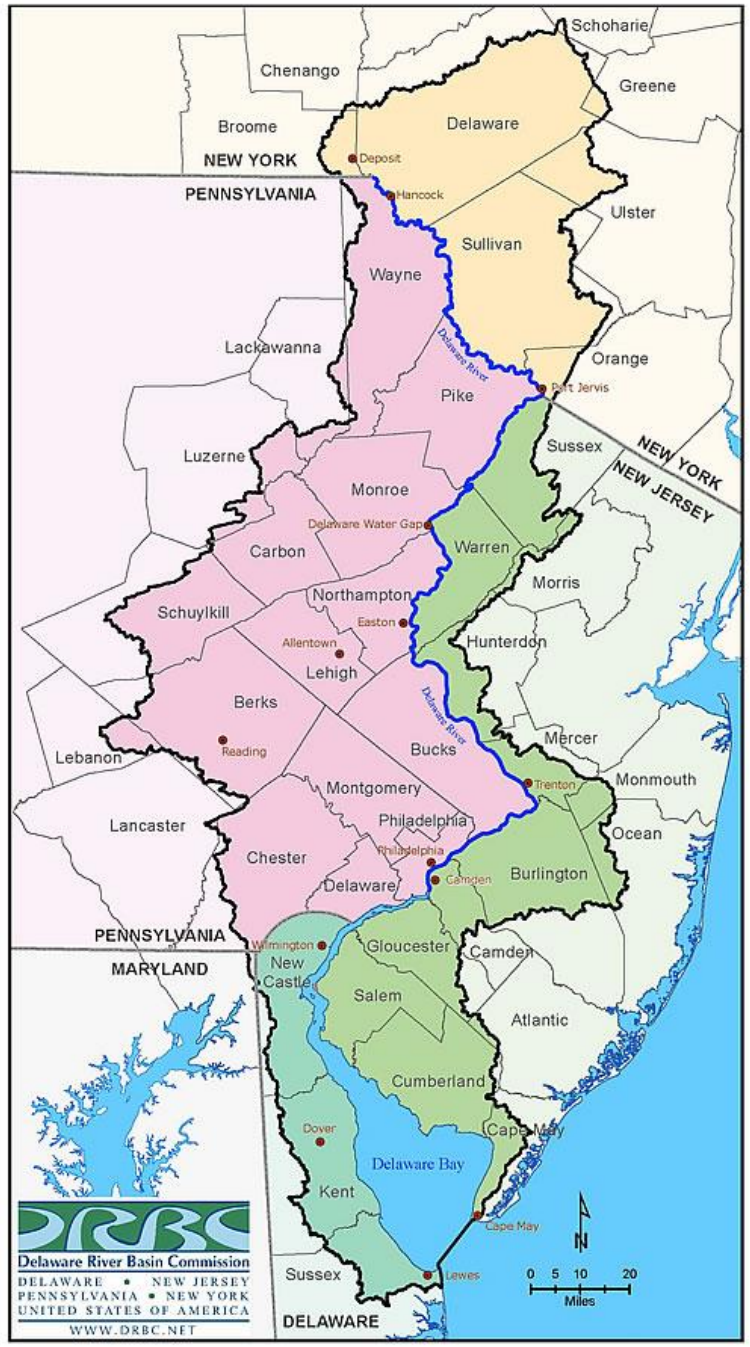
1937

Early-Mid 1900s:

- Severe pollution in the tidal Delaware River and its major tributaries
- Water supply shortages and disputes over the apportionment of the Basin's waters
- Serious flooding

Joint Responsibility for a National Treasure

Shared Resources = Shared Problems



The Challenge: How to Work Together

Disjointed Water Management

- 4 States
- Multiple Agencies
- 42 Counties
- 838 Municipalities
- NY City

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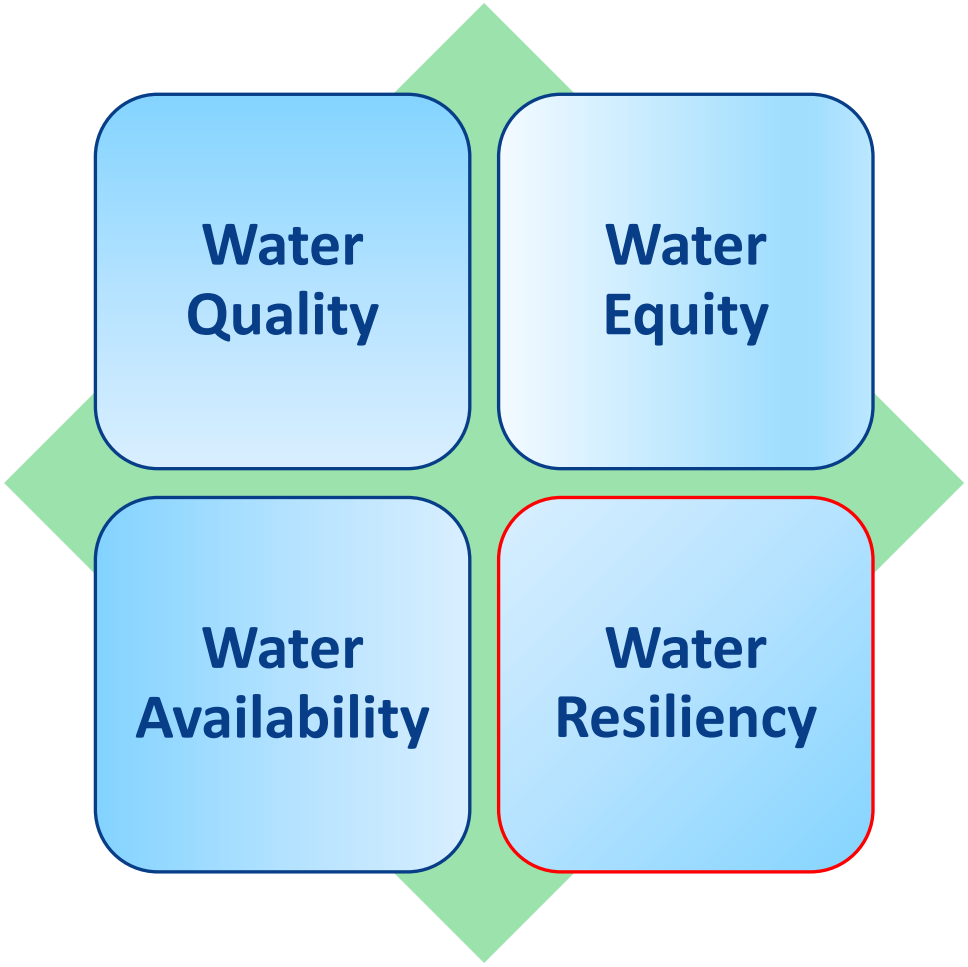
Solution: Delaware River Basin Commission Formed 1961

- Delaware River Basin Compact: Federal Law & State Law
- First of its kind (Federal-Interstate Water Regulatory Agency)
- 5 Equal Members
- Governors are the Commissioners; USACE NAD Commanding General is Federal Commissioner; NYC & Phila. are advisors
- Meets Quarterly
- Full-time Staff of Engineers, Scientists, Planners

Ceremonial signing of the Delaware River Basin Compact, Nov. 2, 1961.

DRBC Functional Responsibilities

Manage, Protect & Improve the Basin's Water Resources, ensuring water security for 13+M People



- **Water Quality Protection & Improvement**
- Drought Management
- Flood Loss Reduction
- **Sustainable Water Supply**
- Watershed Planning
- Regulatory Review (Permitting)
- Outreach/Education
- Recreation

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DRBC Focus from the Start:
Water Quality Improvement

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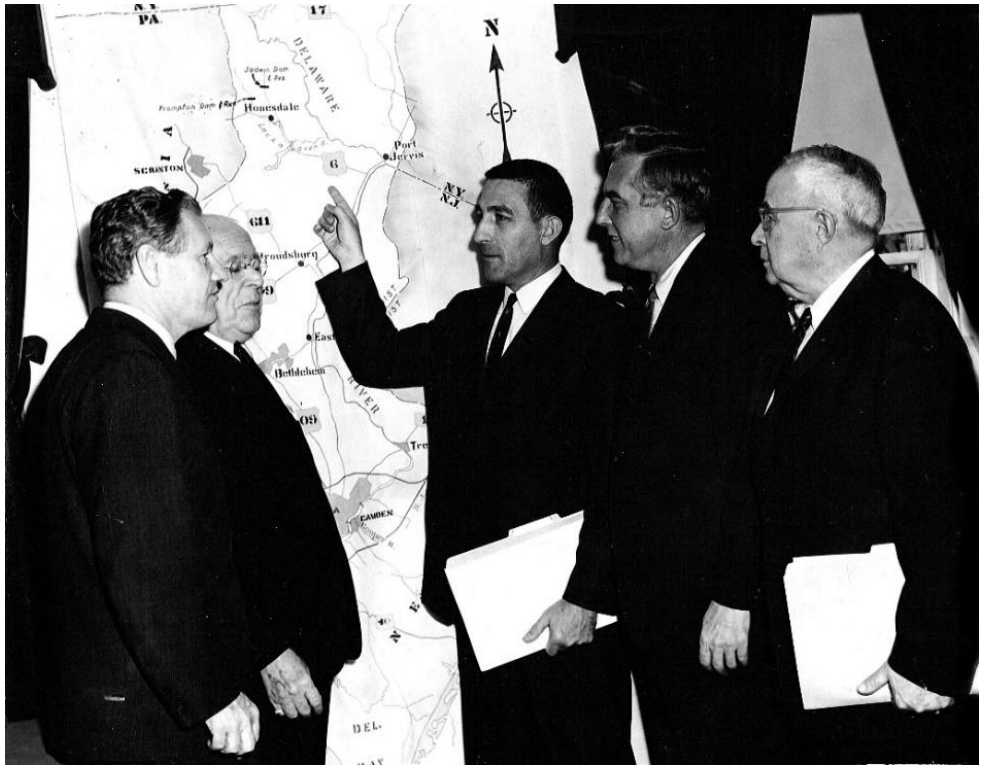
1967: Adopted the most comprehensive water quality standards of any interstate river basin in the nation. **Udall said** only the Delaware among the nation's river basins was moving into "high gear" in its pollution abatement efforts.

1968: Adopted regulations for implementing and enforcing the 1967 standards. The **Federal Water Pollution Control Administration** said, "This is the only place in the country where such a procedure is being followed. Hopefully, it will provide a model for other regulatory agencies."



3rd from L: Sec. of the Interior Stewart Udall (Federal Rep) at the 1st meeting of the DRBC.

Multi-Decade Collaborative Effort to Improve Estuary Water Quality

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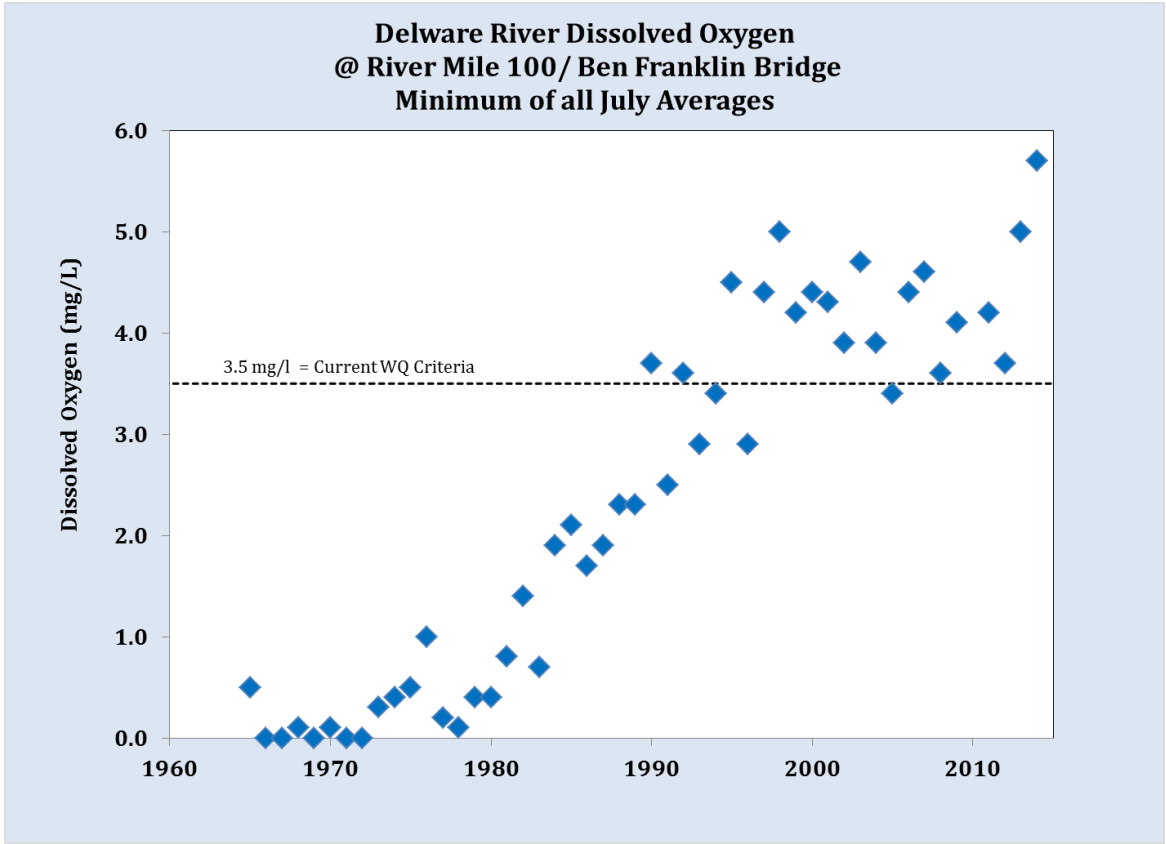
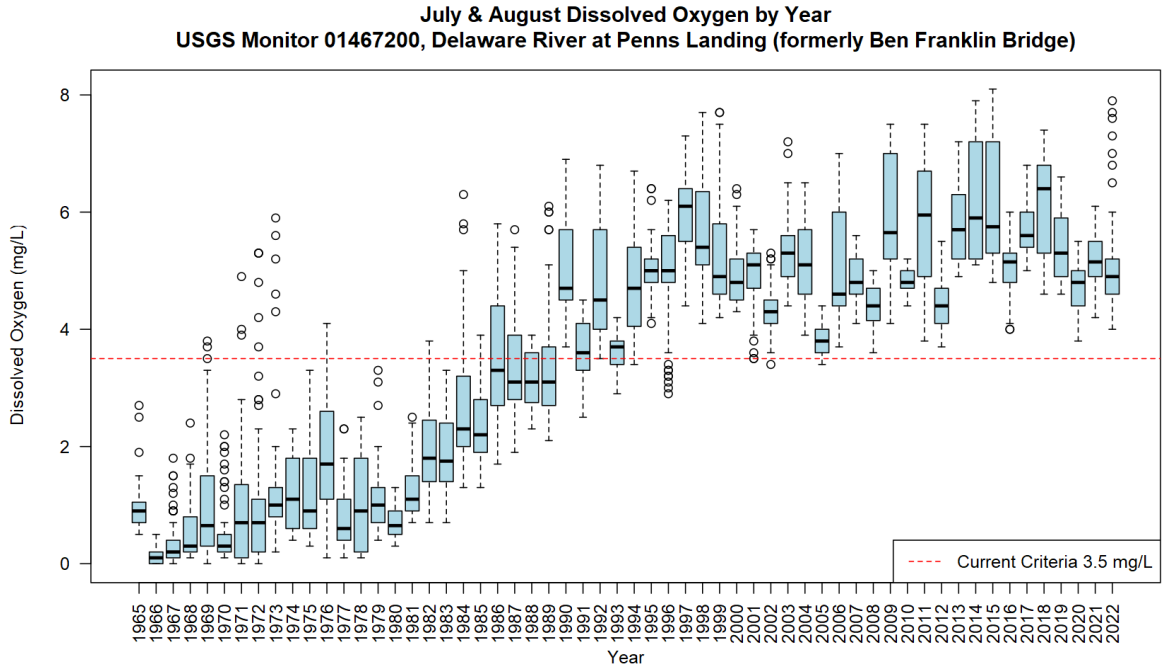
- 30 Miles of River around Philadelphia considered a "Dead Zone," no oxygen
- **1970s: Creation of the U.S. EPA & 1972 CWA were instrumental in supporting cleanup efforts: investment in improved wastewater treatment.**
- CWA Goals: Fishable & Swimmable waters
- By 1990s – DO levels above 1967 standards, even during summer
- Return of migratory fish



The Next Chapter: Further Improving Delaware Estuary Water Quality

Aquatic Life Designated Use Study:

- Still see lower DO sags in summer months since warmer water holds less DO. Esp. around Philly & Camden.
- Resident & migratory fish have returned, but juveniles more sensitive; require higher DO levels. Same with endangered Atlantic Sturgeon.
- DRBC multi-year, technical study ongoing, will determine whether higher DO levels are feasible & achievable.



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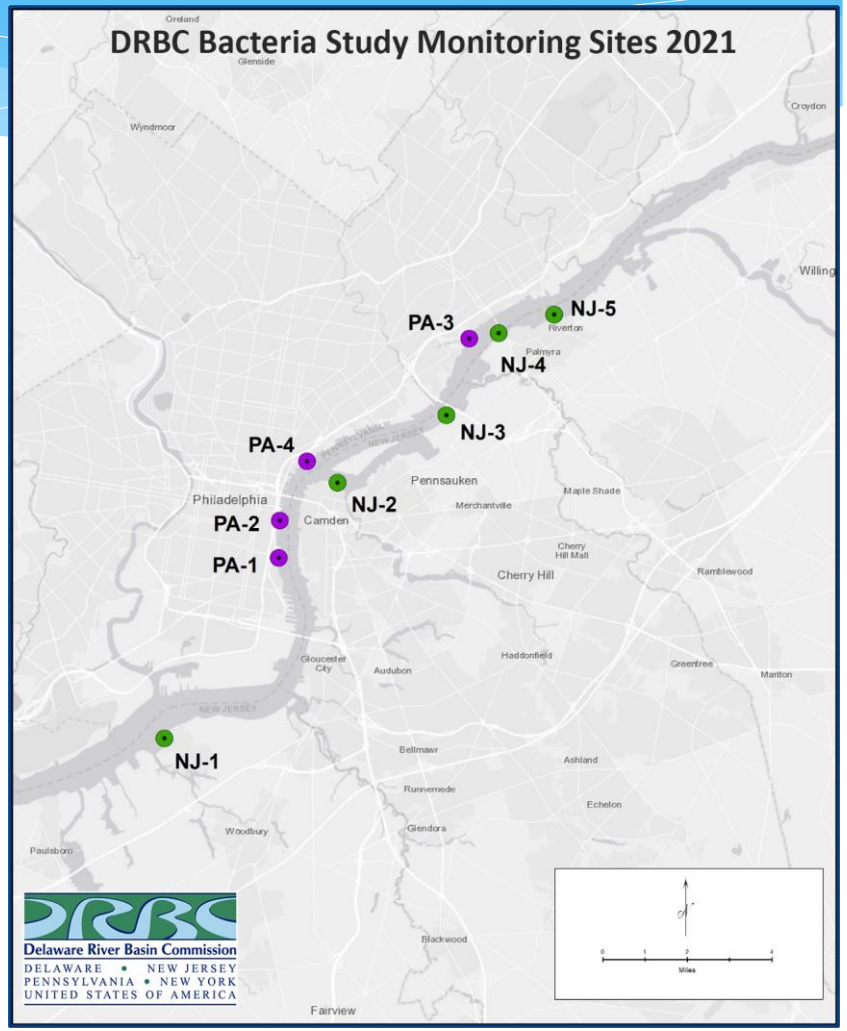
The Next Chapter: Further Improving Delaware Estuary Water Quality

Bacteria Monitoring:

- No swimming or other primary contact recreation is allowed in river around Philly due to bacteria levels.
- Monitoring bacteria in center channel for decades (Boat Run – started in 1967)
- In 2019, started monitoring near-shore. The study is ongoing.

Contaminants of Emerging Concern:

- PPCPs, PFOA/PFAS, 1,4-Dioxane, Microplastics
- Persist in the environment. Found in surface & groundwater, also found in humans and aquatic life.
- Potential impacts to water quality, aquatic species & drinking water sources. Not currently well regulated or monitored.
- DRBC does periodic monitoring of surface water, sediment &/or fish tissue for CECs.



Non-Tidal Delaware River:
Keeping the Clean Water Clean

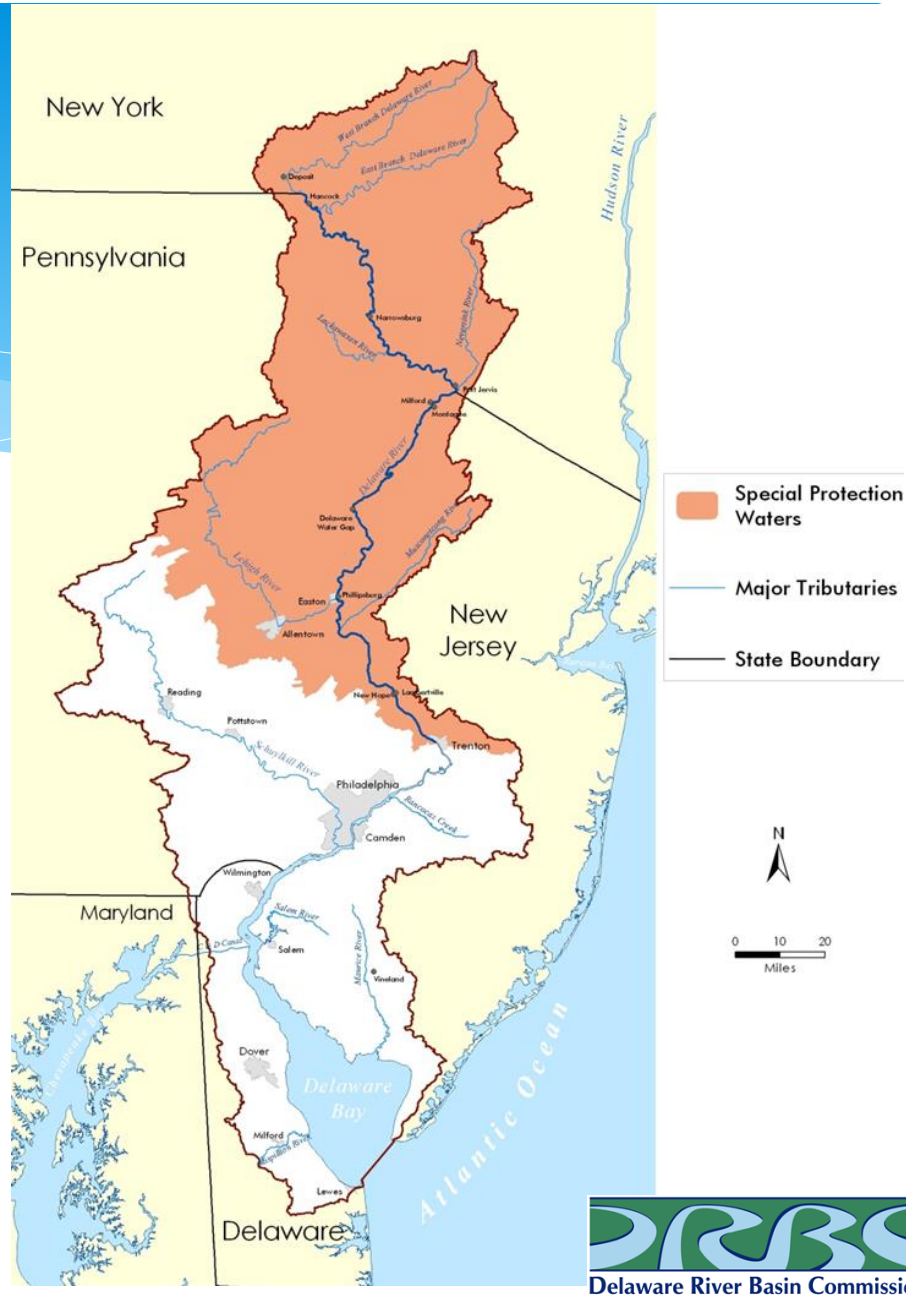
"Fortunately, the Delaware above Trenton is still a clean river, and it is to be kept that way."
DRBC 1967 Annual Report

1978: Upper & Middle Delaware River added to National Wild & Scenic Rivers System

1992: DRBC designated Upper & Middle Delaware River as Special Protection Waters (SPW)

2000: Lower Delaware River added to the National Wild & Scenic Rivers System (75% non-tidal river, ~150 mi designated)

2008: DRBC designated the Lower Delaware SPW, establishing the longest stretch of anti-degradation waters in the nation



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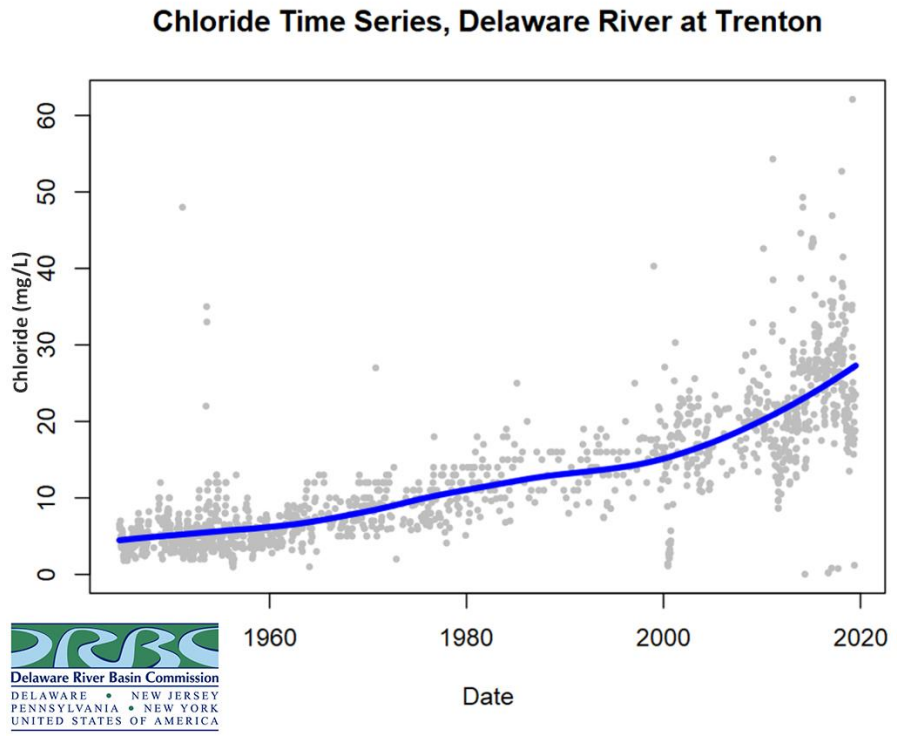
Today: Is SPW Working?

- Monitoring shows that SPW is working. Water Quality is being maintained for most parameters; reductions in nutrients have also been seen.
- However, we are seeing an upward trend in chloride concentrations, but still below criteria for drinking water and aquatic life use.
- In 2021, the DRBC initiated a study to monitor chlorides, TDS concentrations, sodium & other ions in SPW waters. Study includes 27 sites, mainstem & tribs. Continuous data collection & monthly visits.



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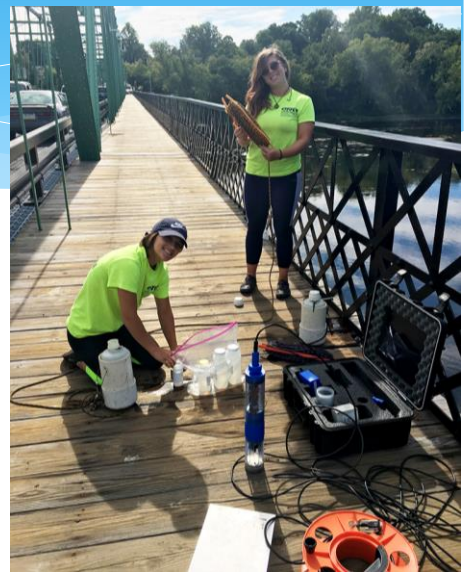
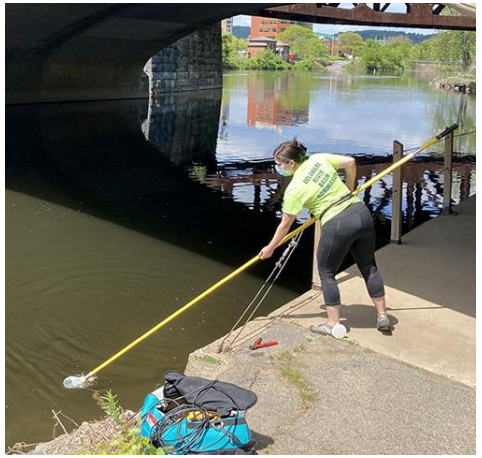
You Can't Manage What You Don't Measure





DRBC Focus from the Start:
Flow & Drought Management

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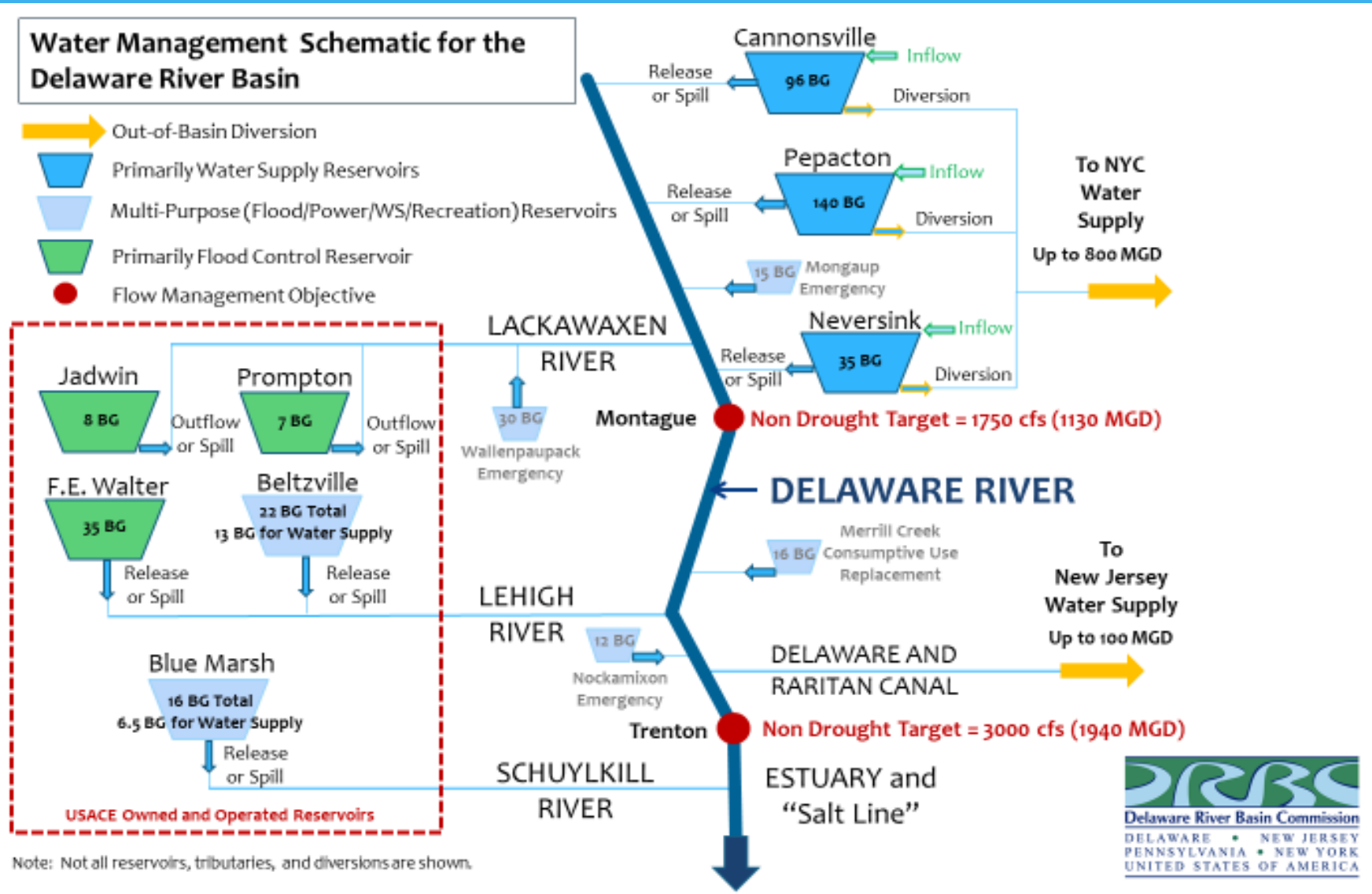
- The region experienced a severe, multi-year drought from 1961-67, which is still considered the Basin's drought of record.
- While Tocks Island Dam was eventually voted down in 1975, several reservoirs were built in the basin for water supply, flood mitigation & recreation
- Collaboration during 1970s & 1980s on drought mgmt. efforts: Good Faith Agreements
- The DRB has experienced droughts since then, but the DRBC's drought management plan has worked to protect water supplies.

Delaware River at Morrisville, Pa. October 1963.

Delaware River: *Free Flowing but Managed*



Water Supply Planning & Conservation

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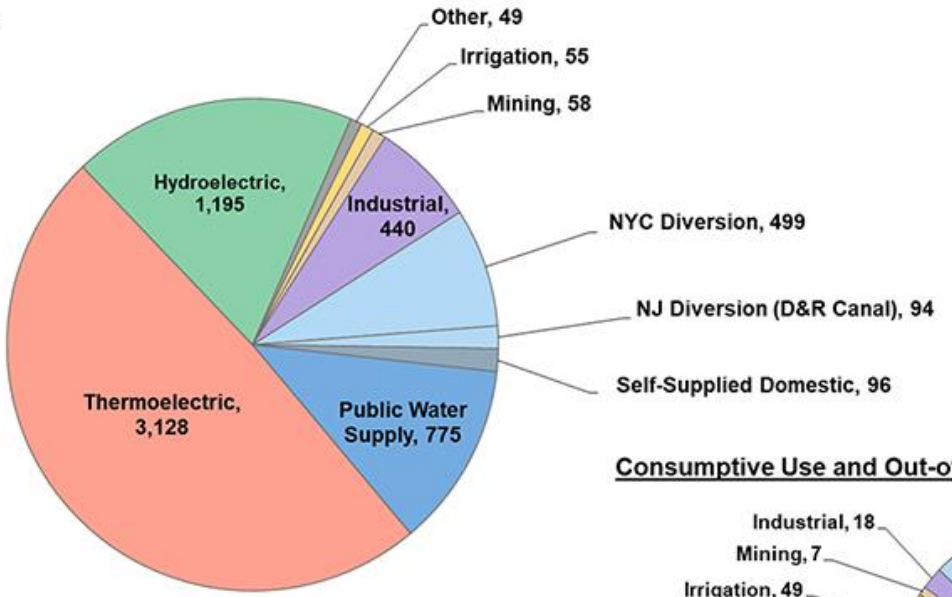
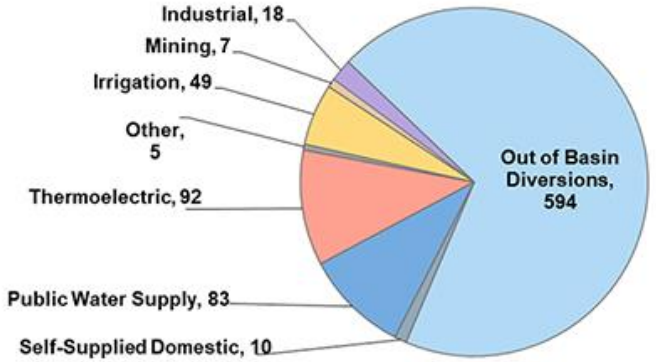
Key Components:

- Basin Water Use
- Water Use Projections & Reservoir Storage Needs
  - Is there enough supply to meet demand?
- Water Conservation
- Water Audit Program
- Water Charging Program

Total Water Withdrawals (ground and surface) from the Delaware River Basin, **2020**: **6,390 MGD**



Consumptive Use and Out-of-Basin Diversions: 857 MGD



Climate Change in the DRB

Need to consider climate impacts in water resource planning:

- Sea Level Rise, Salt Front Impacts
- Increasing air temperatures
- More frequent dry periods (droughts)
- More intense heavy rains (flooding)
- Seasonal changes in hydrology, snow pack & snow melt
- Instream flow & temperature changes on aquatic habitat

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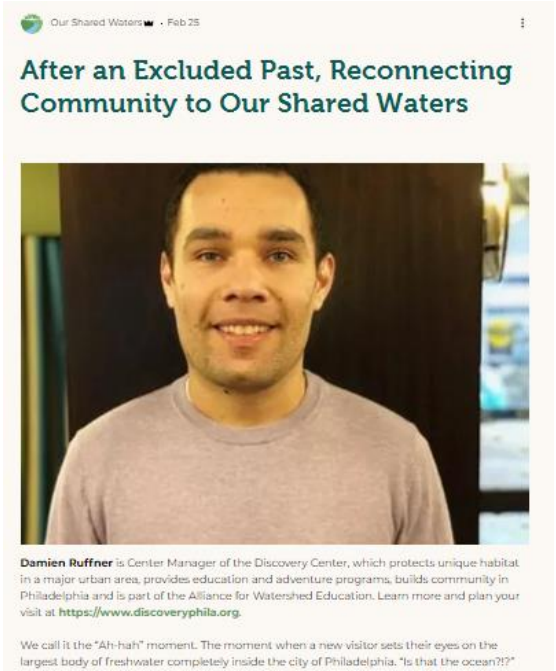
Our Shared Waters: Outreach/Education Partnership Program

Our Shared Waters is a DRBC-managed public outreach effort of multiple Delaware River Basin stakeholder groups.

Program Goals:

- Educate the public, partners and decision-makers about the current state of the Basin and the opportunities available to play a role in its continued sustainability.
- Connect people to their local waterways, connect with one another/create partnerships and connect with the bigger picture – we're all a part of the Delaware River Basin.



Basin Recreation & Education: Opportunities Abound!

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River Sojourns:

- Guided paddling & camping trips on the Delaware River and its tributaries (Lehigh, Schuylkill, Perkiomen)
- Mission: Connect People to the River through Paddling, Create River Stewards
- Family-Friendly Experiential Learning; Equipment & Basic Instruction Provided

Other Activities:

- Trails & Parks
- Fishing
- Birdwatching
- On-Water Activities
- Volunteering
- Learning Opportunities

Why Be Water Smart: So Many Wins

EPA WaterSense PARTNER

- **Preserves a Finite Resource:**
  - Using Less Water Conserves Our Freshwater Supplies: For People & For a Healthier Environment.
- **Reduces Pollution:**
  - Improved landscape practices (rain barrels, rain gardens, native plants) helps reduce runoff/non-point source pollution.
- **Saves Energy:**
  - Using less water reduces the amount of energy used in water & wastewater treatment. And, using less energy also saves water (largest water use in DRB is power generation)!
- **Saves Money:**
  - Homes that use less water can yield substantial savings on water, sewer & energy bills.

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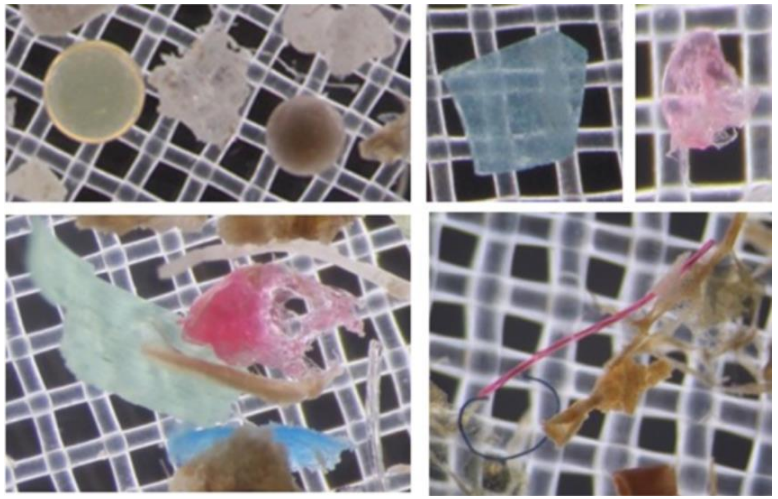
Water Smart in the Home: Kitchen/Laundry

- **Dishwasher & Laundry**
  Full loads only. Wash fleece less often to ↓ microplastics.
  Use cold water cycle & hang clothes to dry to save energy.

- **Compost Food Scraps**
  Don't use garbage disposal or throw away. Use on your gardens.

- **Drink Water From the Fridge**
  No need for bottled water at home or to run the tap for cold water.
  Keep cold, filtered water in the fridge.

- **Check for Leaks & Consider Efficient Appliances**
  If possible, replace with water-efficient or energy-saving appliances



As seen under the microscope: microplastics collected from the Delaware Bay by University of Delaware researchers. Photo courtesy of the University of Delaware.

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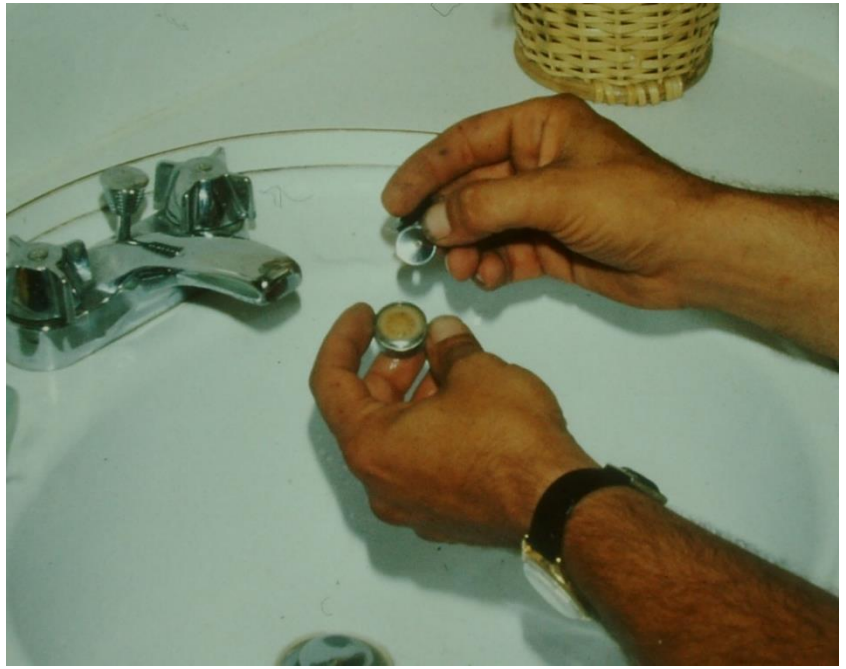
Water Smart in the Home: Bathroom

- **Install Low Flow Toilets**
  - Also check for "silent" leaks: Place food coloring in the tank & see if it leaks into the bowl.
- **Install Water Efficient Showerheads**
  - Shortening your shower by just 1 minute can save ~550 gallons/year
- **Turn OFF the Faucet When Not in Use**
  - Use aerators on faucets to reduce water use.
- **NEVER Flush Meds!**
  - Keep medications out of our rivers and streams. This is important for our drinking water & aquatic life.



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Water Smart Outside the Home

Nothing but Rain down the Drain!

Do NOT litter or put anything down storm drains – they are all connected to waterways. If you wouldn't drink it…don't dump it!

Reconsider Car Washing & Pavement Cleaning

Wash less often, with less water & "greener soaps." Or wash it at a car wash where they clean & recycle the water. Use a broom instead of a hose to clean off your driveway or sidewalk.

Reduce Salt Usage

- Shovel First & Often
- Don't Overuse; Reuse if Possible
- Use the Correct Product for the Temps (Rock Salt near Freezing, Calcium Chloride if Colder)
- Look for "Friendlier" Options or Try Using Sand

Gene Wilburn (Flickr; CC BY-NC-ND 2.0)

Water Smart in the Backyard

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Use Less Lawn Chemicals
Consider more earth-friendly alternatives. Always follow the instructions; more ≠ better. Don't apply right before a rainstorm.

Mowing & Watering
Use a mulching lawnmower or recycle clippings. Keep blades sharp for healthy grass. Water in evening or early mornings to minimize evaporation. Recycle yard waste.

Mom's Organic Market

Pick Up Your Pet's Poo
Adds bacteria & excess nutrients to stormwater runoff & waterways.

Water Smart in the Backyard

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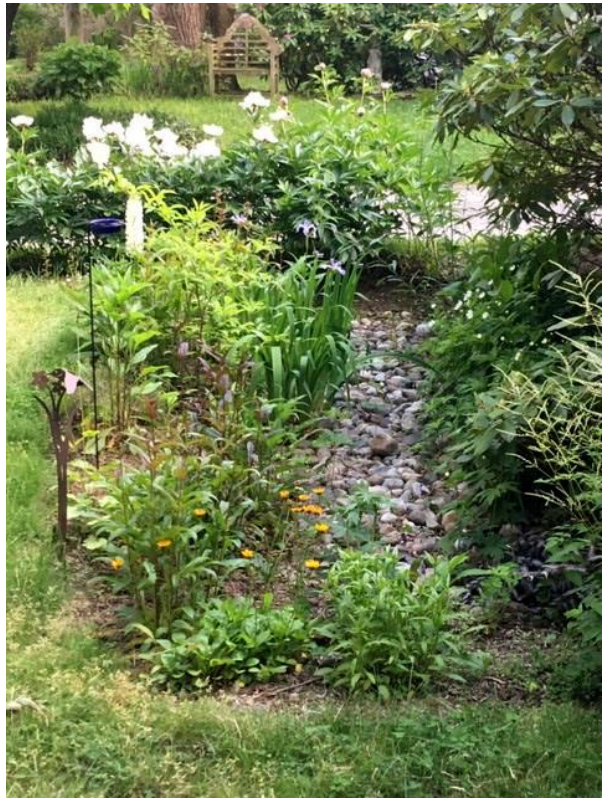
Use a Rain Barrel
Rain barrels catch & reuse water. Attach to a downspout or hook up to your air conditioner.

Install a Rain Garden
If you have wet areas on your property, a rain garden or a garden with moisture-loving native plants is a great way to absorb excess rainfall, reducing runoff and erosion.

Mulch Garden Beds; Consider Drip-Irrigation
Mulching helps retain moisture = less watering. Reduces soil erosion and the growth of weeds & is good for your soil as it breaks down. Drip irrigation is an efficient way to water.



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Use Native Plants & Those Adapted to Your Property's Conditions

Native plants benefit wildlife & are used to growing in your area, reducing fertilizer & watering needs. Always plant according to your yard's sunny/shady/dry/wet spots.

Don't Cut Your Gardens Back in the Fall

Let your plants go to seed in the fall. The seedheads provide food for birds, and the brush provides shelter for animals &insects during the colder months.

Out & About: Use Less Plastic

Use to Conserve Water & Reduce Plastic Waste:

- Refillable Drink Container
- Reusable Bags
- Say “No Thanks” to the Straw & Plastic Utensils (or BYO)
- BYO Carryout Containers

Why?

- World-Wide, 91% of Plastic Made was NOT Recycled
- Since 2012, the U.S. only Recycles 9% (Europe 30%, China 25%)
- Prediction: by 2050, there will be MORE PLASTIC in the Ocean than Fish (Ton for Ton)
- Plastics & Microplastics are found everywhere!

@yuvalzommer

Looking Ahead: Working Together

Side by Side, Top Down & Bottom Up

While the waters of the Delaware River Basin have improved, there is more to do to ensure they are drinkable, fishable, swimmable & equitable for all.

Each of us can help protect & conserve the Basin's waters!

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Thank you & Stay in Touch!

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Sign-up for Listservs

- https://www.nj.gov/drbc/contact/interest/

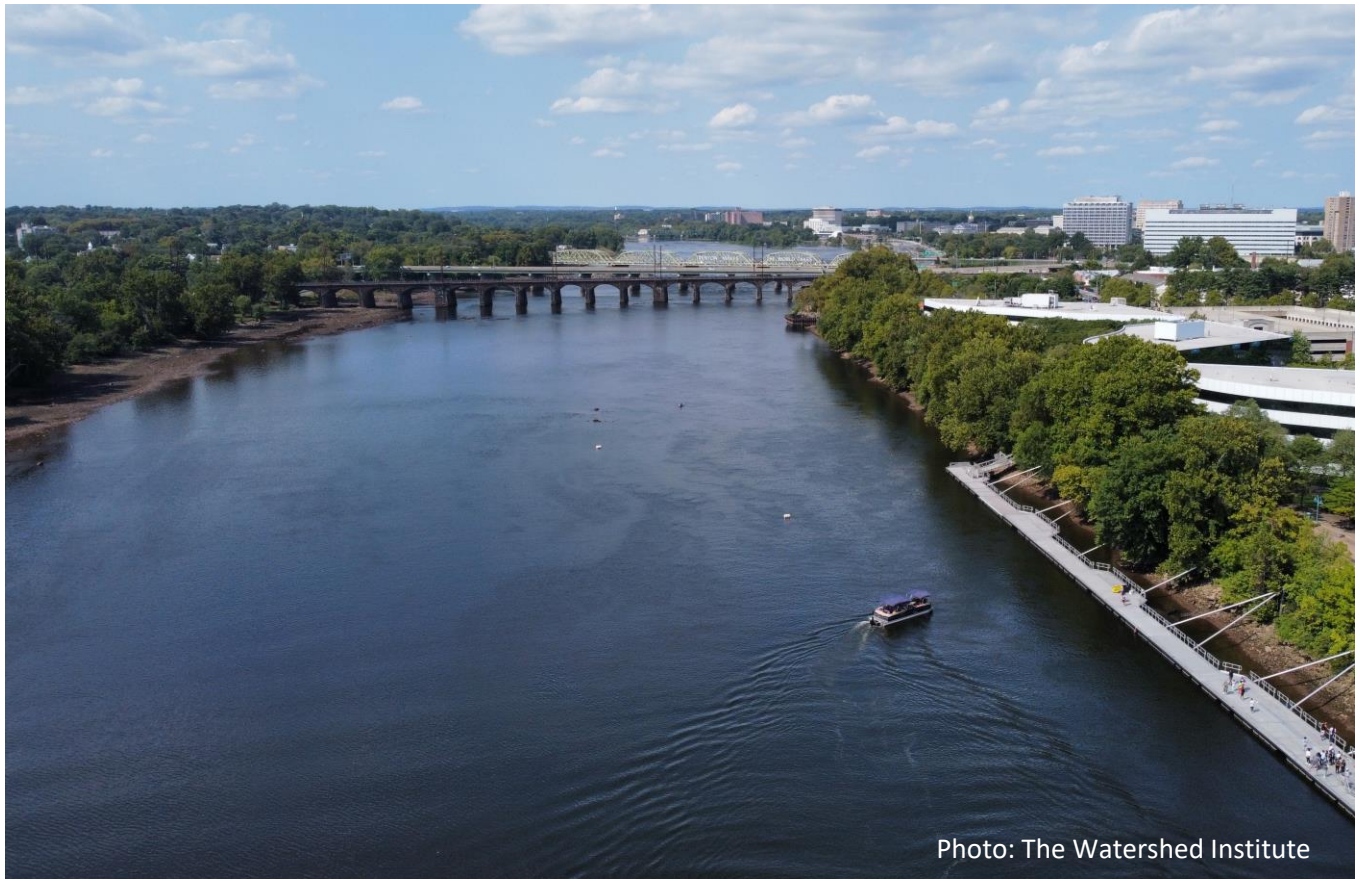

Photo: The Watershed Institute