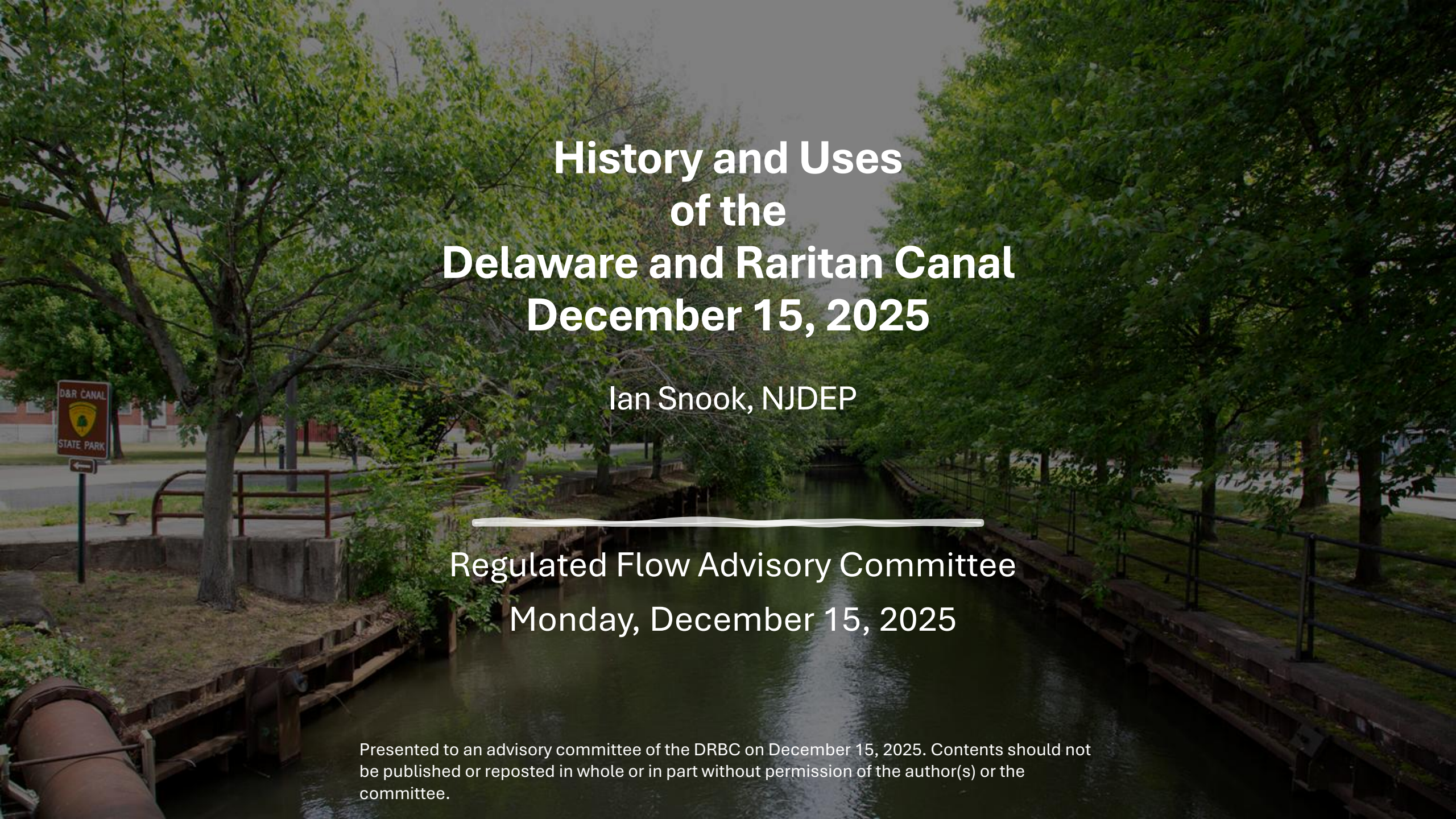


History and Uses of the Delaware and Raritan Canal December 15, 2025

Ian Snook, NJDEP

Regulated Flow Advisory Committee

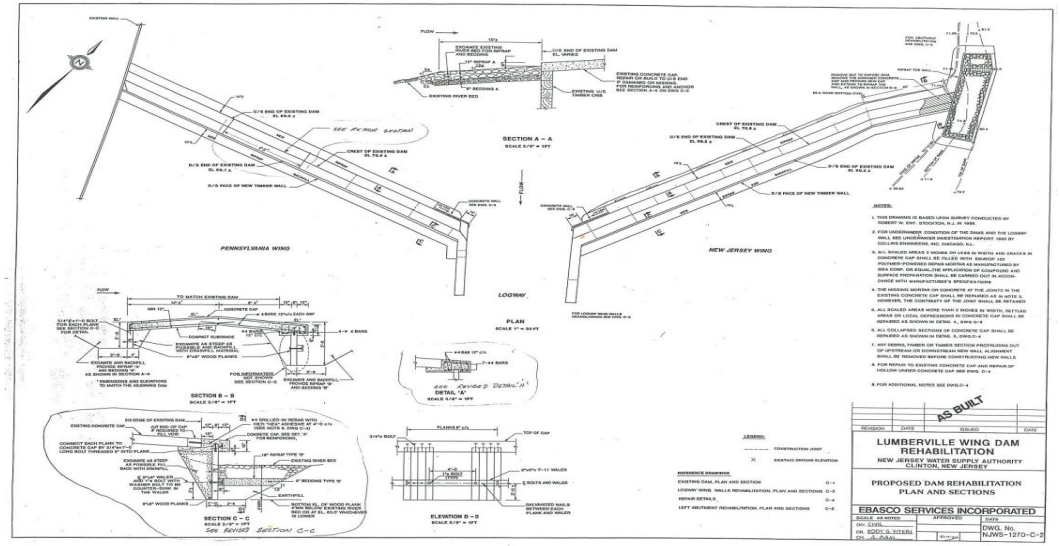
Monday, December 15, 2025

Canal Design

- The Feeder Canal from Bulls Island to Trenton is fed by the Delaware River, Lockatong Creek and Wickecheoke Creek
  - 22 miles long
  - 6’ Deep and 50’ Wide

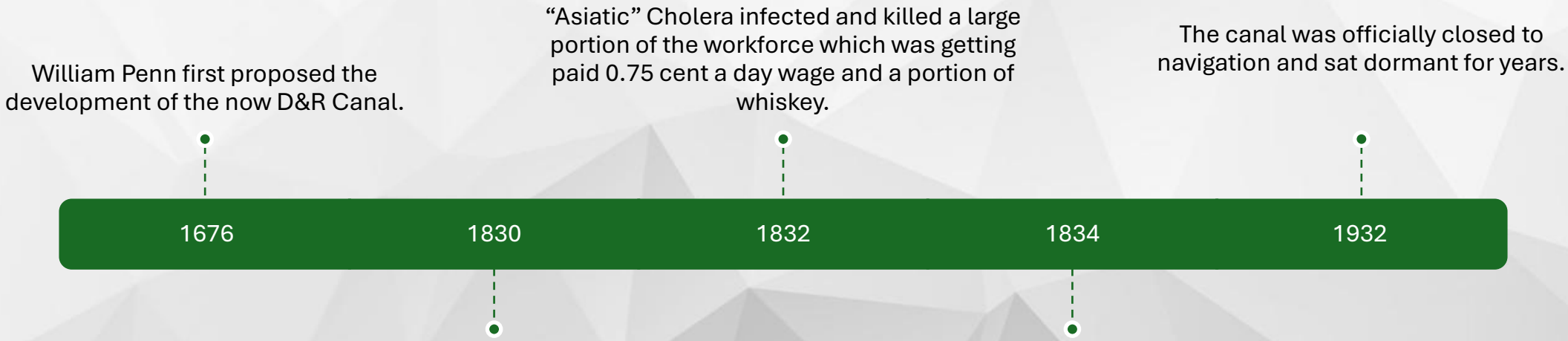
- Main Canal from Raritan to Bordentown
  - 44 miles long
  - 8’ Deep and 80’ Wide
  - 14 (24’ wide, 220’ long) locks managing 115 feet of elevation from Bordentown to the Raritan River.
  - Travel time is 8 days at 65 mgd and 5 days at 100 mgd

Wing Dam @ Lumberville



- Constructed 1464 feet downstream of the inlet @ Bulls Island
- Creates a pooling effect that provides the desired surface elevation for diversion through the inlet of the D & R Canal.
- The dam is designed to allow for aquatic passage and acts as a sediment funnel forcing water into the center channel.

A Vision for Commerce



The Impact of the Canal and Slow Fade

- During 1866 the Canal surpassed the gross tonnage of the Erie Canal at 2.8M tons shipped in a single year, making the Canal the most profitable in America.
  - It provided a sheltered passage connecting Philadelphia and New York without entering the dangerous shallow bays and ocean passage to the ports, shortening the route by over 100 miles.
- In 1932 after operating at a financial loss the time came when the rise of the railroads slowly rendered the canal waterway obsolete for moving freight.
- In 1936 the main canal in Trenton south of the juncture with the feeder portion of the Canal was deeded to the City of Trenton and filled as part of a Works Progress Administration project.
- In1944 construction began to convert the canal to a water supply system.

Rebirth as a Water Supply and State Park

During the 1940's the canal began to be rehabilitated for use as a public water supply transmission system.

- Replacing old wooden locks with dams to control water flow.

The 1954 U.S. Supreme Court Decree resolving dispute over the Delaware River water, authorized NJ to divert an average of 100 million gallons per day through the Raritan Basin.

- This solidified the rights of NJ to export water from the Delaware Basin through the canal to the Raritan Basin.
- The export is measured by the USGS 01460440 gage at Port Mercer, NJ.

Management and Oversight

The D&R Canal, owned by the State of New Jersey, is a unique system with divided responsibility~

Operated and maintained under the terms of a 1986 property lease agreement and maintenance operations agreement between:

- State of the New Jersey Department of Environmental Protection
- New Jersey Water Supply Authority (NJWSA)
  - Operates and maintains the Canal, ensuring the reliable flow of water.
- Delaware and Raritan Canal Commission (DRCC)
  - Created in 1974, the DRCC administers land-use regulatory program to protect the canal and its 400-square-mile watershed.
- New Jersey State Park Service
  - Designated a state park; the towpath is an extremely popular public trail. It has approximately 70 miles of continuous flat and mostly crushed stone path along the canal once used by mules pulling barges.

D&R Canal @ Swan Creek
Lambertville, NJ
Photo Credit: Shane Walsh, NJDEP

Port Mercer, New Jersey

- Located on the boundary of Lawrence Twp., West Windsor, and Princeton intersect in Mercer County, New Jersey which is 4.7 miles downstream of Trenton, New Jersey.
- Historical significance to the area of Port Mercer is due to its role in the American Revolution.
- Named after General Hugh Mercer, who died at the battle of Princeton.
- Served as the hamlet for nearby farms originally occupying the area called “Great Meadows”.
- At the site, a canal house was built at 4278 Quakerbridge Road around 1833-1834, home to the bridgetender and family who operated the swinging bridge and collected tolls for passage.

Hurricane Irene flooding 8-28-2011
Photo Credit: Paul Schorr, NJDEP

Port Mercer Gaging Station

- Located approximately 29 miles from the Delaware River diversion.
- **Data Collected:** The station monitors several parameters, including:
  - **Discharge (Streamflow):** Measured in cubic feet per second (cfs).
  - **Stream Water Level Elevation:** Measured in feet above NAVD 1988.
  - **Water Temperature** (in degrees Celsius).
- Other historical data collected has included specific conductance and turbidity.
- Because the D&R Canal is both a recreational corridor (State Park) and a critical water supply resource, the data from this gaging station is important for both water management and monitoring the health of the waterway.
- Between Port Mercer and the Canals terminus the canal stores nearly 0.56 BG.

How is the Canal utilized?

- Canal water is utilized as a supply for 5 public drinking water purveyors with over 1.5 million customers.
  - New Jersey American Water – 49.2 miles from the Delaware River
  - Middlesex Water Company – 58.5 miles from the Delaware River
  - New Brunswick Water Department – 58.5 miles from the Delaware River
  - North Brunswick Water Department – 42.9 miles from the Delaware River
  - East Brunswick Water Utility – 58.5 miles from the Delaware River
- During times of water supply emergencies, up to 60 mgd of water can be pumped into the Canal from the Raritan River at Ten Mile Lock.
- Canal use evolves to address emerging water supply needs and problems
  - In the summer of 2022, a major HAB on the Millstone River threated the NJ American intake downstream and significant volumes of water were released from the Raritan reservoirs to keep the HAB away from the intake.
  - The following summer 23 mgd of canal water was released downstream of Carnegie Lake which kept flows higher in the Millstone River and prevented a HAB from forming. The small canal release prevented much larger releases from the reservoirs from being made.
  - Additional work has started to prevent future HAB's from forming in Carnegie Lake and to reduce nitrates in wastewater discharges.

Photo Credit: New Jersey American Water Company

Raritan Basin System

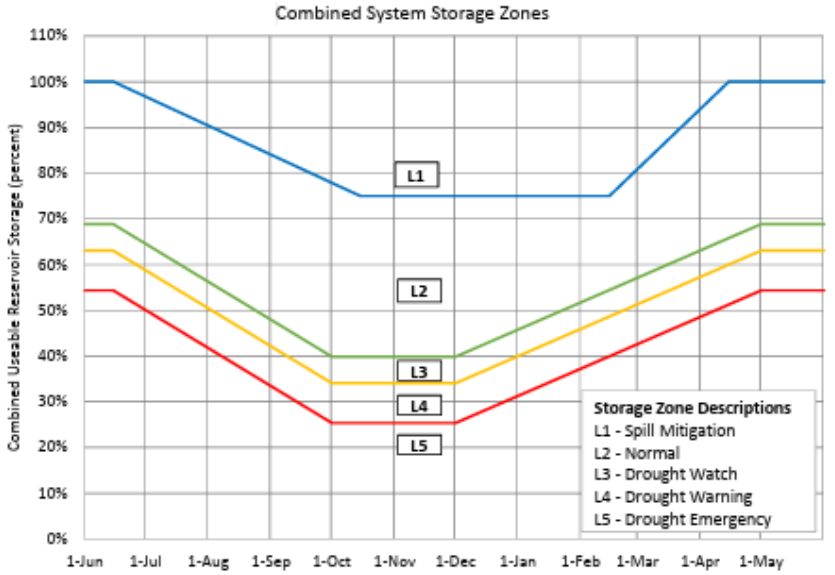
- The D&R Canal is an integral part of the Raritan Basin Water Supply System which provides 241 mgd of safe yield to 1.5 million people
- System consists of:
  - Spruce Run (11BG) and Round Valley (55 BG) Reservoirs operated conjunctively with the D&R Canal
  - 5 major potable supply intakes on both the Canal and Raritan River below reservoirs as well as multiple smaller diversions
  - Operated by the NJ Water Supply Authority (a quasi-DEP agency)
- The objective is to have no water flowing over the end of the canal, i.e. no waste
- The Canal, and Raritan Basin System as a whole, is a critical part of the state's water supply infrastructure which can provide water to the northeast and coastal north regions during emergencies.

Terminus of the Canal @ Route 18

Spruce Run Reservoir
32% Storage

Flows of the Canal

- Flows of the Canal are currently governed by the Flexible Flow Management Program of 2017
  - 10-year agreement
  - 5 party agreement between the States of Delaware, New Jersey, New York, Commonwealth of Pennsylvania and the City of New York.
  - The trigger for cutback to the Canal is the combined storage of the NYC reservoir system storage.
- 1991-2024 Annual average using monthly mean at Port Mercer was 86.5 mgd or 134 cfs.



Condition	'54 Decree	'83 GFA	FFMP 2007-11	FFMP 2012- 16	FFMP 2017
Normal	100 mgd	100	100	100	100
Watch	(no drought in Decree)	85	100	100	100
Warning		70	85	100	90
Emergency		65	85	85	80
Note: Limits are in million gallons per day as an average monthly rate, Decree/GFA/FFMP					

Maintenance

- Tree cutting/management and grass removal
- Spillway and culverts debris clearing
- Embankment and leak repairs
- Dredging , hydro raking
- In 2016 Hydrilla was discovered in the Washing Crossing section of the Canal.
  - In 2017 after extensive surveys and research, the NJWSA began a low dose (<4ppb) herbicide injection of Sonar Genesis for up to 120 days targeting hydrilla and other nuisance aquatic vegetation.
    - There are no restrictions on fish/fish consumption, human/animal water consumption or contact related to the treatment.
    - The presence of invasive weed within the Canal can greatly affect the ability to move the necessary quantities of water needed.

NJ Canal Diversion Scope of Work

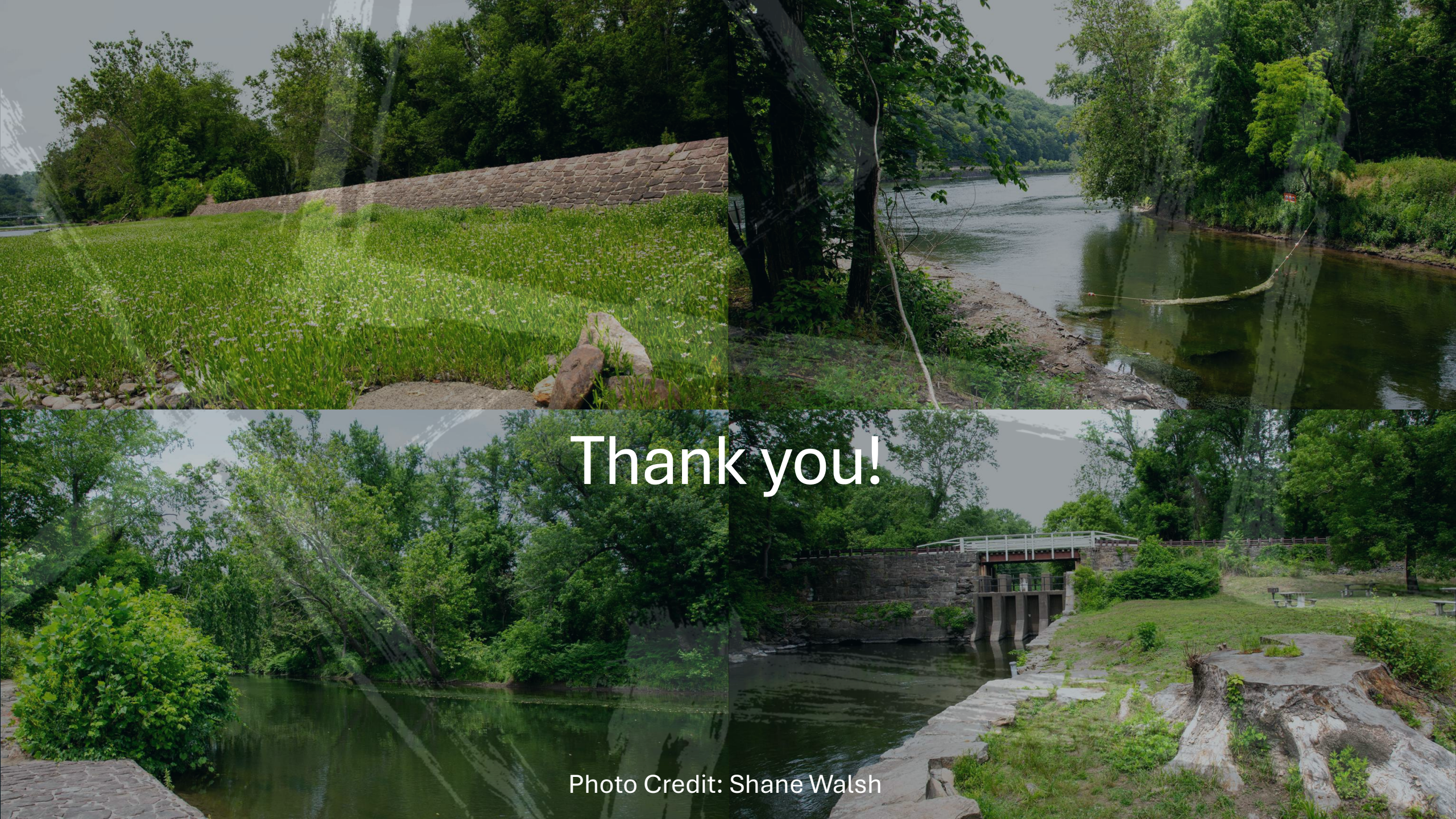
- The Flexible Flow Management Program 2017 identified the need to study the New Jersey Diversion as one of three major issues to be resolved during the 10-year agreement.
- The study tasks were designed to focus on:
  - Quantifying the impacts of drought on the Delaware and Raritan Canal (the diversion route).
  - Identifying hydrologic and hydraulically derived diversion limit(s).
  - Assessing the diversion rate's effects on basin resources, including reservoir storage and flow in the river and estuary.
- Currently available on the RFAC portion of DRBC's website.
  - Shared with the public on November 24th, 2025.
  - Comment will be accepted from the public until January 30th, 2026.

19th and 20th Century Value

- Canal was an economic lifeline and marvel of 19th century engineering
- Crucial Transportation Link
- Economic Development Corridor

Modern-Day Value

- Water Supply
- Recreation and Park Land
- Conservation Corridor for wildlife
- National Register of Historic Places since 1973



Thank you!

Photo Credit: Shane Walsh