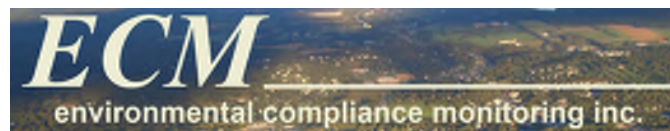


Watershed-based Plan to Control Phosphorus Loads to Duhernal Lake

Stakeholder Information & Education Session

September 25, 2025



Project Overview

- WMUA awarded a \$300,000 Water Quality Restoration Grant from NJDEP
- Goal: Development and Implementation of a Watershed-based Plan to Control Phosphorus Loads to Duhernal Lake, in support of NJDEP's Total Maximum Daily Load (TMDL) initiatives
 - TMDL = Load that a waterbody can take and still be in compliance with applicable Surface Water Quality Standards (SWQS)
- Focus: Reduce Phosphorus Load to Duhernal Lake
 - (Point & Nonpoint Sources)
- Project duration: 3 years (2023–2026)
- Stakeholders: 13 municipalities, 2 counties, utilities, and public

Regulatory Context

- NJDEP has concluded Duhernal Lake is in need of a phosphorus TMDL to attain compliance with the NJ SWQS
- A watershed-based plan can be an effective alternative to a traditional TMDL to characterize pollutant sources, the reductions needed to attain standards, and the means to achieve the reductions.
- Typically, watershed-based plans identify reasonably achievable Best Management Practices (BMPs) and load controls to be implemented by stakeholders in the near, medium, and long-term; in alignment with EPA's 9 Elements of a Watershed-based plan

Project Partners

- WMUA – Grant Recipient
- Kleinfelder – Technical Expert
- ECM Analytical Laboratory – Sample Analysis and Benchtop Study
- Municipal Stakeholders
- NJDEP – Grant Manager

Western Monmouth Utilities Authority

- The Western Monmouth Utilities Authority (WMUA) was established in 1972 by Marlboro and Manalapan Townships to provide wastewater treatment services to the Western Monmouth region of New Jersey.
- As a public authority created under the Municipal Utilities Authorities Law, it was formed to meet the requirements of the Clean Water Act.
- OUR VISION - The Western Monmouth Utilities Authority endeavors to be a world-class public authority committed to a leading role in the pursuit of environmental excellence.
- Owns and operates the Pine Brook STP, 250+ miles of pipe and 32 Pump Stations

Project Tasks

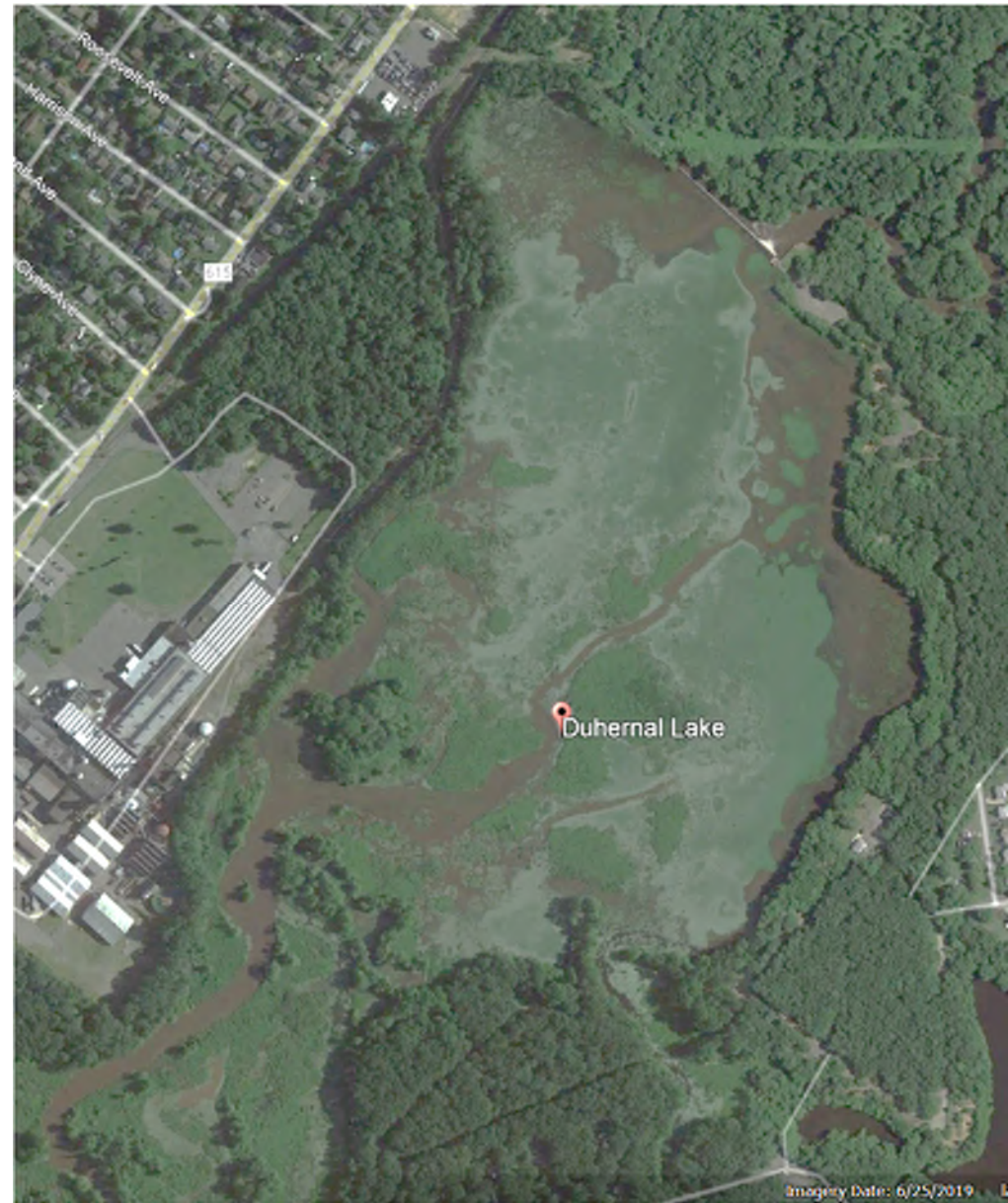
- Task 1 – Nonpoint source load assessment
- Task 2 – Point source load assessment
- Task 3 – Lake sediment internal loading assessment
- Task 4 – Total loading assessment
- Task 5 – Implementation and testing of nonpoint source controls
- Task 6 – Monitoring and testing
- **Task 7 – Public education program**
- Task 8 – Preparation and submission of final report
- Task 9 – Quarterly reporting (per grant requirements)

EPA 9 Elements and Project Tasks

EPA Element	Element Desc.	Project Task
I	Identification of the causes of impairment and pollutant sources	1,2,3,4
II	Estimate of the load reductions	1,2,3,4
III	Description of source management and critical areas	2,3,4,5
IV	Estimate the amounts of technical and financial assistance needed	5
V	Information and education component	7
VI	A schedule for implementing the management measures	8
VII	A description of interim measurable milestones	8
VIII	A set of criteria to determine whether loading reductions are being achieved	8
IX	A monitoring component	6

Duhernal Lake

- Duhernal Lake situated in Spotswood & Old Bridge
- ~118-acre impoundment, formed in 1930s by DuPont, Hercules, and National Lead by damming the South River
- Currently owned by Sayreville Water
- Maintains consistent water levels for adjacent well system
- Downstream terminus of Matchaponix Brook, Manalapan Brook, and Iresick Brook



Phosphorus Load

- Excess phosphorus can enter lakes, rivers, and streams and cause water quality impairments. It typically comes from human activities, including agricultural, suburban, and urban runoff, and wastewater discharge. Phosphorus is a key nutrient that stimulates plant growth, but too much of it can lead to excessive plant growth and associated environmental problems.

Phosphorus Load

- Excess phosphorus promotes nuisance-growth of algae and aquatic plants, leading to a phenomenon known as eutrophication. This process can degrade water quality, disrupt aquatic ecosystems, and harm fish and other wildlife.

Seasonal Changes in Duhernal Lake

July 24, 2023



August 14, 2023



Representative photos from dry weather sampling events

September 5, 2023



October 12, 2023



October 25, 2023



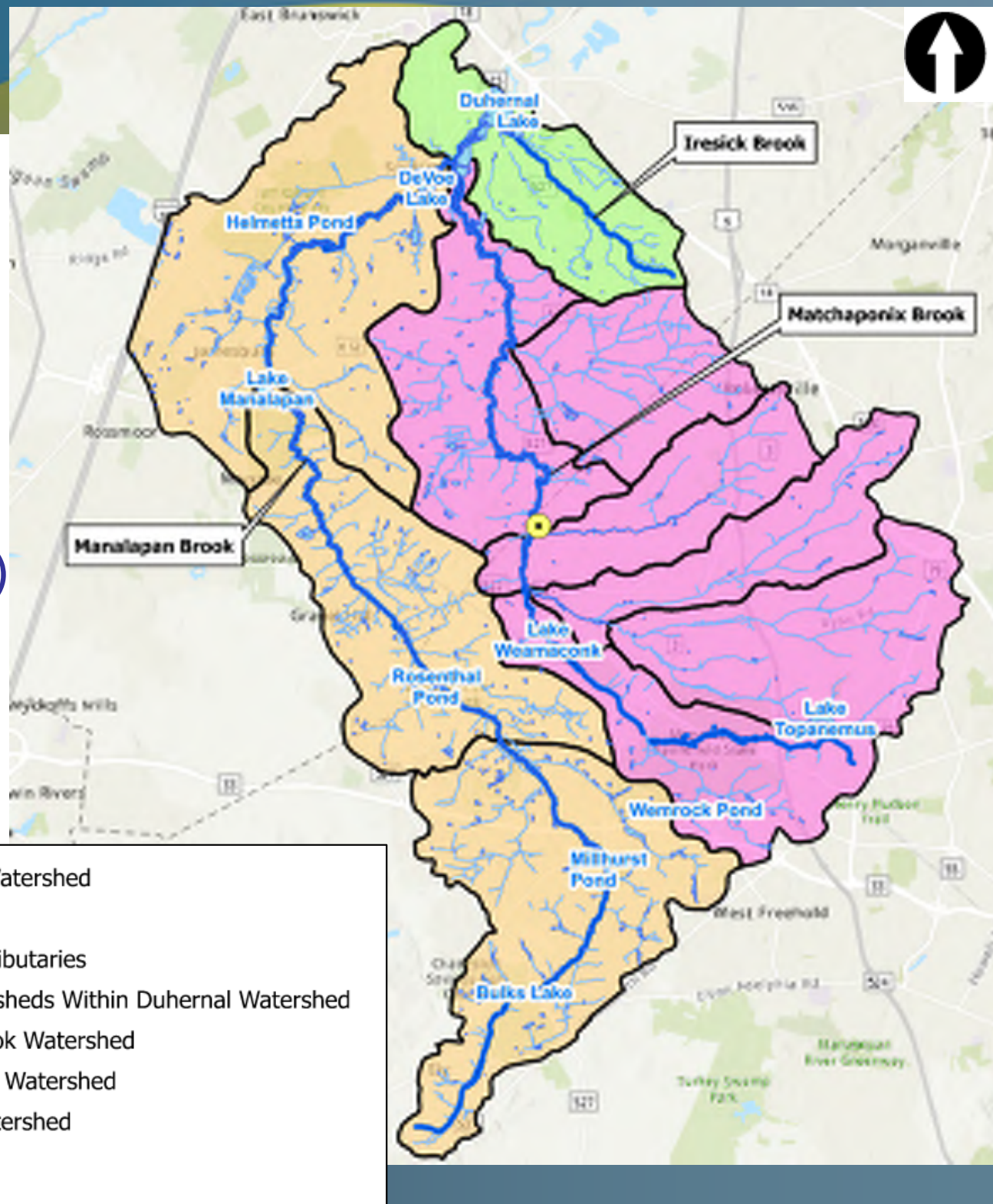
November 15, 2023



Representative photos from dry weather sampling events

Phosphorus Load Sources

- Stormwater runoff (nonpoint)
- Pine Brook STP (point)
- Internal Load from Sediments



Potential Methods to Reduce Phosphorus Load

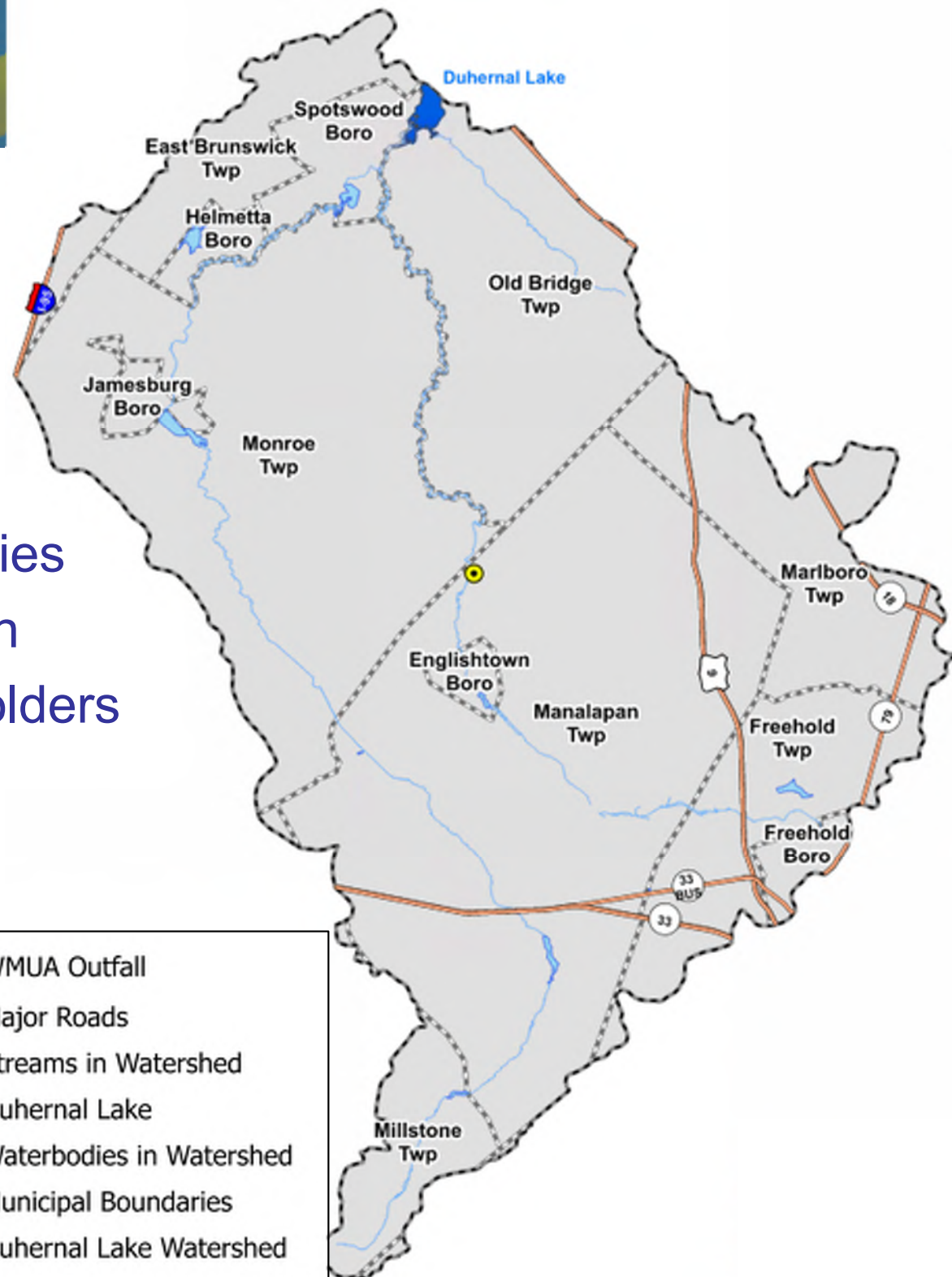
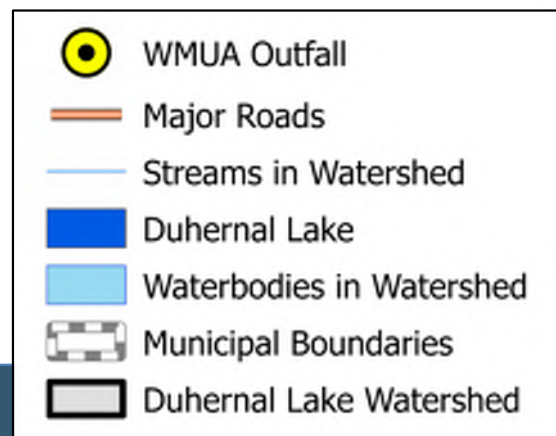
- Rain gardens, bioswales, detention and retention basins
- Wetland restoration & streambank stabilization
- Stormwater retrofits & street sweeping
- Optimized WWTP operations
- Control of internal phosphorus load from lake sediments



NJ Future: Stormwater Retrofit Guide, November 2023

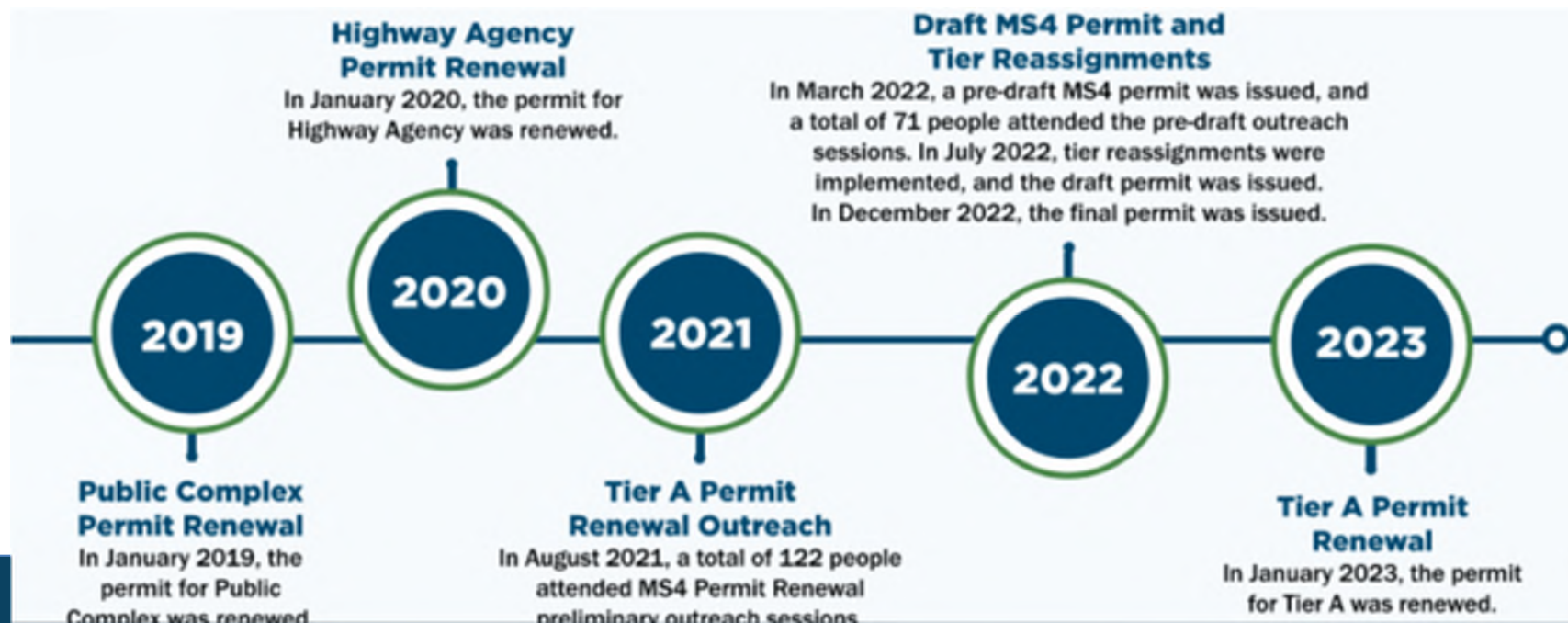
Role of Municipalities

- Stormwater Management
 - MS4 permit compliance
 - Implement BMPs locally
 - Provide stormwater priorities
- Support education & outreach
 - Identify additional stakeholders
- Collaborate on funding
 - Identify funding sources
 - Apply for funding



MS4 Permit Program at a Glance

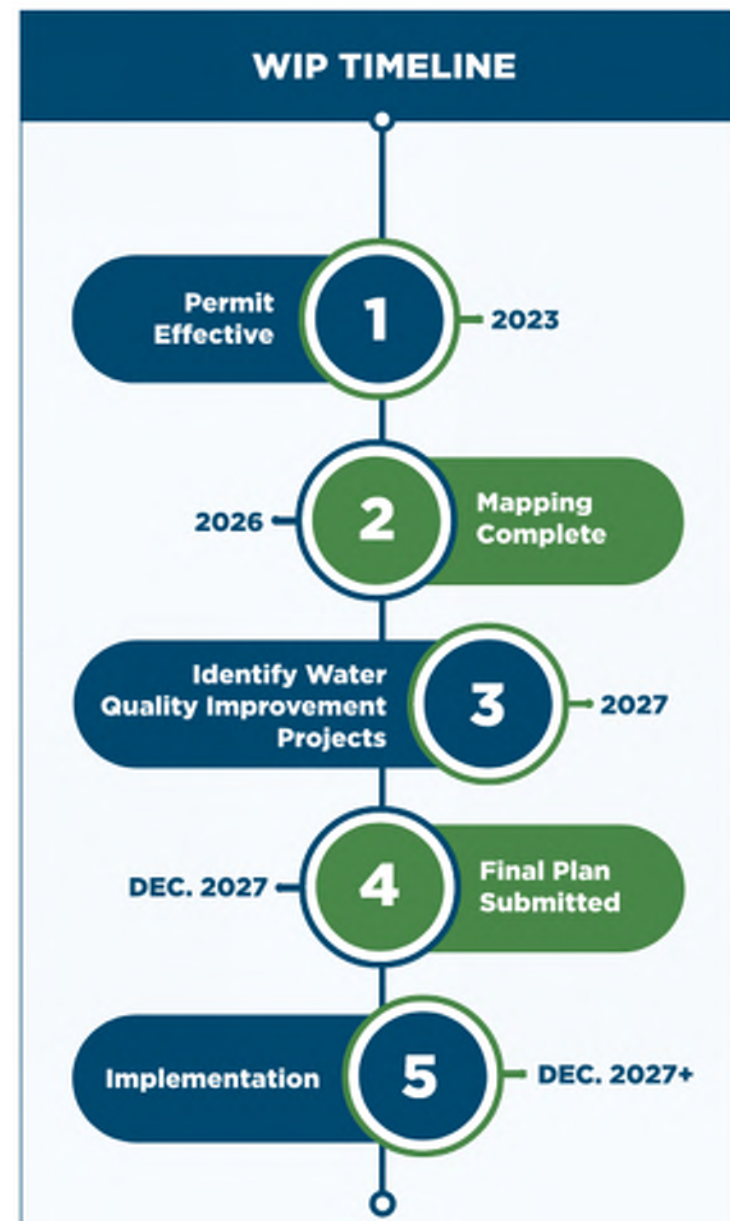
- All NJ Municipalities now hold Tier A permits
- Municipal Stormwater Management Plan
- Stormwater Pollution Prevention Plan
- MS4 Infrastructure Inventory
- Watershed Improvement Plan (WIP)



*NJ Future:
MS4 Primer,
September
2023*

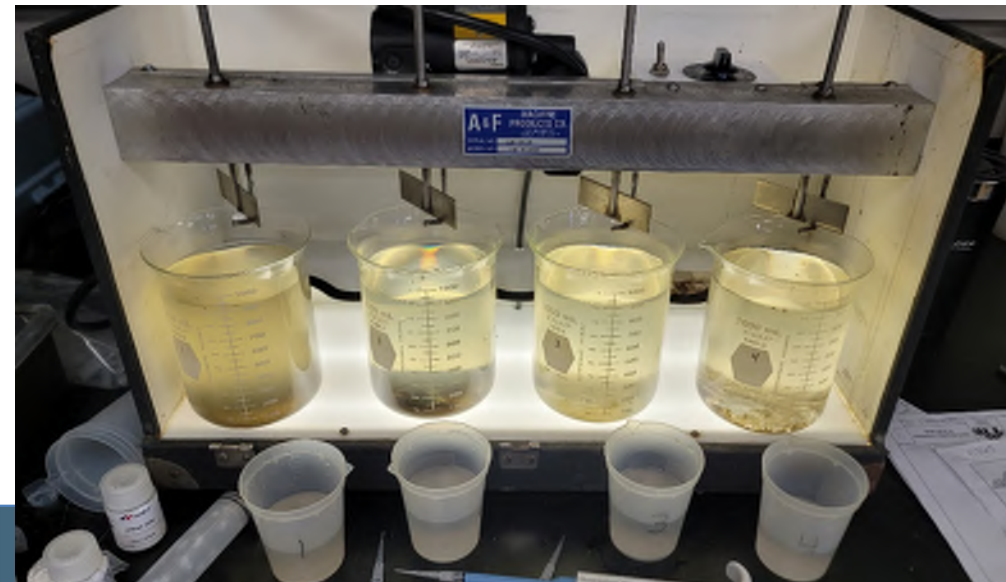
Watershed Improvement Plans

- **Phase 1 – Watershed Inventory Report**
 - Prepare and submit a summary and electronic mapping of stormwater system. Due 1/1/2026
- **Phase 2 – Watershed Assessment Report**
 - Prepare and submit an assessment of potential water quality improvement projects. Due 1/1/2027
- **Phase 3 – Final Watershed Improvement Plan**
 - Prepare and submit proposed water quality improvement projects. Due 12/1/2027



Project Timeline

- 2023 – Project Kickoff and data collection
- 2024 – Load analysis & BMP research
- 2025 – Pilot BMPs
- 2026 – Watershed-based Plan prepared and submitted to NJDEP



Next Steps

- Host additional stakeholder meetings
- Share interim results
- Identify BMP projects
- Develop funding partnerships
- Finalize Watershed-based Plan

*NJ Future:
MS4 Primer,
September
2023*



Thank You

○ We appreciate your support!

