

Restoring Our Clean Waters: An Urban Watershed Perspective

A Presentation to the Association of New Jersey Environmental Commission (ANJEC) Congress

September 25, 2026

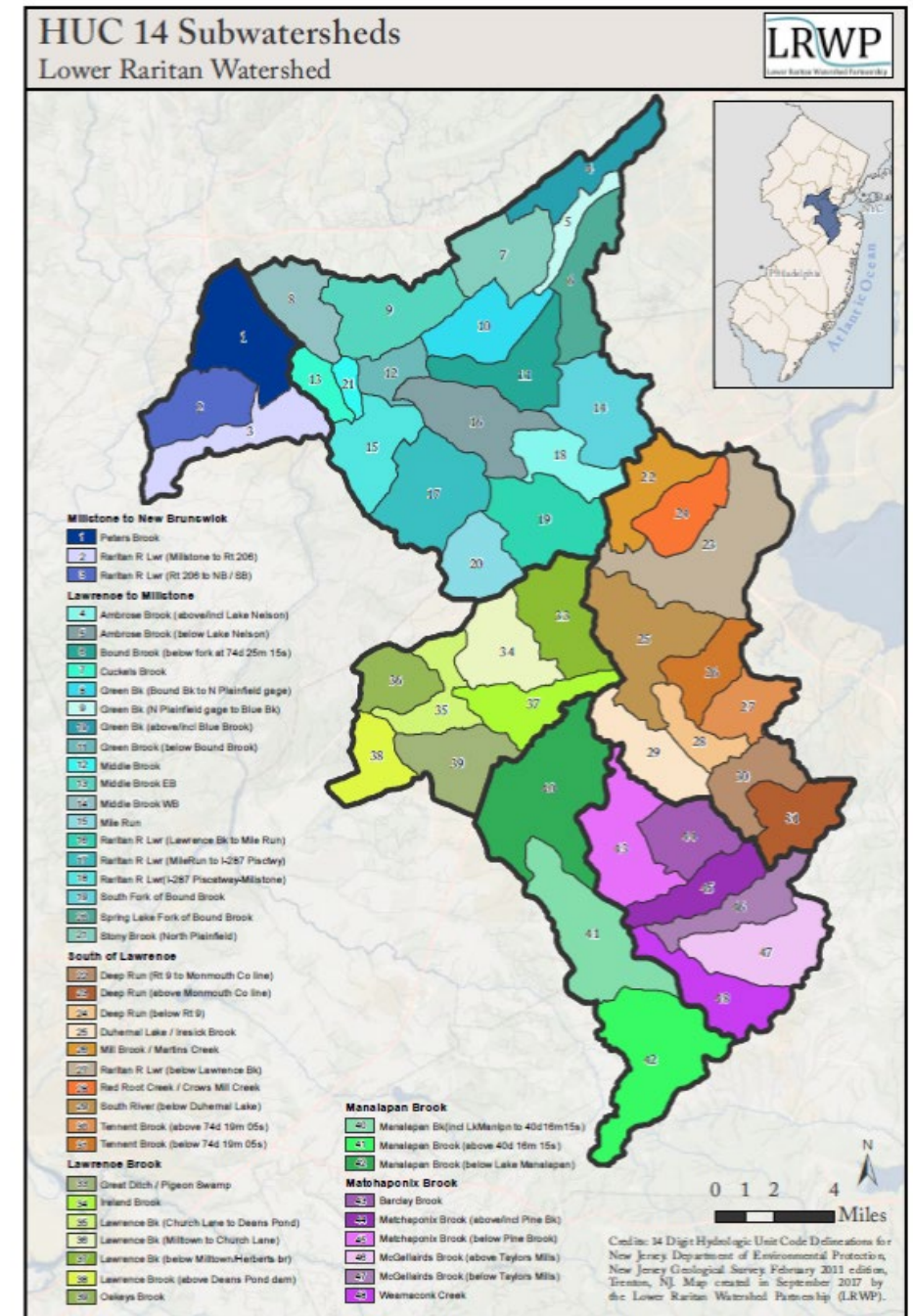
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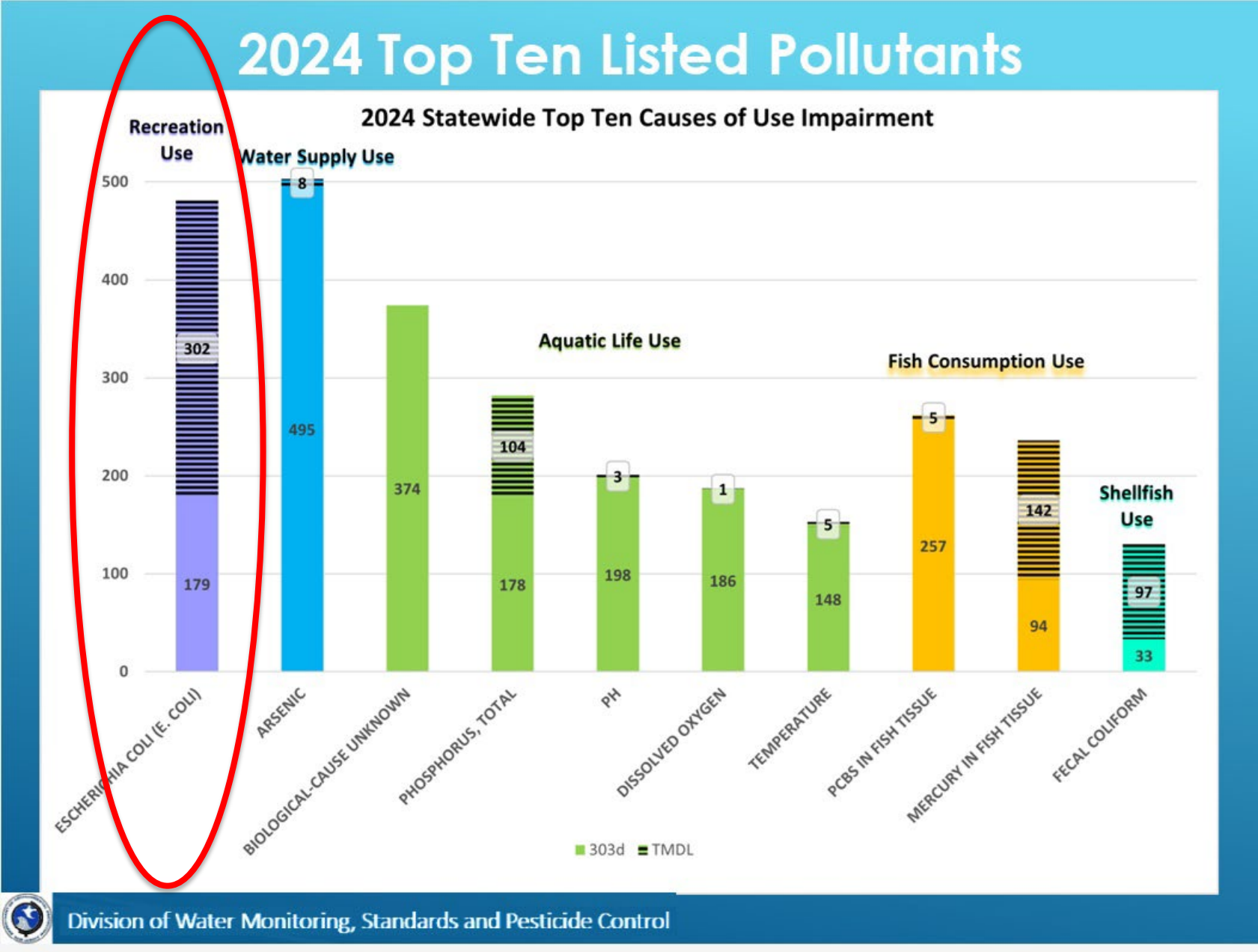
Lower Raritan Watershed Partnership (LRWP) “cultivating a culture of science & stewardship”

The LRWP vision:

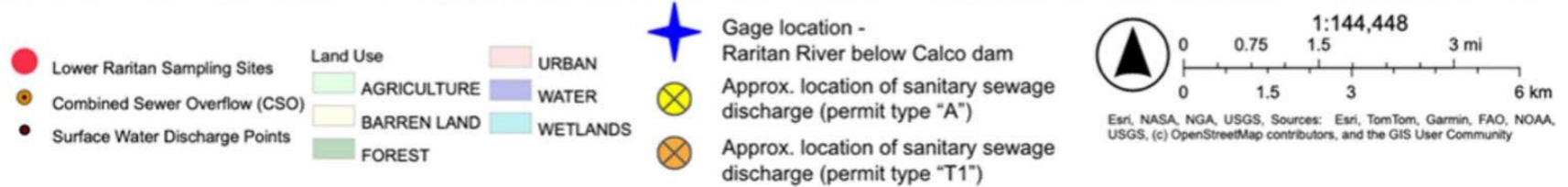
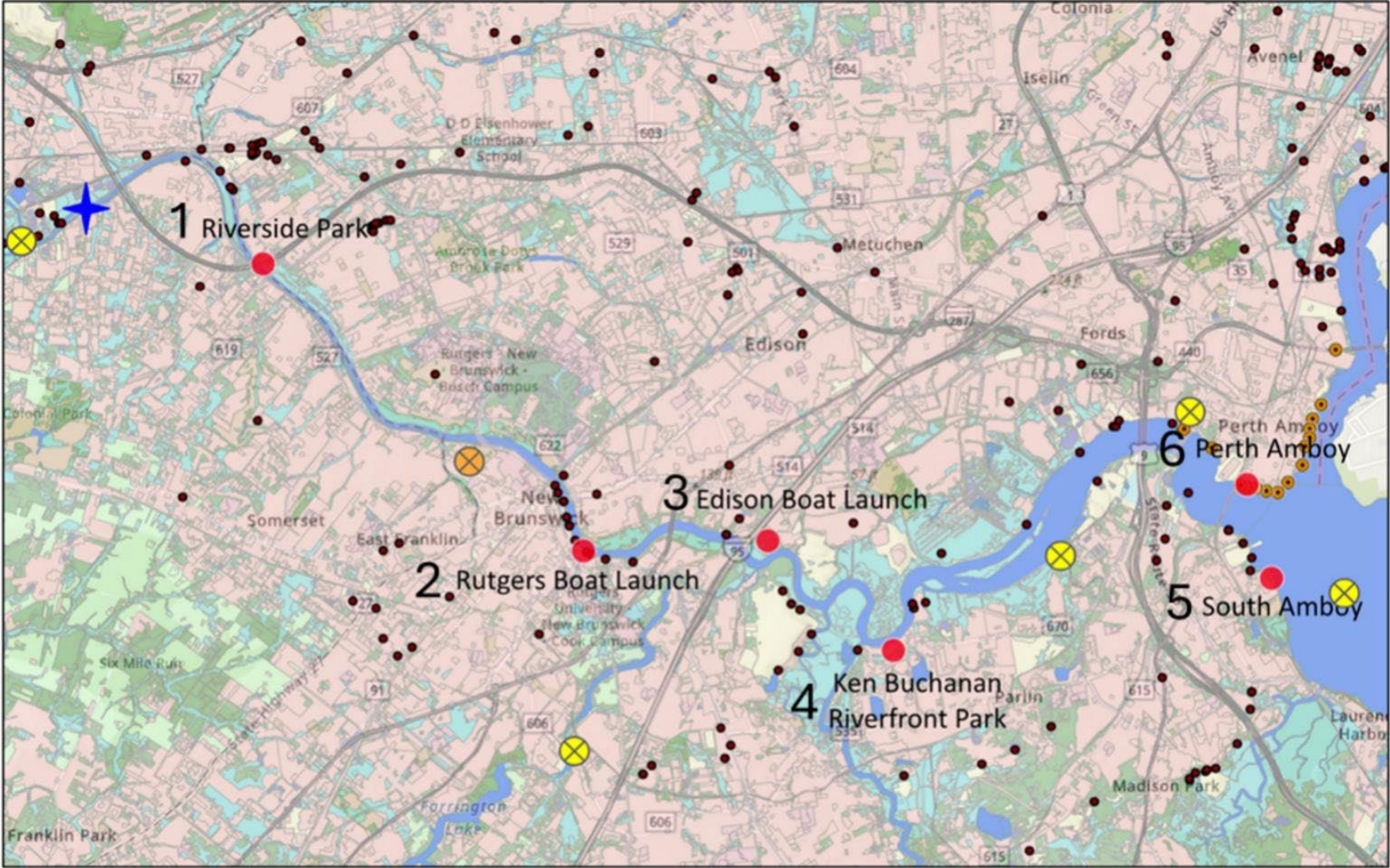
A healthy Raritan River and Lower Raritan Watershed community, restored and sustained through collaboration, participatory science, and stewardship



Protecting Our Urban Waters: Focus on Recreational Uses & Beach Advisories



Protecting Our Urban Waters: Water Monitoring at Raritan River Non-Bathing Public Access Beach Sites



Protecting Our Urban Waters: What do we monitor and why?



Protecting Our Urban Waters: What do we monitor and why?

- Presence of Enterococcus
 - Indicator of disease-causing bacteria
- Presence of Fecal Contamination
 - Indicator of disease-causing bacteria
 - Potential indicator of sanitary sewage infrastructure failures
- Water Temperature
 - Aquatic life -> changes in temperature can be harmful
 - Affects pH and DO levels
- Salinity
 - Indicates pollution or wastewater input
 - Varies across sites because of tidal and estuarine influence
- Dissolved Oxygen
 - Aquatic life - > low levels can result in hypoxia and fishkills
- pH
 - Affected by (stormwater) runoff, algae blooms and human activity
 - Indicates possible sources of industrial pollution
- Chl-ug/L + Chl-RFU
 - Indicates harmful algae blooms (HAB) via phytoplankton
- Latitude/Longitude
 - Ensures location accuracy

Interstate Environmental Commission Laboratory
NELAP Certified Laboratory - NY Lab ID 10437, NJDEP Lab ID NY240, CTDPH Reg. No. PH-0320
BioBAT, Brooklyn Army Terminal | 140 58th Street, 2nd Floor of Building A | Brooklyn, NY 11220

IEC Volunteer Pathogen Monitoring Field Datasheet

Date of Sampling:							Organization:				
IEC Investigation Number:							Weather Conditions:				
Crew/Sampling Team:											
Station ID	Time	Temp (°C)	Salinity (ppt)	Dissolved Oxygen (mg/L)	Dissolved Oxygen (% sat.)	pH	Chl-α (µg/L)	Chl-α (RFU)	Phycocyanin (µg/L)	Latitude	Longitude

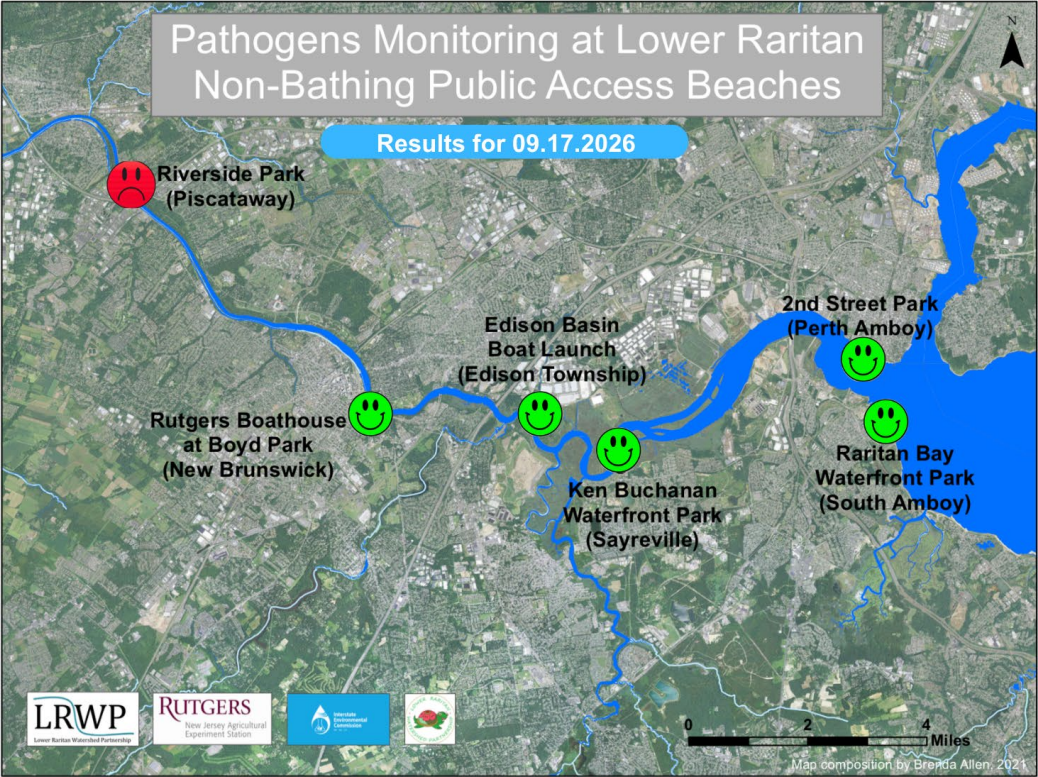
Comments:

Parameter	Range
Temperature (°C)	-5 to 65°C
Salinity (ppt)	0 to 70 ppt
Dissolved Oxygen (mg/L)	0 to 20 mg/L
Dissolved Oxygen (% sat.)	0 to 200%
pH	0 to 14 pH units
Chlorophyll-α (µg/L)	0 to 100 µg/L
Phycocyanin (µg/L)	0 to 199 µg/L



Fish kill observed in Sayreville during water quality monitoring in 2020

Protecting Our Urban Waters: Communicating Weekly Water Quality Findings



Raritan River Pathogen Monitoring Results for: 09.17.2026

Site Name	Time Sampled	Enterococcus (CFUs)	Fecal Coliform (CFUs)	Status
LR1- Riverside Park	7:45 am	160	440	☹️
LR2- Rutgers Boathouse	9:03 am	38	100	😊
LR3- Edison Boat Basin	9:47 am	40	100	😊
LR4- Ken Buchanan Waterfront Park	10:34 am	31	80	😊
LR5- South Amboy Waterfront Park	11:07 am	10	*	😊
LR6- 2nd St. Park	11:42 am	2	46	😊

Enterococci and Fecal Coliform sampling results are reported in Colony Forming Units (CFUs). Environmental Protection Agency (EPA) National Bacteria Criteria: To protect human health during primary contact recreation, Enterococci bacteria in coastal and marine waters must not exceed 104 cfu / 100 mL.

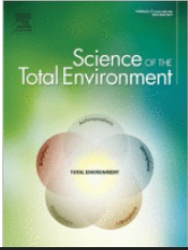
EPA Legacy Fecal Coliform Standard: To protect human health during primary contact recreation, Fecal Coliform in coastal and marine waters should not exceed 200 cfu / 100 mL.

These results are preliminary, awaiting Quality Control (QC) by our sample processing lab the Interstate Environmental Commission (IEC), which operates in partnership with the EPA.

*LR5 assessed using 'Most Probable Number' rather than 'Colony Forming Units.' Most Probable Number analysis only estimates the enterococcus count, not the fecal coliform.

www.lowerraritanwatershed.org

Protecting Our Urban Waters: Communicating Water Quality Findings



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Comparison of propidium monoazide and total-DNA based qPCR and long-read sequencing for microbial source tracking in an estuarine river

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10.1016/j.scitotenv.2025.181271

Article

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Metrics

Highlights

- Fecal source tracking done via viability-based and total-DNA biomolecular methods
- Less human fecal marker HF183 seen in PMA-DNA compared to total-DNA
- No correlations between indicator organisms and qPCR, regardless of DNA prep method
- Correlations between indicator organisms and PMA sequencing and SourceTracker

Abstract

Pathogen pollution is a widespread water quality issue motivating fecal source tracking efforts to inform mitigation strategies. Biomolecular approaches including qPCR and library-based methods have been widely applied for fecal source tracking but can result in false positives given the persistence of DNA in aquatic systems. The potential for viable-cell DNA (i.e., propidium monoazide, PMA-DNA) to improve correlations with cultivable fecal microbes has received less attention than total-DNA based biomolecular approaches. The objectives of this study were to compare the results from total and PMA-DNA for human

Outline

Highlights

Abstract

Graphical abstract

Keywords

1. Introduction

2. Methodology

3. Results & discussion

4. Conclusions

CRedit authorship contribution statement

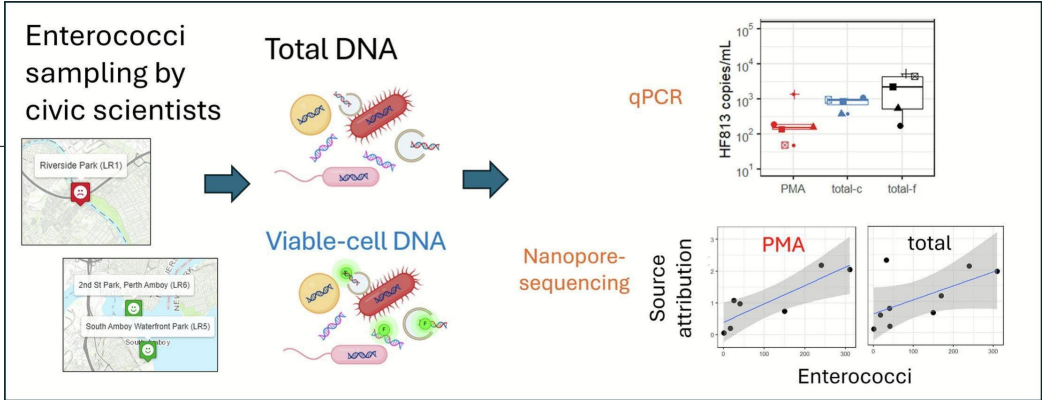
Declaration of competing interest

Acknowledgements

Appendix A. Supplementary data

Data availability

References



Reading Assistant

Protecting Our Waters: Communicating Water Quality Findings

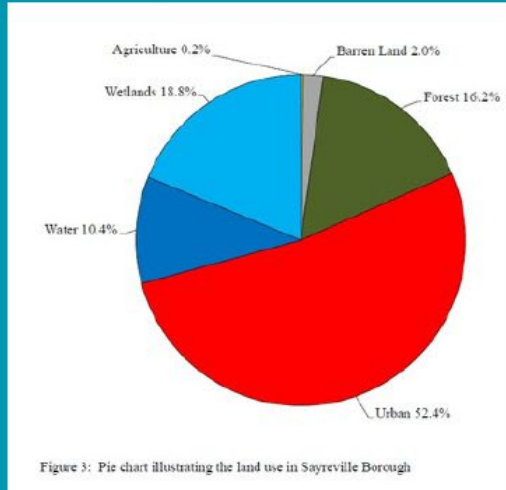


KEY FINDINGS FOR KEN BUCHANAN BOAT RAMP SAYREVILLE, NJ

- This site exceeded the federal standard for Enterococcus pathogens 51 / 131 sampling events in the last six years.
- This site consistently exceeds federal standards for Fecal Coliform.
- High pathogens and fecal levels are linked to precipitation.

CAUSES OF POLLUTION

52% of Sayreville is urbanized. Urban communities have more hard surface (impervious cover), which increases flooding and stormwater runoff.



Stormwater runoff carries pollutants into our waterways. Pervious land surfaces like wetlands and forests work to naturally filter out pollutants before they enter the water and are important for water quality and environmental health

Sources of stormwater pollution:

Fertilizers/Pesticides/Grass Clippings
Pet/Animal waste
Litter
Improperly functioning wastewater & stormwater infrastructure

STORMWATER MANAGEMENT

Under the Federal Clean Water Act, all New Jersey Municipalities are required to secure Municipal Separate Storm Sewer System (MS4) permits.

These permits focus on:

- Pollution prevention measures
 - Treatment and removal techniques
 - Water Quality Monitoring
 - Measures to control discharge of stormwater runoff.
-
- **Sayreville should focus on the following to improve stormwater management:**
 - Seek funding via the Bipartisan Infrastructure Law to modernize stormwater and sanitary sewage infrastructure.
 - Adopt and implement an impervious cover reduction strategy
 - Protect and restore all remaining wetlands and forests
 - Increase education and outreach around water quality, environmental health and stormwater management

Protecting Our Waters: Strategies for Urban Waters

LRWP's STRATEGIC ACTION PILLARS

01

Sewage & Pathogen Control

- Private Lateral Sewer Repair Ordinances
- Stormwater Utilities

02

Restoring Habitat Connections

- Culvert Retrofits / Connecting Habitat Across New Jersey (CHANJ)
- Riparian area restoration

03

Planning for Resilience

- Establish Inter-Municipal Authorities
- Resilient Floodplain Restoration

04

Celebrating Our Watershed

- #lookforthe river / historic hydrology and place-based environmental education
- Supporting on-water recreation

01 - Sewage & Pathogen Control

Willingboro Twp Private Lateral Sewer Inspection Ordinance for COO

Private Lateral Sewer Repairs

Willingboro Township required private sewer lateral inspections starting on September 21, 2021, under [Ordinance No. 2021-13](#). [\[1\]](#)

Key Details

- **Ordinance:** No. 2021-13
- **Adoption Date:** September 21, 2021
- **Requirement:** A video inspection and certified report from a master plumber proving the private sewer lateral is in satisfactory condition before obtaining a Certificate of Occupancy.



Inspection of Private Sewer Laterals for Resales

A private sewer lateral is the pipe that connects a home's plumbing system to the MUA wastewater collection main pipeline. The lateral is considered the "private" segment when it is located on private property and serves the purposes of an individual, privately owned building. The property owner is responsible for the entire pipe length, including the wye or saddle at the point of connection to the MUA mainline. To protect the public health and safety these pipes must be regularly inspected and repaired to maintain their integrity.

Willingboro Township has placed into their ordinance new regulations that will require a video inspection and a certified inspection report from a Master Plumber to indicate whether the private sewer lateral is in satisfactory condition. If it is determined that the sewer lateral needs to be repaired, such repairs **MUST** be completed prior to the issuance of a Certificate of Occupancy and prior to occupancy of the house since without a properly functioning lateral a house is not fit for human habitation.

Private Sewer Lateral Compliance Certificate Requirements:

No Repairs Needed - Qualified Plumber completes required video inspection and fills out the Private Sewer Lateral Inspection Report. If no repairs are necessary, turn in the completed Private Sewer Lateral Inspection Report a copy will also be stored within the property files.

Repairs Needed - If repairs or replacement is necessary, the Property Owner should obtain multiple quotes to complete the work, obtain a plumbing permit for work, and complete the sewer lateral repair/replacement work. Once all inspections from the Township Plumbing Inspector and the MUA have been approved, a Certificate of Approval for the work completed will be issued and the Plumber or Property Owner will return a (post repair) Private Sewer Lateral Inspection Report.

It is recommended that this process start once the property is listed for sale due to the time it will take for completion, but no later than once a property has an agreement of sale. The inspection must be completed before the property is transferred.

The sewer lateral inspection is good for 6 months. If a property transfers ownership within that time frame another inspection is not required.

01 - Sewage & Pathogen Control Stormwater Utilities



100%

Dedicated Funding Revenue

Clean Stormwater & Flood Reduction Act

Statutory Authority: N.J.S.A. 40:14A-1 / N.J.S.A. 40A:26B-1 empowers NJ municipalities and sewerage authorities to create dedicated Stormwater Utilities

Equitable Feebate Model: User fees are assessed based on hard impervious surface area. Property owners who install private green infrastructure retrofits receive direct fee credits ("feebates").

Feasibility Funding: Feasibility studies and legal framing are supported by NJ Water Bank (NJWB) Planning & Design Grants.

02 - Restoring Habitat Connectivity: Culvert Retrofits & Connecting Habitats Across New Jersey (CHANJ)

Aquatic Connectivity



Hydraulic Capacity



Water Resources Institute
Cornell University
Cornel Culvert Model

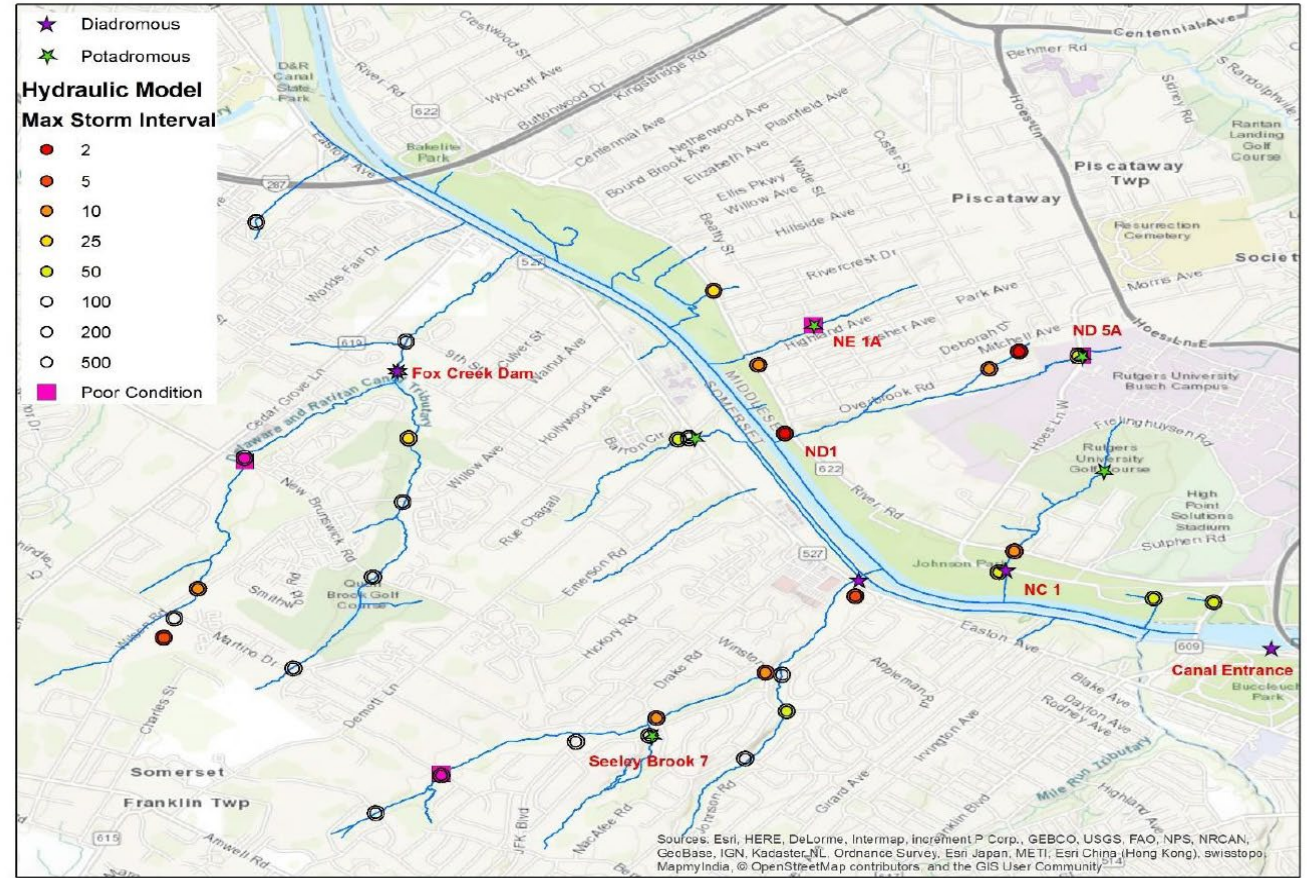
CHANJ Platform

<https://dep.nj.gov/njfw/conservation/tools-of-chanj/>

From the CHANJ mapping web viewer:

1. Select the layers for “NAACC Culvert Inventory of New Jersey – Aquatic Organism Passability”
2. Click on the colored squares for data, photos and culvert retrofit details

Raritan Restoration Recommendations



03 – Planning for Resilience

Inter-Municipal (Watershed) Authorities

Legal Authority & Structuring

Shared Services Act (N.J.S.A. 40A:65-1): Enables neighboring municipalities and counties to establish joint watershed management commissions through Interlocal Agreements.

Consolidated Services Act (N.J.S.A. 40:48B-1): Grants joint authorities full power to manage regional drainage, outfall monitoring, and green infrastructure operations.

N.J.S.A. 40A:65-1 | Shared Services

Common Scope of Shared Services in Watershed Management

Under N.J.S.A. 40A:65-1, municipalities structure their environmental interlocal agreements to cover:

- 1. Equipment Sharing:** Joint purchasing or leasing of specialized machinery, such as jet-vac trucks, street sweepers, and hydro-excavators.
- 2. MS4 Permit Compliance:** Shared public education programs, GIS outfall mapping, and joint water-quality sampling.
- 3. Regional Stormwater Utilities & Maintenance:** Coordinated maintenance of regional detention basins, stream cleaning, and flood-mitigation infrastructure crossing town lines.

03 – Planning for Resilience

Resilient Floodplain Restoration



NJ REAL Rules (N.J.A.C. 7:7, 7:13):

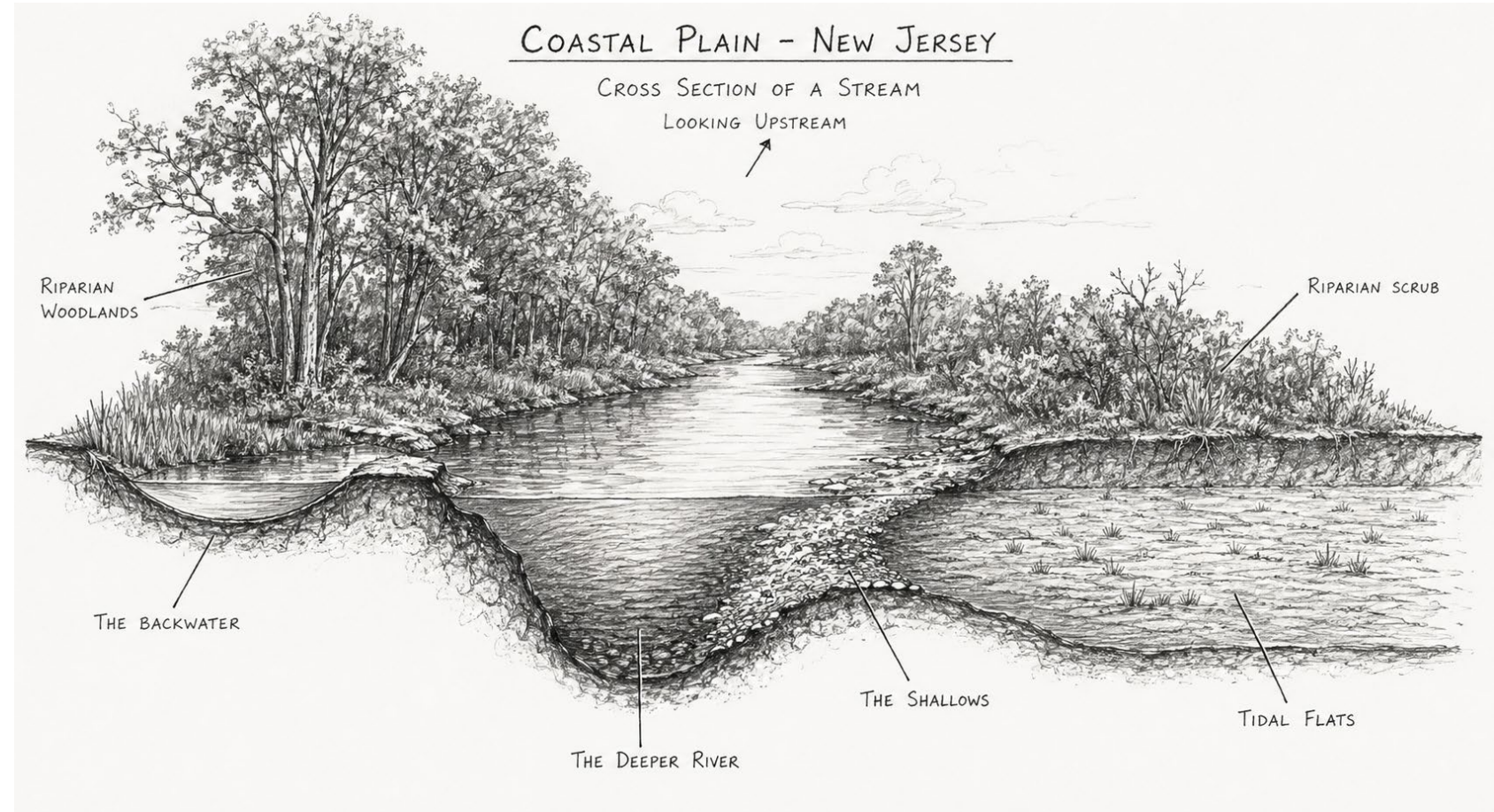
Updates flood hazard standards for climate-driven sea level rise and extreme rainfall events.



Blue Acres Buyouts: Uses Green Acres funds (N.J.S.A. 58:16A-50) to acquire flood-prone properties and convert them into permanent natural wetland buffers.

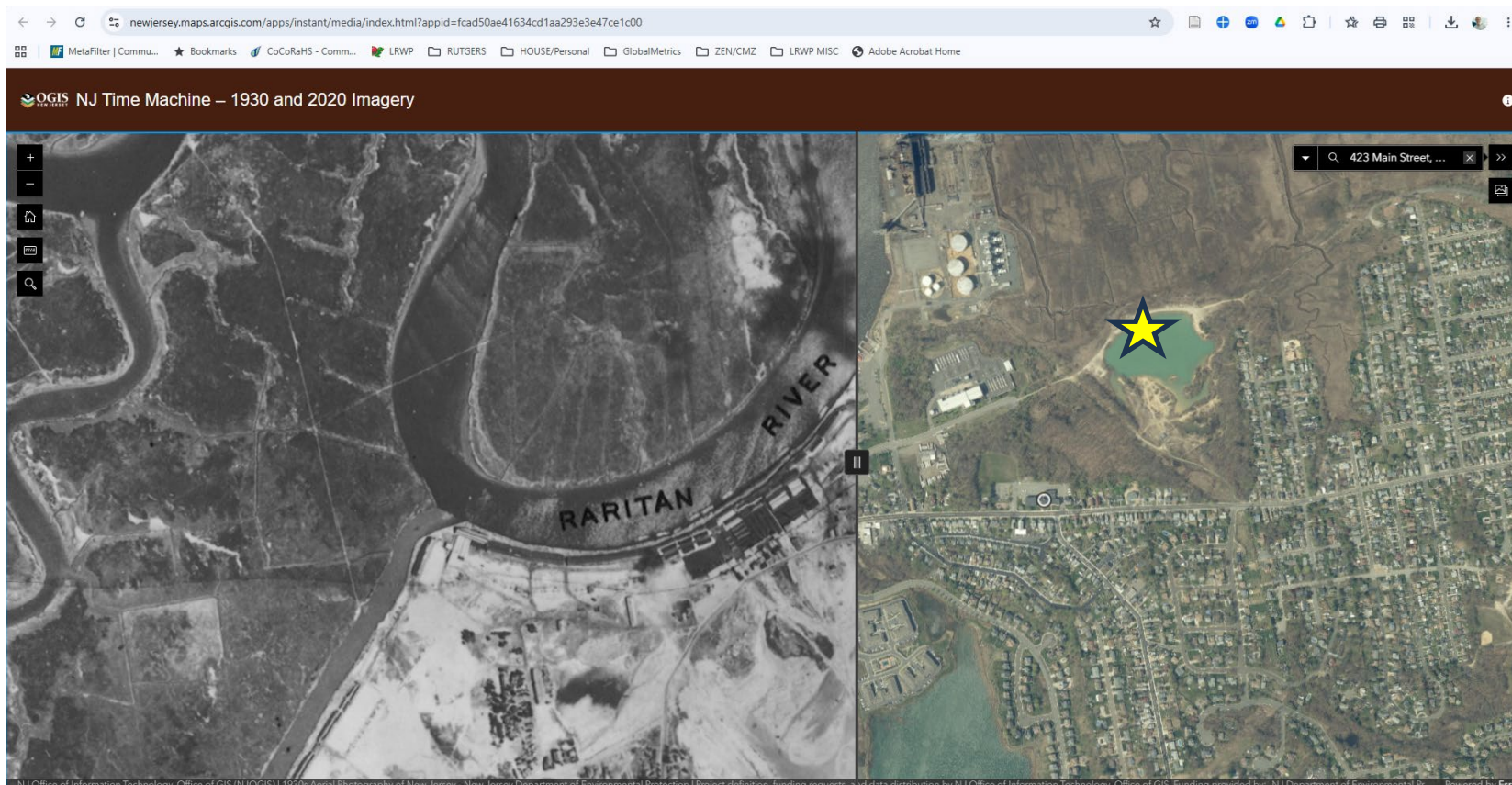


FEMA BRIC Grants: Co-funds stream daylighting, floodplain reconnection, and ecological restoration projects.



04 – Celebrating Our Watersheds

#lookfortheriver & mapping heritage hydrology



<https://newjersey.maps.arcgis.com/apps/instant/media/index.html?appid=fcad50ae41634cd1aa293e3e47ce1c00>



Taking a watershed perspective, how has development and land use changed how the land functions?

Most of our streams and wetlands have been filled in, buried, or culverted to create space for industrial and residential development.

These “hidden streams” make us highly vulnerable to flooding and water quality pollution today.



Lower Raritan Watershed Partnership

“Cultivating a culture of science & stewardship”

Learn more - and get involved!

lowerraritanwatershed.org
admin@lowerraritanwatershed.org



LRWP Website



LRWP Events
Registration



LRWP Reports

