

Great Swamp Watershed Association 2023 Water Quality Report Card

Dundee Dam – Garfield, NJ

Sandra LaVigne

Director Of Water Quality Programs

*Protecting the Waters of the Passaic River Region
from Source to Sea*

Great Swamp Watershed Association
Protecting the waters of the Passaic River region, from source to sea.





Our Mission – One River, One Community

- Use Water Quality for data driven work along our streams to:
 - Educate
 - Advocate
 - Steward
 - Preserve
- For present and future generations

We look to a time when all of the region's citizens understand that the health of the watershed is integrally connected to the quality of their daily lives.

GSWA – Water Quality and more..



Advocacy

- Preserve open space
- Advocating for smart development
- Helping to protect the waters of the Passaic River
- Education



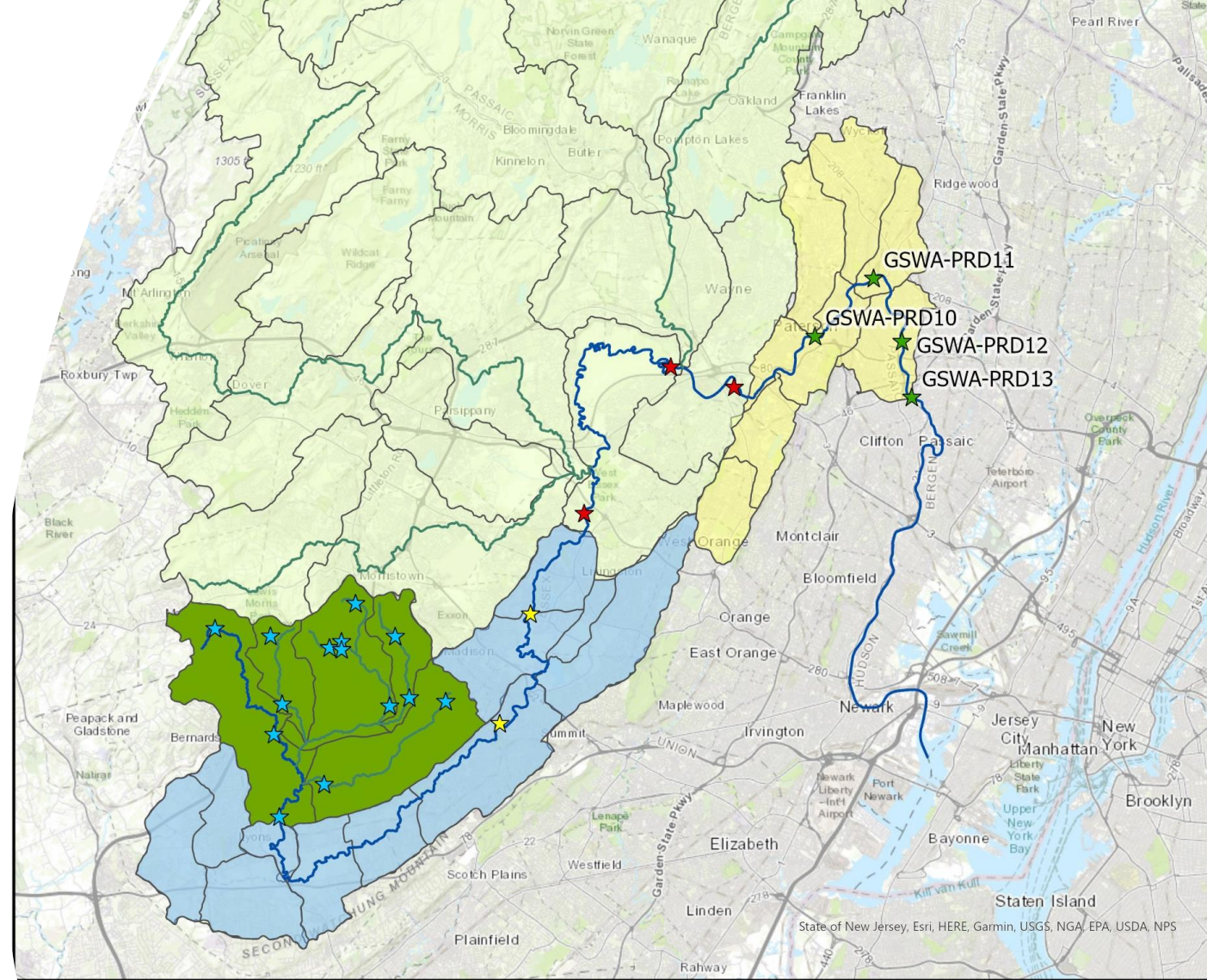
Underpinned with Water Quality Data

- Visual Assessments
- *E. coli*
- Macroinvertebrate
- Chemical Monitoring
- Microplastic Monitoring
- PFAS



Where we work!

- Great Swamp Sub-watershed
- From 2017 – Full length of the Passaic River



Great Swamp Watershed and Passaic River Expansions GSWA Monitoring Sites



Legend

- ★ 2023 Expansion Monitoring Sites
- ★ 2020 Expansion Monitoring Sites
- ★ 2018 Expansion Monitoring Sites
- ★ Great Swamp Watershed Monitoring Sites
- Passaic River
- Passaic Watershed 2023 Expansion
- Passaic Watershed 2020 Expansion
- Passaic Watershed 2018 Expansion
- Great Swamp Watershed



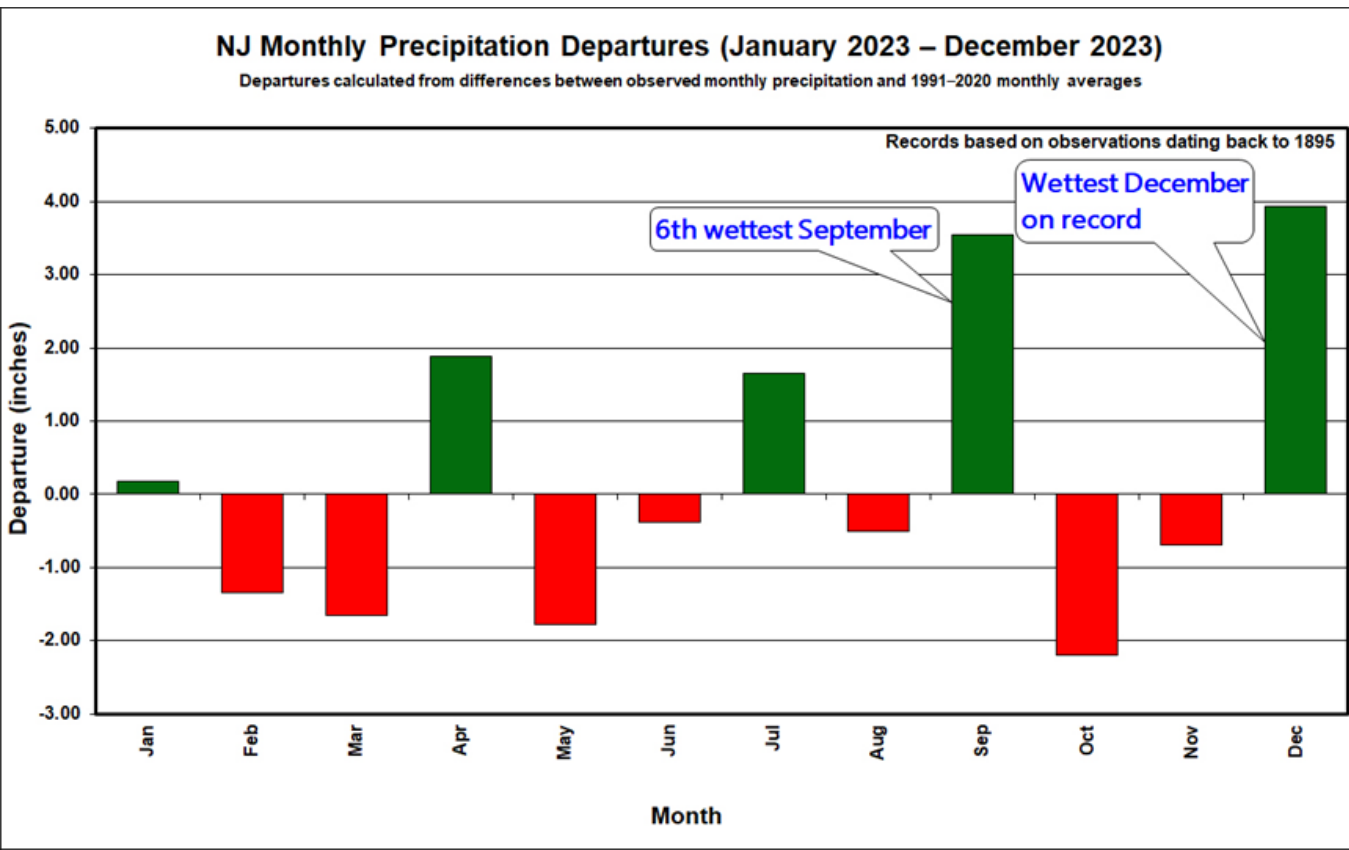
Current threats
to Passaic River
Region –
Death by a
thousand cuts....

- Problems of Water Quality
 - Pollution
 - Flooding
- Development pressures
- Climate Change





Water Quality and Climate



- Increased flooding and scouring
- Increased turbidity

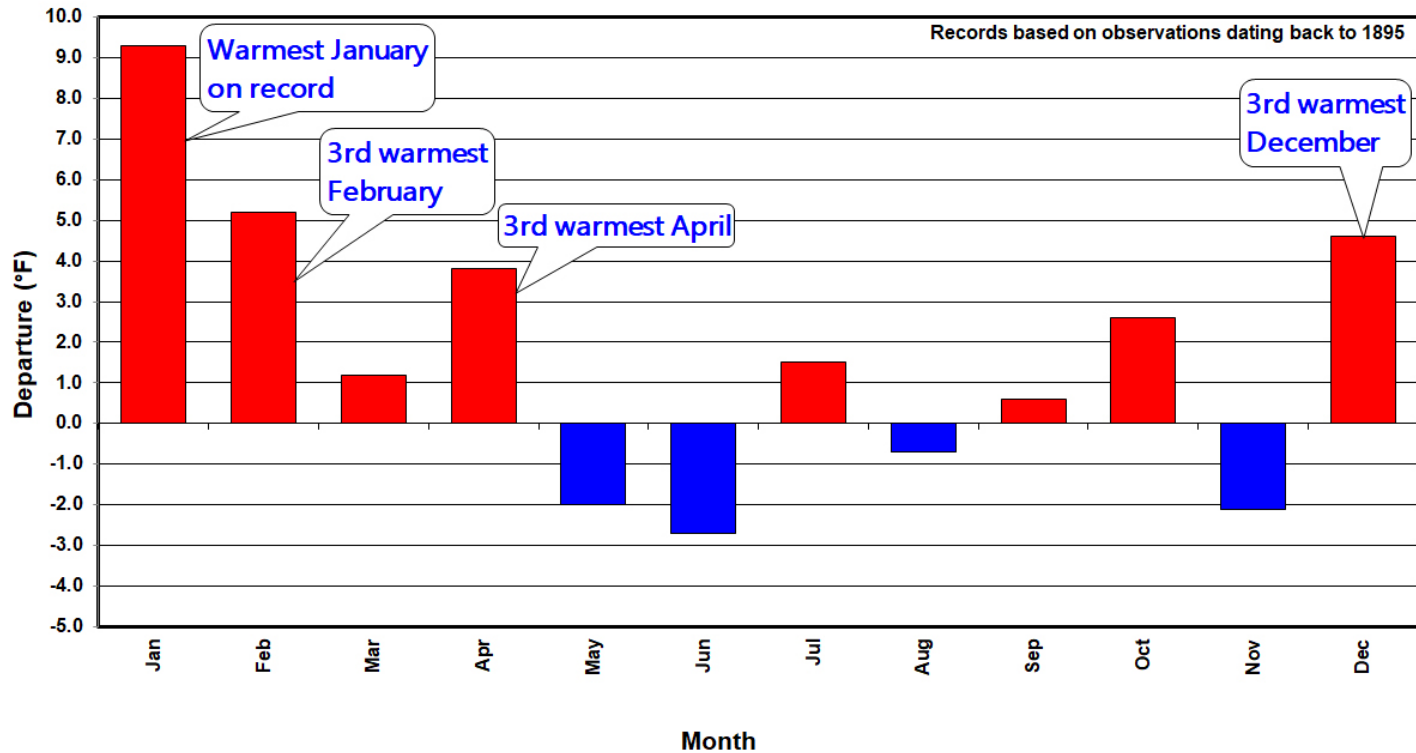


Water quality and Climate

- 2nd warmest winter on record
- 8 out of 12 months above average temperatures

NJ Monthly Temperature Departures (January 2023 – December 2023)

Departures calculated from differences between observed monthly temperatures and 1991–2020 monthly averages



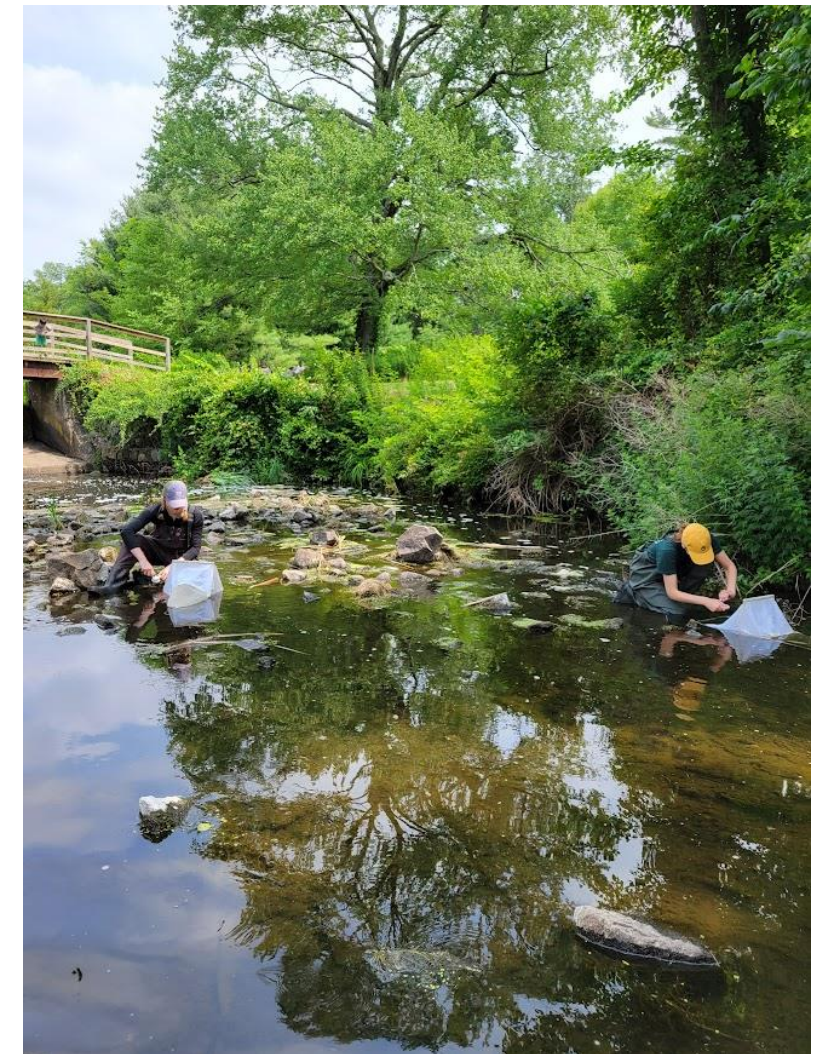


2024 Water Quality Monitoring

- Chemical Monitoring
 - 23 sites
 - 4 times a year
 - Handheld meters
 - Lab analysis
- Bacteria Monitoring
 - 21 sites
 - Five consecutive weeks
July/Aug
- Macroinvertebrate Sampling
 - 18 sites
- Microplastic – follow-up sampling
- Visual Assessments
 - NJ DEP protocols
 - Spring and Fall
 - 24 sites

Chemical Parameters

- pH
- Temperature
- Dissolved Oxygen
- Flow
- Nitrogen
 - Nitrate
 - Nitrite
 - Total Kjeldahl Nitrogen
 - Ammonia



• Phosphorus

- Total Phosphorus
- Soluble Reactive Phosphate

• Road Salt

- Total Dissolved Solids
- Sodium
- Chloride
- Conductivity

• Water Clarity

- Turbidity
- Total Suspended Solids

2023 Water Quality Data Results

| KEY | | | | |
|---|------|------|-----------|--------------------|
| Arrows indicate a >.5 % change from the 2022 data and correspond with the grade not the measurement | | | | |
| Excellent | Good | Poor | Very Poor | NO Data |

| Stream | Macro-invertebrates | Visual Stream Assessment | Bacteria | Dissolved Oxygen | Water Temperature | pH | Road Salt | Water Clarity | Nitrogen | Phosphorus |
|--|---------------------|--------------------------|-------------|------------------|-------------------|-----------|-------------|---------------|-------------|------------|
| Black Brook | Poor ↓ | Good | Very Poor ↓ | Excellent ↑ | Excellent | Excellent | Good ↑ | Good ↓ | Excellent ↑ | Good ↑ |
| Great Brook (main stem) | Very Poor ↓ | Excellent ↑ | Poor ↑ | Excellent ↑ | Excellent | Excellent | Poor ↓ | Excellent ↑ | Good ↑ | Good |
| Silver Brook | Very Poor ↓ | Good | Very Poor ↓ | Excellent ↑ | Excellent ↑ | Excellent | Very Poor ↓ | Good ↓ | Very Poor | Good |
| Loantaka Brook | Poor | Good ↑ | Very Poor ↑ | Excellent ↓ | Excellent | Excellent | Very Poor ↓ | Good | Very Poor | Poor |
| Primrose Brook (main stem) | Good ↑ | Good ↓ | Very Poor ↓ | Excellent | Excellent ↑ | Good ↓ | Excellent ↑ | Excellent ↓ | Excellent ↑ | Excellent |
| Passaic River (Headwaters) | Poor ↓ | Excellent ↑ | Good ↑ | Excellent | Excellent | Excellent | Good ↓ | Poor ↑ | Good | Excellent |
| Passaic River Watershed Outlet | Good ↑ | Excellent | Poor ↑ | Excellent | Excellent | Excellent | Good | Poor ↓ | Excellent ↑ | Good |
| Passaic River (Upper Passaic) | Good | Poor | Very Poor ↑ | Excellent | Good ↓ | Excellent | Good ↑ | Good ↑ | Poor ↑ | Good |
| Passaic River (through Little Falls) | Poor | Good ↑ | Poor ↑ | Excellent ↓ | Excellent ↓ | Excellent | Good ↑ | Poor ↑ | Poor ↑ | Poor |
| Passaic River Little Falls to Paterson | Poor | Very Poor | Excellent | Excellent | Excellent | Poor | Poor | Very Poor | Poor | Poor |

Great Swamp Watershed – Passaic River Tributaries

Primrose Brook

- Macros improving
- Vegetative Buffers decreasing
- Weather impacting bacteria levels

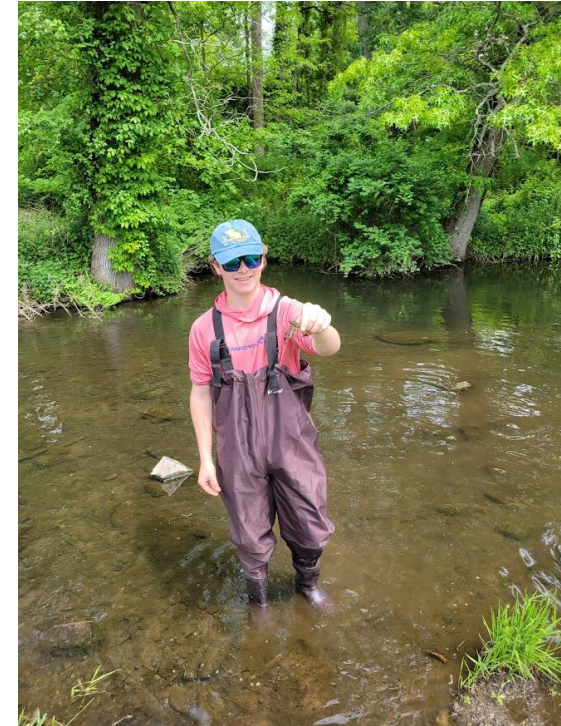
| Category | 2021 | 2022 | 2023 |
|--------------------------|-------------|-------------|-------------|
| Macro-invertebrates | Good | Good | Good ↑ |
| Visual Stream Assessment | Excellent ↑ | Excellent | Good ↓ |
| Bacteria | Excellent ↑ | Good ↓ | Very Poor ↓ |
| Dissolved Oxygen | Excellent | Excellent ↓ | Excellent |
| Water Temperature | Excellent ↓ | Excellent ↓ | Excellent ↑ |
| pH | Excellent | Excellent | Good ↓ |
| Road Salt | Excellent ↑ | Good ↓ | Excellent ↑ |
| Water Clarity | Good ↓ | Excellent ↑ | Excellent ↓ |
| Nitrogen | Excellent | Excellent ↓ | Excellent ↑ |
| Phosphorus | Excellent | Excellent | Excellent |



Black Brook

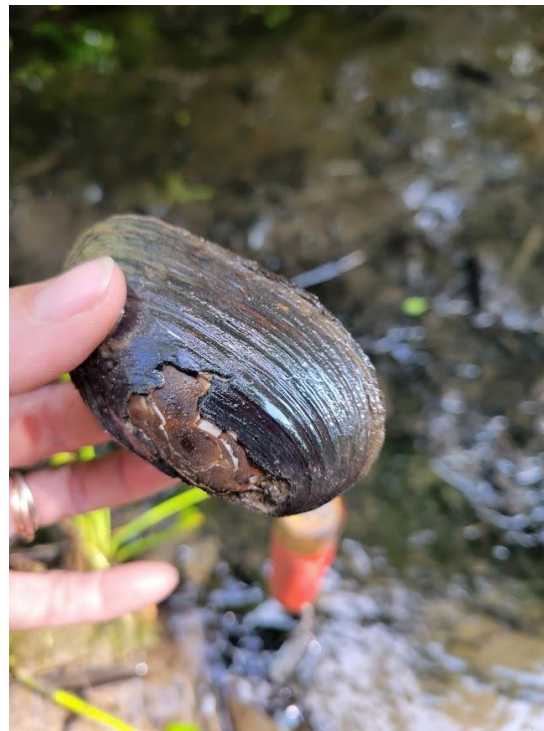
- Climate impacts
 - Clarity
 - Macro habitat
 - Nutrients

| Category | 2021 | 2022 | 2023 |
|--------------------------|-------------|-------------|-------------|
| Macro-invertebrates | Poor ↑ | Poor | Poor ↓ |
| Visual Stream Assessment | Good | Good | Good |
| Bacteria | Very Poor ↑ | Very Poor ↑ | Very Poor ↓ |
| Dissolved Oxygen | Excellent ↓ | Good ↓ | Excellent ↑ |
| Water Temperature | Excellent | Excellent ↓ | Excellent |
| pH | Excellent | Excellent | Excellent |
| Road Salt | Good ↓ | Good ↓ | Good ↑ |
| Water Clarity | Poor ↑ | Excellent ↑ | Good ↓ |
| Nitrogen | Good ↓ | Very Poor ↓ | Excellent ↑ |
| Phosphorus | Poor | Poor | Good ↑ |



Great Brook and Silver Brook

- GSWA – GB1 – found Mussel – *Strophitus undulatus* – on the NJDEP sp of concern list
- Silver Brook – scouring impacting macros
 - Continued restoration efforts included adding habitat – rocks and plants



| Category | Great Brook | | |
|--------------------------|-----------------|-------------|-------------|
| | 2021 | 2022 | 2023 |
| Macro-invertebrates | Good | Poor ↑ | Very Poor ↓ |
| Visual Stream Assessment | Good | Good | Excellent ↑ |
| Bacteria | Poor ↑ | Very Poor ↓ | Poor ↑ |
| Dissolved Oxygen | Excellent | Excellent ↓ | Excellent ↑ |
| Water Temperature | Excellent | Excellent ↓ | Excellent |
| pH | Excellent | Excellent | Excellent |
| Road Salt | Good ↓ | Good ↑ | Poor ↓ |
| Water Clarity | Poor | Poor | Excellent ↑ |
| Nitrogen | Poor ↓ | Poor ↑ | Good ↑ |
| Phosphorus | Excellent ↑ | Good ↓ | Good |

| Silver Brook | | | |
|-------------------|--------------------------|-------------|-------------|
| Category | 2021 | 2022 | 2023 |
| | Visual Stream Assessment | Very Poor ↑ | Poor ↑ |
| Bacteria | Very Poor ↑ | Very Poor ↑ | Very Poor ↓ |
| Dissolved Oxygen | Excellent | Excellent ↓ | Excellent ↑ |
| Water Temperature | Excellent | Good ↓ | Excellent ↑ |
| pH | Excellent | Excellent | Excellent |
| Road Salt | Good ↑ | Very Poor ↓ | Very Poor ↓ |
| Water Clarity | Poor ↓ | Excellent ↑ | Good ↓ |
| Nitrogen | Very Poor ↓ | Very Poor ↑ | Very Poor |
| Phosphorus | Excellent ↑ | Good ↓ | Good |

Loantaka Brook

Loantaka Brook
State Waterbody ID: NJ02030103010040-01

Year Last Reported: 2020
Waterbody Condition: ● Impaired (Issues Identified)

Organization Name (ID): New Jersey (21NJDEP1)

| What is this water used for? | Condition |
|--|-----------------|
| <input checked="" type="checkbox"/> Drinking Water | Impaired |
| <input checked="" type="checkbox"/> Aquatic Life | Impaired |
| <input checked="" type="checkbox"/> Fish and Shellfish Consumption | Condition Unknc |
| <input checked="" type="checkbox"/> Swimming and Boating | Impaired |

Identified Issues:

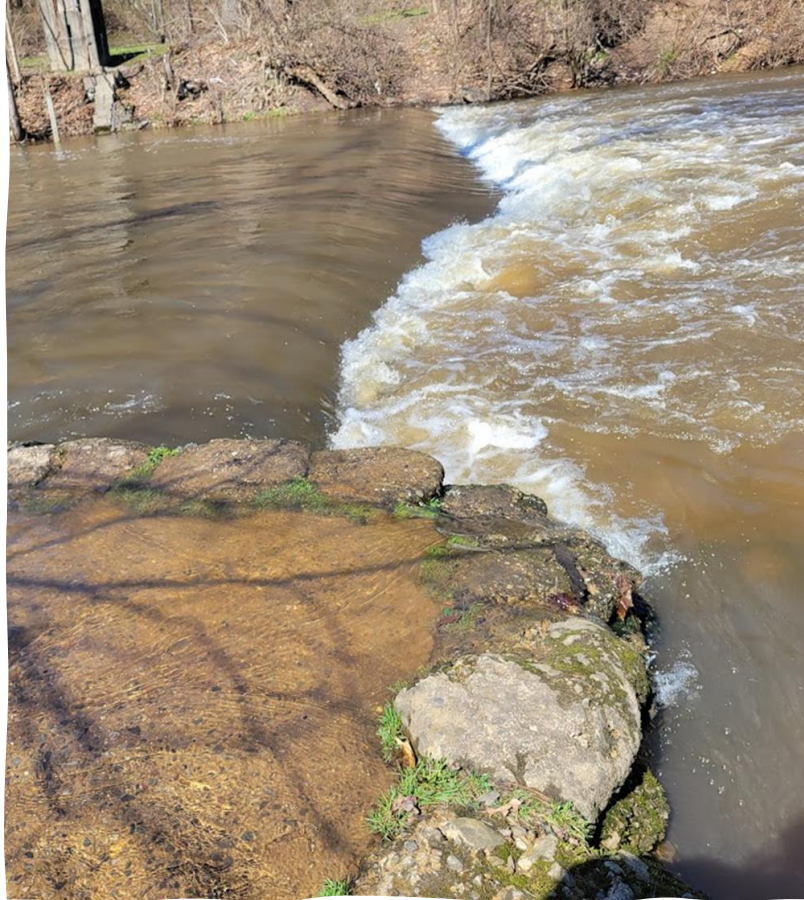
- Bacteria and Other Microbes
- Degraded Aquatic Life
- Nitrogen and/or Phosphorus
- Salts



| Category | 2021 | 2022 | 2023 |
|-------------------|-------------|-------------|-------------|
| cro-invertebrates | Very Poor ↑ | Poor ↑ | Poor |
| Stream Assessment | Poor ↓ | Poor | Good ↑ |
| Bacteria | Very Poor ↓ | Very Poor ↓ | Very Poor ↑ |
| issolved Oxygen | Excellent ↓ | Excellent ↑ | Excellent ↓ |
| iter Temperature | Excellent | Excellent | Excellent |
| pH | Excellent | Excellent | Excellent |
| Road Salt | Poor | Poor | Very Poor ↓ |
| Water Clarity | Good ↑ | Good | Good |
| Nitrogen | Very Poor ↑ | Very Poor ↓ | Very Poor |
| Phosphorus | Poor ↑ | Poor | Poor |



- Most impaired stream
- Headwaters under development
- Heavy erosion



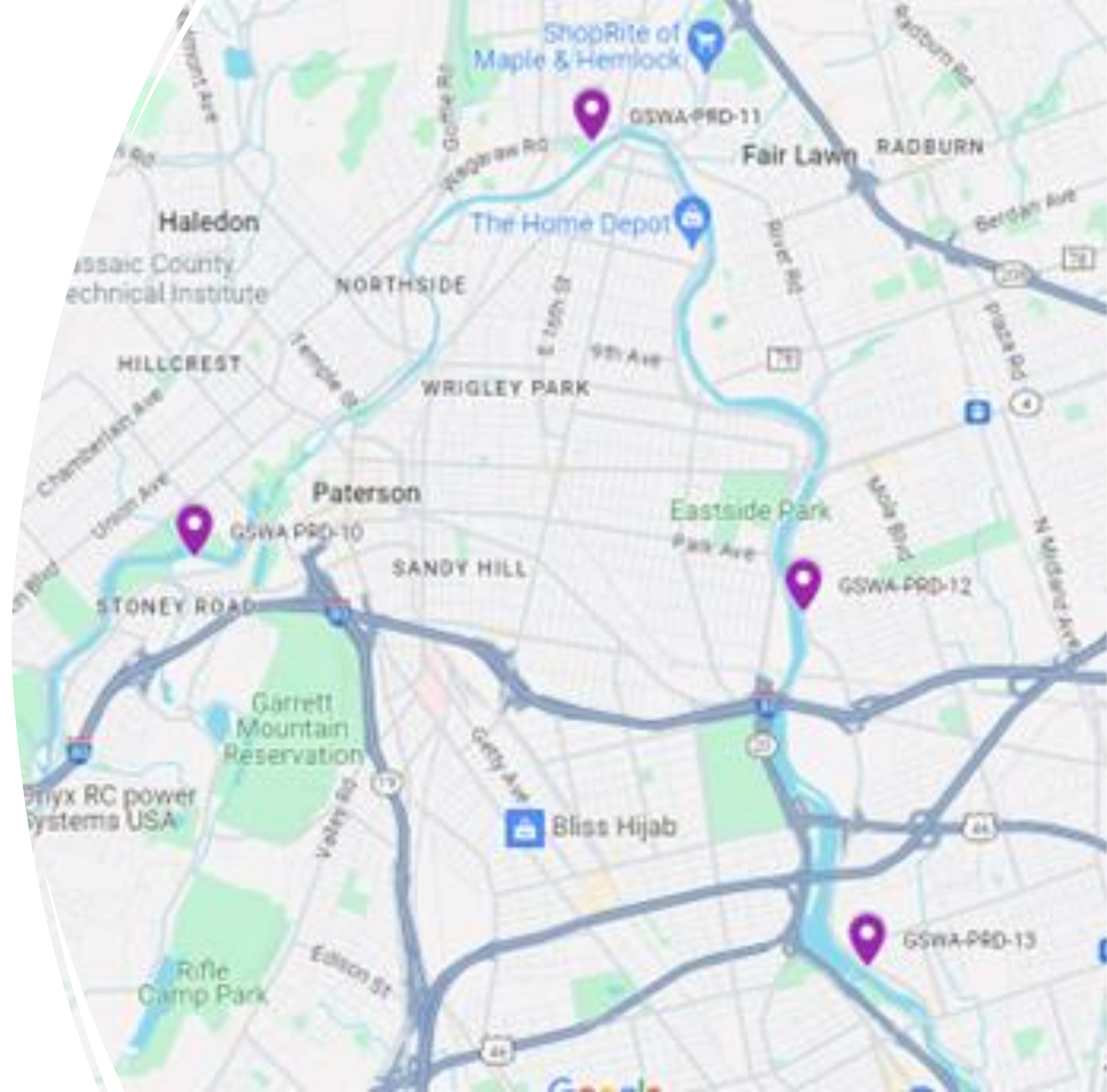
Passaic River Headwaters to Little Falls

| Stream | Macro-invertebrates | Visual Stream Assessment | Bacteria | Dissolved Oxygen | Water Temperature | pH | Road Salt | Water Clarity | Nitrogen | Phosphorus |
|--------------------------------------|---------------------|--------------------------|-------------|------------------|-------------------|-----------|-----------|---------------|-------------|------------|
| Passaic River (Headwaters) | Poor ↓ | Excellent ↑ | Good ↑ | Excellent | Excellent | Excellent | Good ↓ | Poor ↑ | Good | Excellent |
| Passaic River Watershed Outlet | Good ↑ | Excellent | Poor ↑ | Excellent | Excellent | Excellent | Good | Poor ↓ | Excellent ↑ | Good |
| Passaic River (Upper Passaic) | Good | Poor | Very Poor ↑ | Excellent | Good ↓ | Excellent | Good ↑ | Good ↑ | Poor ↑ | Good |
| Passaic River (through Little Falls) | Poor | Good ↑ | Poor ↑ | Excellent ↓ | Excellent | Excellent | Good ↑ | Poor ↑ | Poor ↑ | Poor |

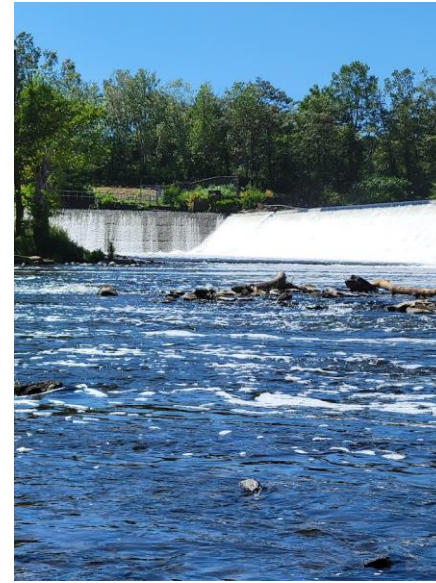
- Increased turbidity
- Headwaters – macros decreased
- Nutrients improved

Passaic River Paterson Expansion

- Above Paterson Great Falls
- Northern Point – Hawthorn side
- Elmwood Park
- Garfield – just below Dundee Dam



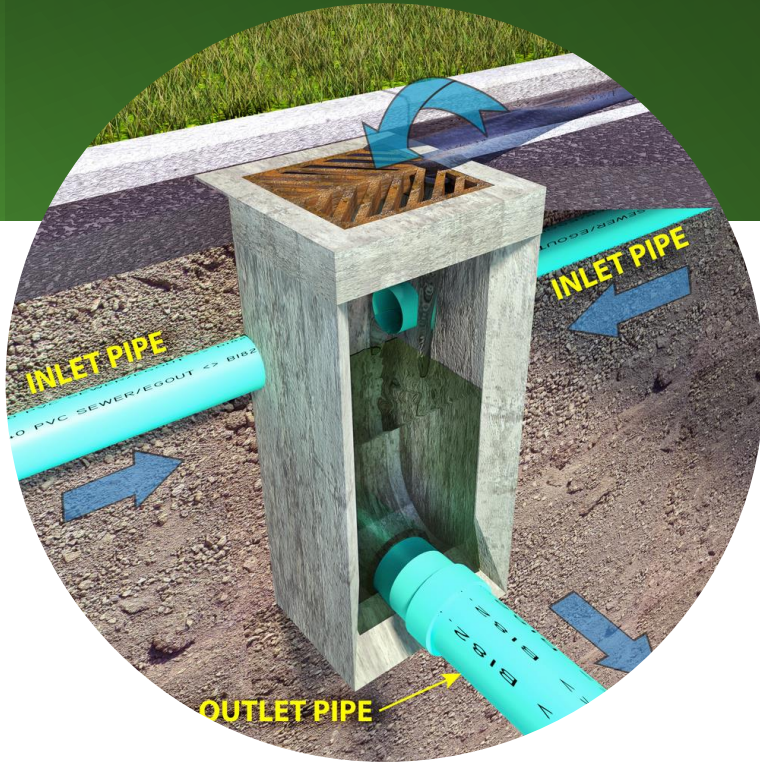
| Category | 2023 |
|--------------------------|--------------|
| Macro-invertebrates | |
| Visual Stream Assessment | Poor |
| Bacteria | Very Poor |
| Dissolved Oxygen | Excellent |
| Water Temperature | Excellent |
| pH | Excellent |
| Road Salt | Poor |
| Water Clarity | Poor |
| Nitrogen | Very Poor |
| Phosphorus | Poor |



Paterson and downstream

- Access issues
- Flooding
- Trash
- Water quality poor

Paterson Adopt a Catch Basin -



- Educate community
- Build Community Interest
- Find community partners

Assemble practical kits to get community members started

- Kits ~ \$40
- Kits include –
 - 12 pairs of disposable nitrile gloves
 - 1 pair of reusable gloves
 - 12 garbage bags
 - 12 recycling bags
 - 1 vest
 - 1 trash picker



GSWA Launches Catch Basin Program in Paterson

- Green Acres Community Garden Fundraiser event
- Attended two previous events
- Had kits and tablets for community members to sign up
- Had magnets to help people remember to clean and report back



ADOPT-A-CATCH-BASIN

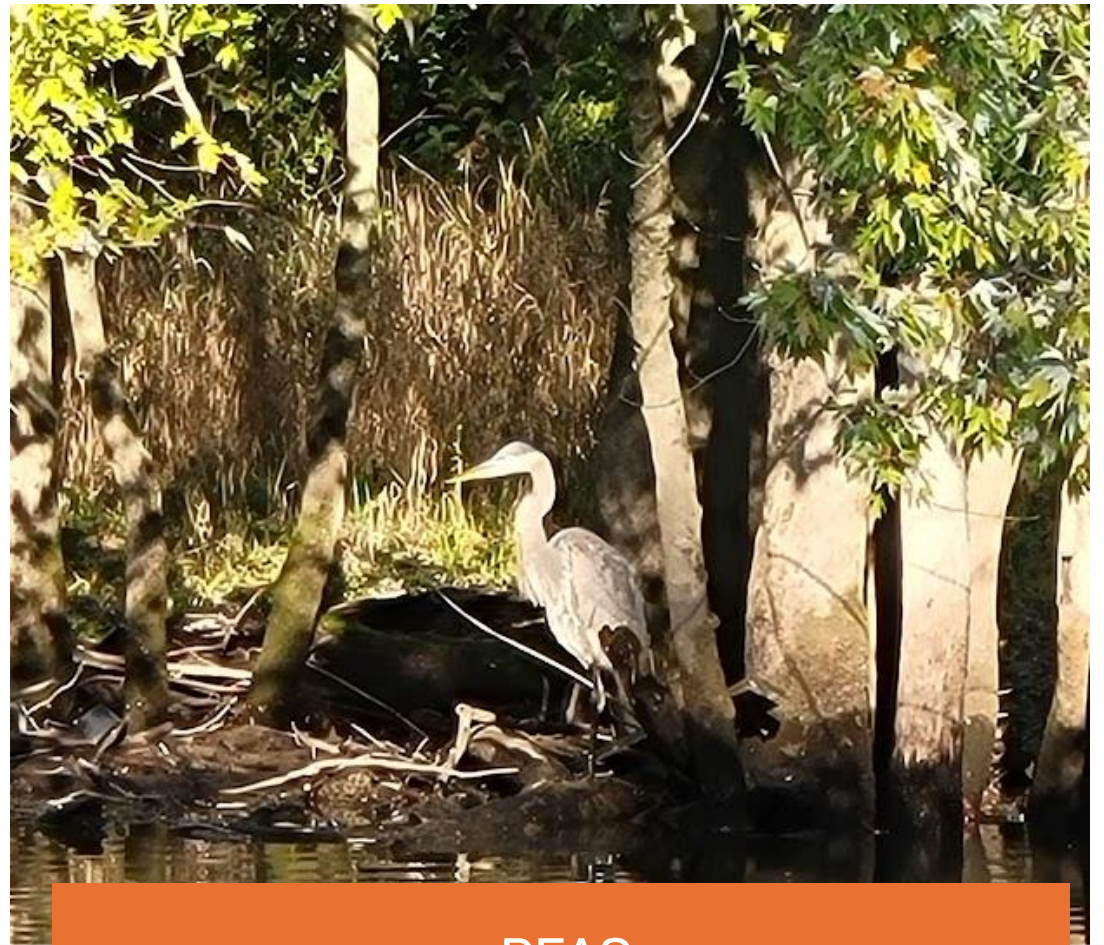
CHECK - CLEAN - REPORT!

Next catch-basin cleaning day is -

Log your work here!

- Check your catch basin at least once a month
- Clean before and after heavy storms and if you see trash
- Stay safe - clean from the sidewalk!
- Report your awesome work!





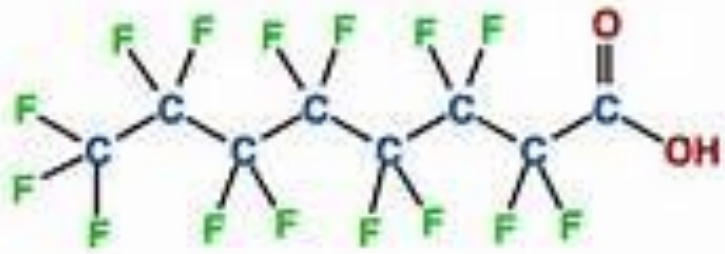
PFAS

- Samples Collected in late Aug 2022 and Nov 2023
 - PFAS found at every site
 - Ubiquitous, cancer-causing chemical
 - Found in many common products

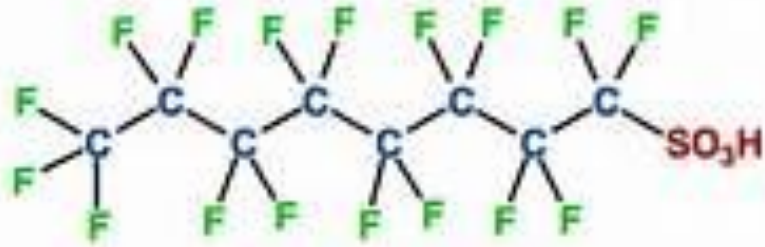
What are PFAS?

- Per and poly-fluoroalkyl substances (PFAS)
- “Forever chemicals”
- Used in –
 - Non-stick cookware
 - Stain-resistant fabrics and carpets
 - Water-proof clothing
 - Firefighting foam





PFOA - perfluorooctanoic acid



PFOS - perfluorooctanesulfonic acid

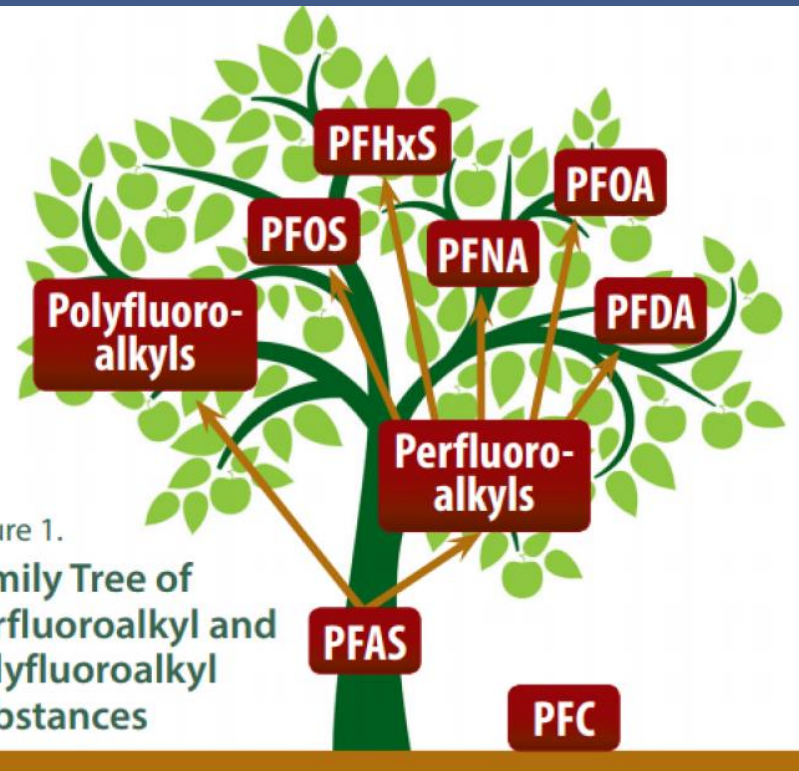


Figure 1.
Family Tree of
perfluoroalkyl and
polyfluoroalkyl
Substances

PFAS – PFOS – PFOA...
What's the difference

- PFAS – A family tree
 - Long-chain fluorocarbons
 - Short-chain fluorocarbons
 - GenX

PFAS – New EPA Rules

- Sets limit for 5 PFAS
- Hazard limit (non-enforceable) on mixture of any two of four

- *Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.*

| CHEMICAL | MCLG (NON-ENFORCEABLE GOALS) | MCL (ENFORCEABLE LIMITS) |
|---|------------------------------|--------------------------|
| PFOA | 0 | 4.0 ppt |
| PFOS | 0 | 4.0 ppt |
| PFNA | 10 ppt | 10 ppt |
| PFHxS | 10 ppt | 10 ppt |
| HFPO-DA (GenX Chemicals) | 10 ppt | 10 ppt |
| Mixture of two or more: PFNA, PFH _x S, HFPO-DA, and PFBS | Hazard Index of 1 | Hazard Index of 1 |

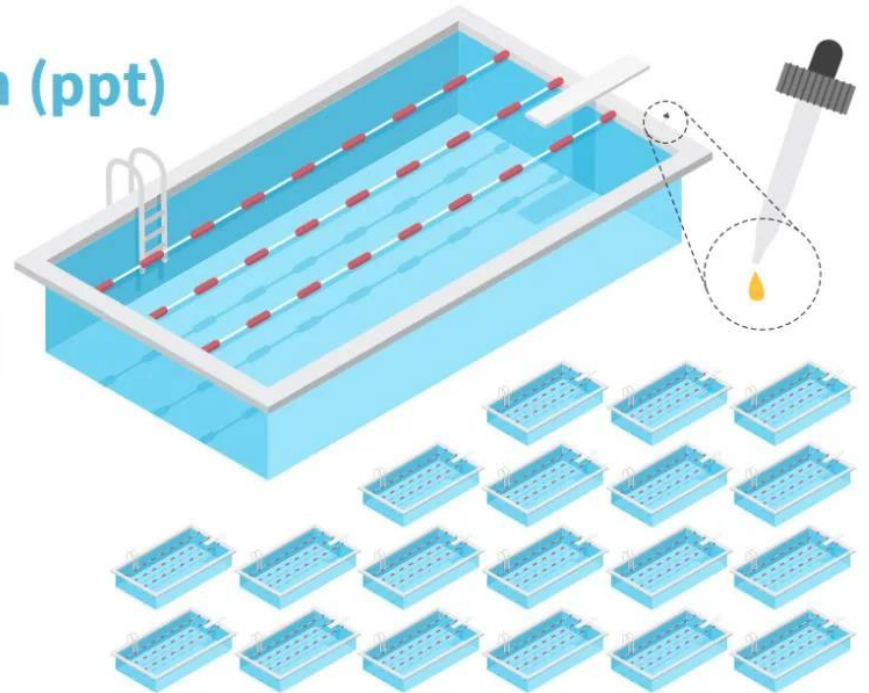
How much is 1 ppt?

- Science has to meet regulation
- Possibility for cross-contamination
- Over 15,000 different PFAS/GEN X chemicals

1 part per trillion (ppt)

IS EQUIVALENT TO A
SINGLE DROP OF
WATER IN

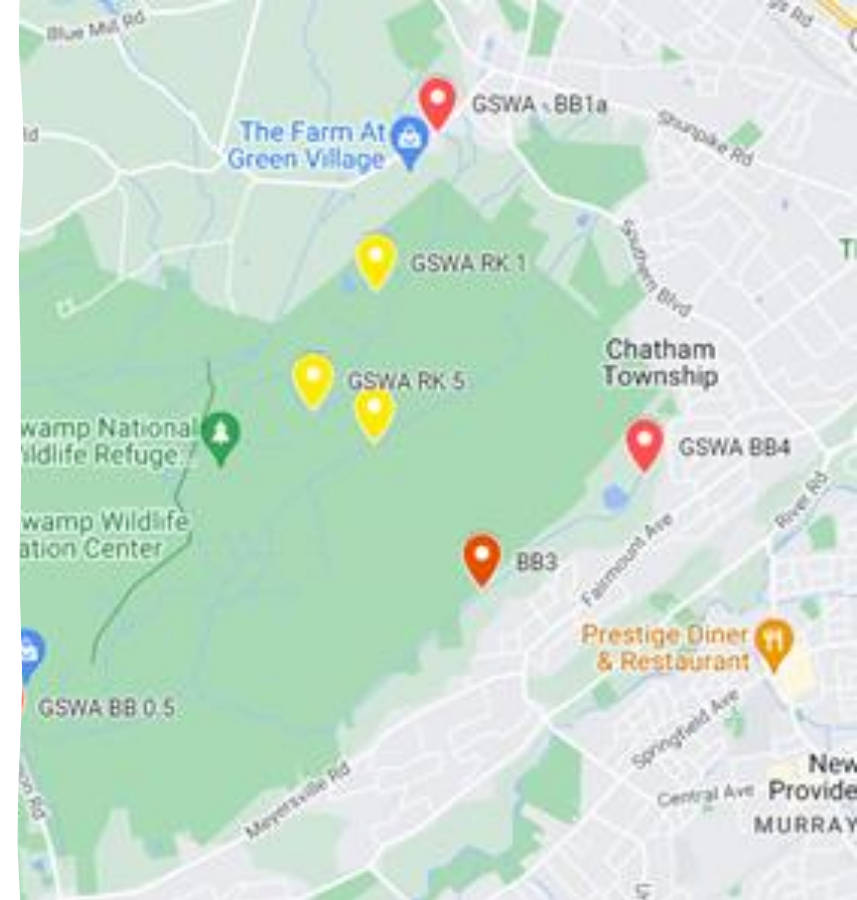
**20 olympic-sized
swimming pools**



Rolling Knolls Landfill

- 200 acres Superfund site in Chatham Township
- 30 acres inside Great Swamp Refuge
- Used as an unlined landfill until the late 1960s
- Landfill products contaminated soil, sediments, surface water and groundwater with metals, PCBs, pesticides, and VOCs.
- A Community Advisory Group (CAG) has been formed. CAGs enhance communications between the community at large and various other stakeholders.





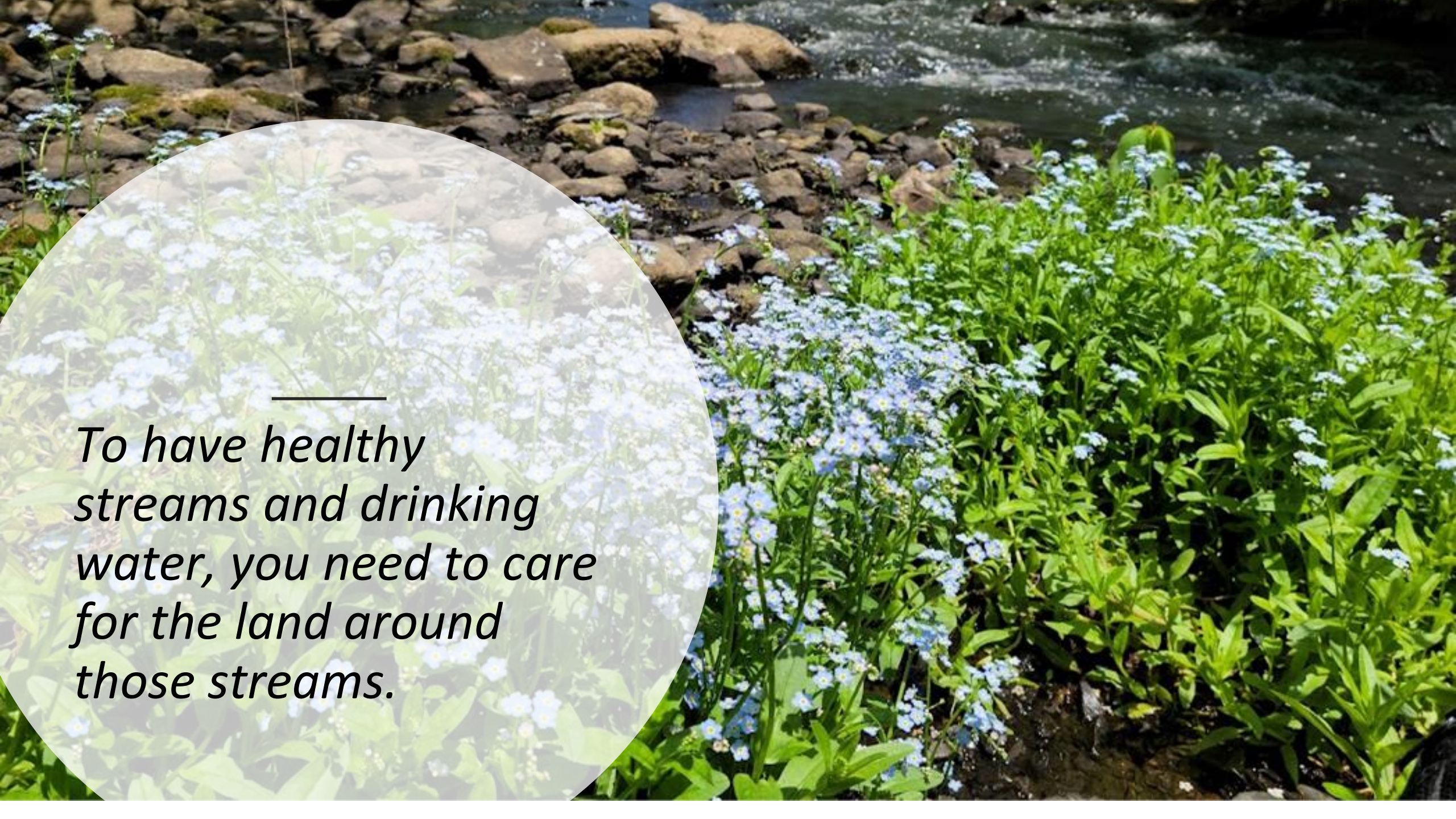
2023 PFAS Sampling

- 7 sites
 - 3 within Rolling Knolls
 - 4 along Black Brook
 - 2 upstream of RK
 - 2 Downstream
- Challenges
 - Access to Rolling Knolls sites

Looking Forward

- Loantaka Restoration
- City of Water Day – Fairfield Cleanup
- Climate Change Education Initiative
- More Catch Basin Outreach



A photograph of a stream flowing over a bed of dark, wet rocks. In the foreground, there is a dense patch of bright green forget-me-not plants with numerous small, light blue flowers. The scene is brightly lit, suggesting a sunny day. A semi-transparent circular graphic is overlaid on the left side of the image, containing text.

*To have healthy
streams and drinking
water, you need to care
for the land around
those streams.*

Great Swamp Watershed Association Water Quality and Community Connections

Keeping our waters clean for everyone

Sandra LaVigne
sandral@greatswamp.org

