

Great Swamp Watershed Association 2022 Water Quality Report Card

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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.



GSWA – Water Quality and more..



Advocacy

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

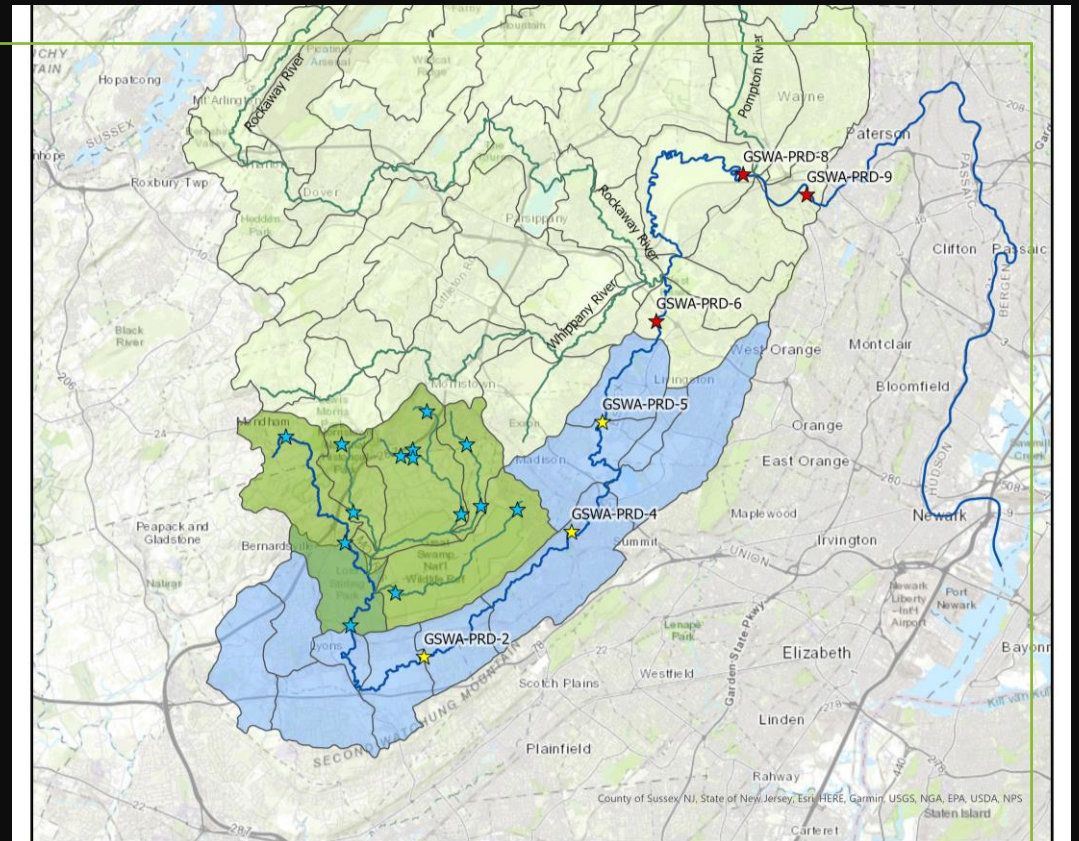


Underpinned with Water Quality Data

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

Where we sample

- Great Swamp Sub-Watershed
- 2017 – 1st Passaic River Expansion – through Livingston
- 2020- 2nd Passaic River Expansion – through Little Falls

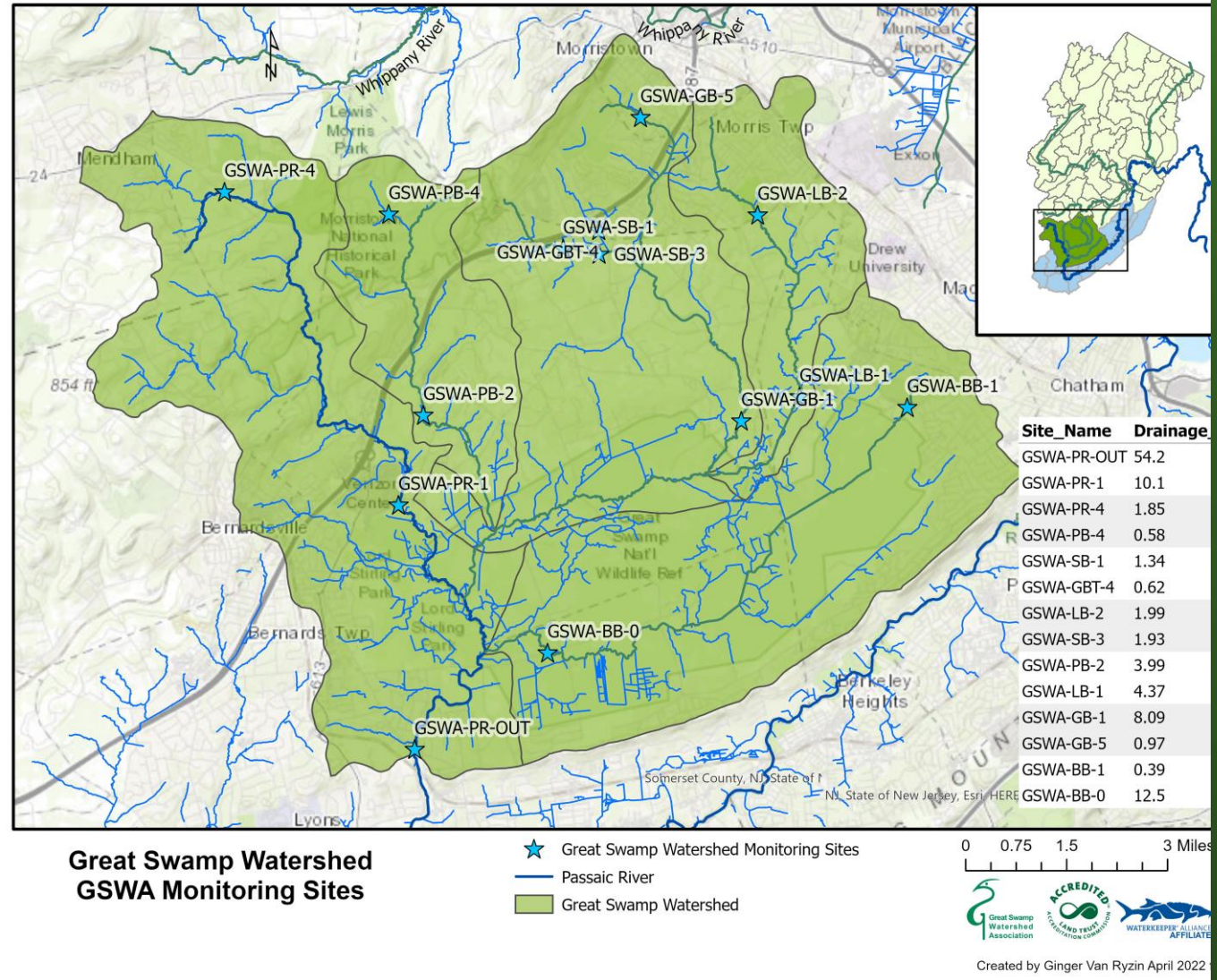


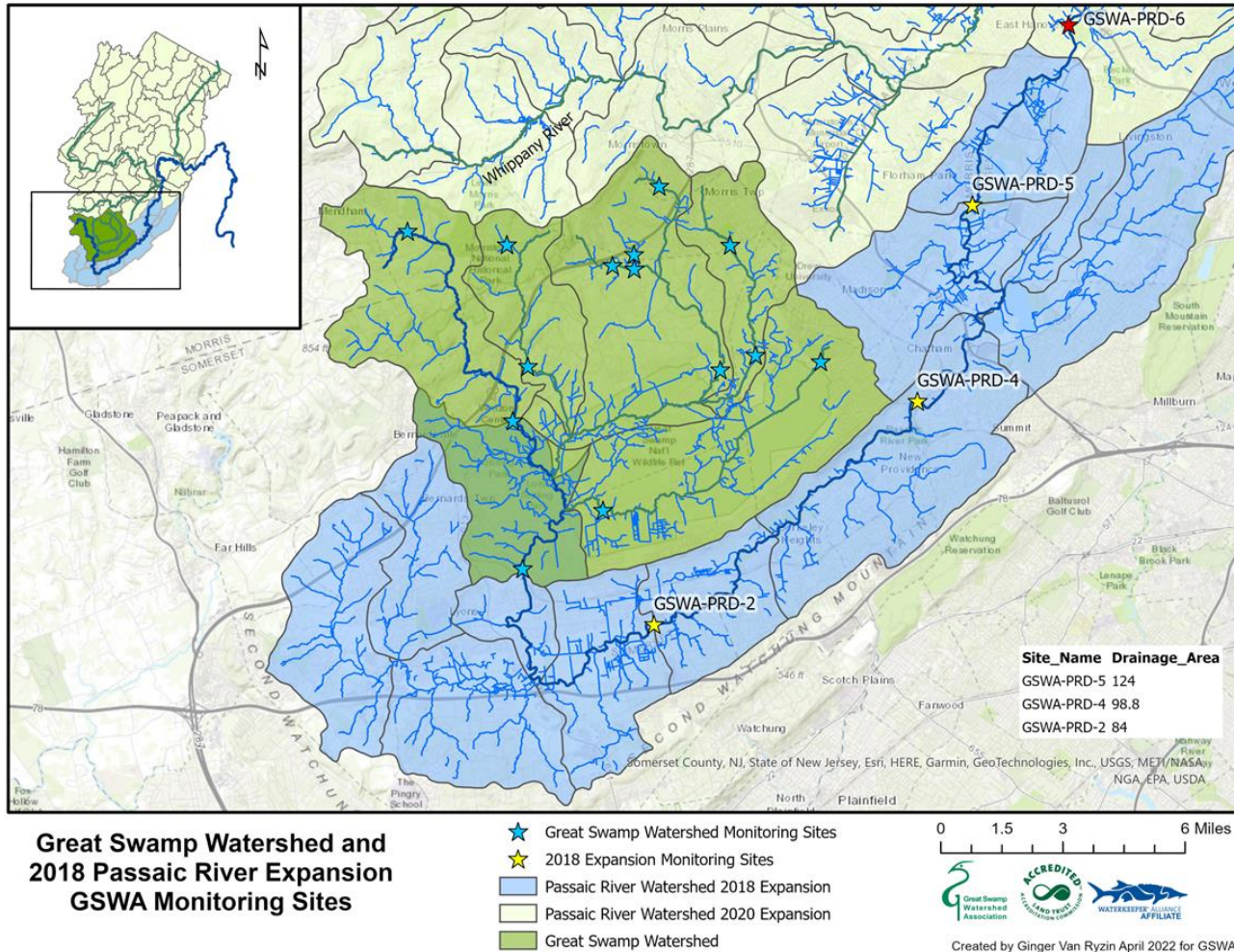
Great Swamp Watershed and Passaic River Expansions GSWA Monitoring Sites



Great Swamp Sub-Watershed

- Headwaters of the Passaic
- Primrose Brook
- Great Brook
- Loantaka Brook
- Black Brook
 - Two sites on each stream reach
 - Upstream - Downstream



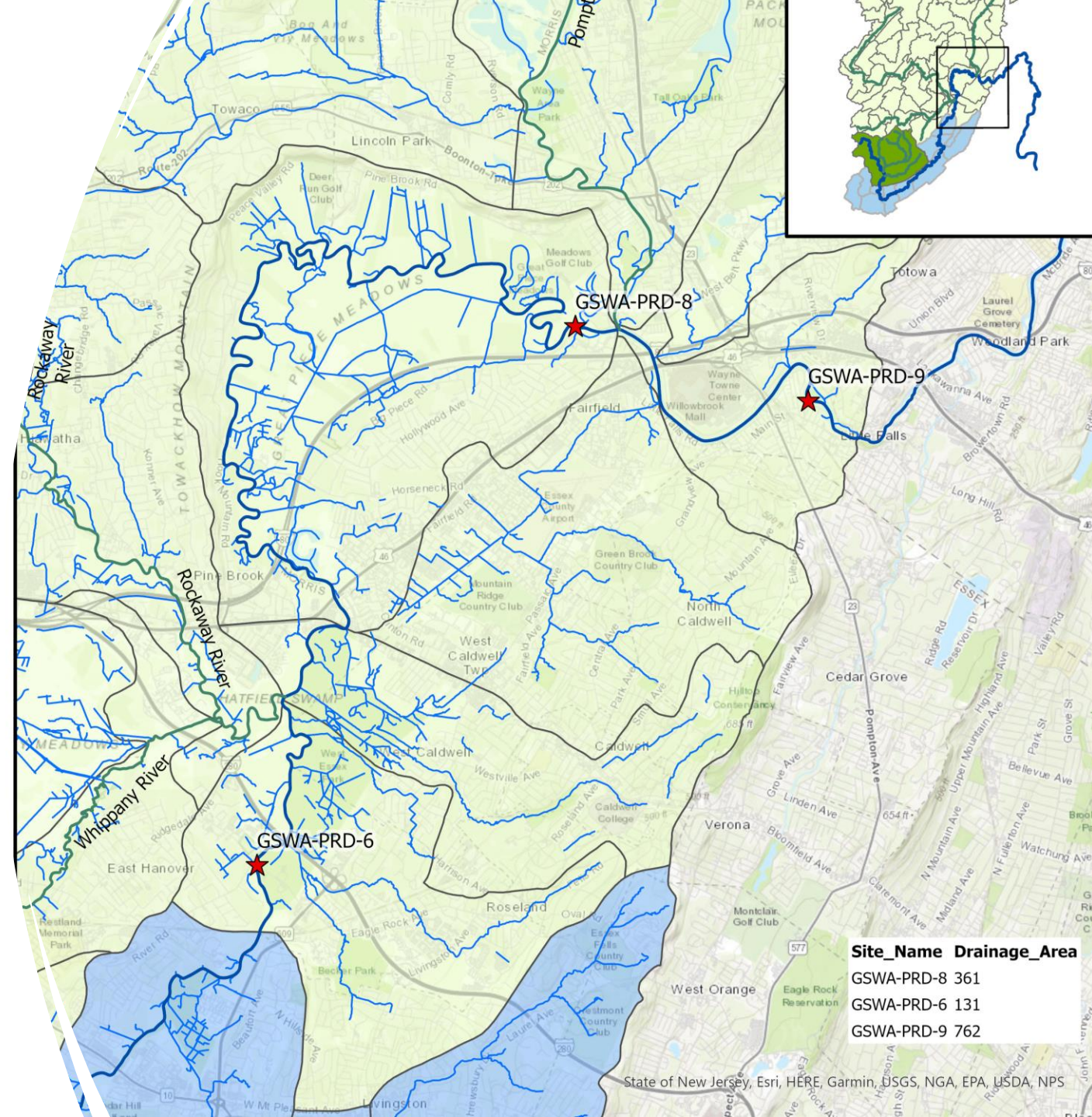


2017 – Passaic River Expansion

- In 2017 – 2018 – added 5 sites
 - Millington
 - Warren
 - Berkley Heights
 - Summit
 - Livingston
- With further expansion in 2020
 - Reduced to 3 sites

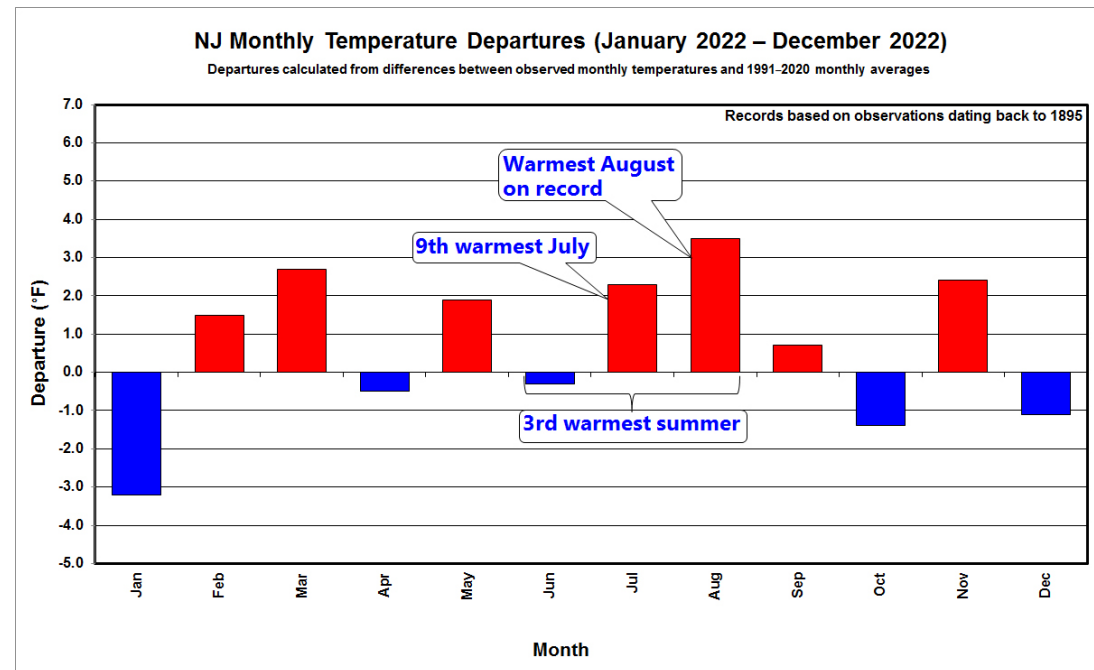
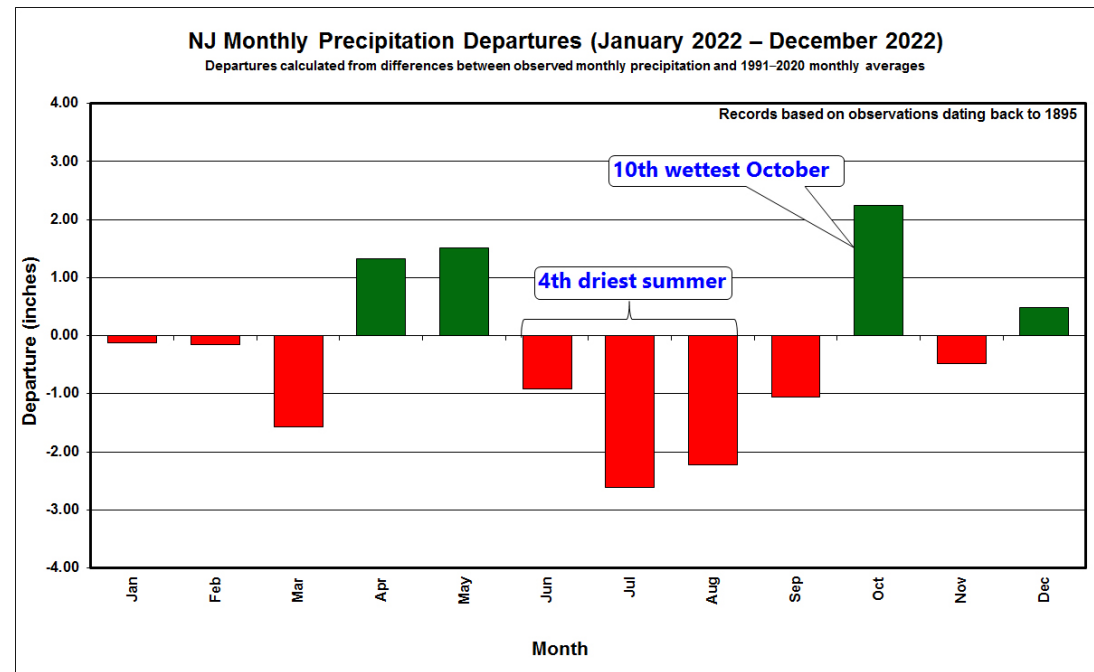
2020 – 2nd Passaic River Expansion

- In 2020 – added 4 new sites through Little Falls
 - Roseland
 - PineBrook
 - Fairfield
 - Little Falls
- 2021 Due to access issues PineBrook site was removed



Water Quality and Climate - 2022

- Dry warm winter
- Wet spring
- Drought through the summer





2022 Water Monitoring



- Chemical Monitoring
 - 4 times a year
 - 20 Sites
 - Handheld meters
 - Lab analysis
- Visual Assessments
 - NJ DEP protocols
 - Spring and Fall
 - 20 sites

- PFAS Monitoring
 - 19 sites
- Bacteria Monitoring
 - 21 sites
 - Five consecutive weeks July/Aug
- Macroinvertebrate Sampling
 - 12 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

2022 Water Quality Results

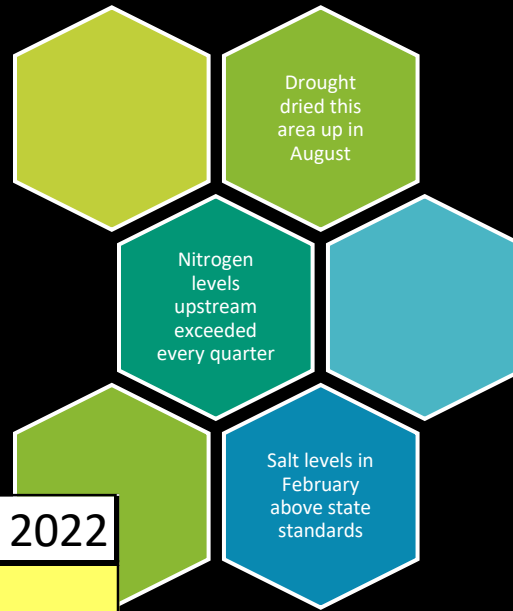
Stream	Macro-invertebrates	Visual Stream Assessment	Bacteria	Dissolved Oxygen	Water Temperature	pH	Road Salt	Water Clarity	Nitrogen	Phosphorus
Black Brook	Poor	Good	Very Poor ↑	Good ↓	Excellent ↓	Excellent	Good ↓	Excellent ↑	Very Poor ↓	Poor
Great Brook (main stem)	Poor ↑	Good	Very Poor ↓	Excellent ↓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

KEY

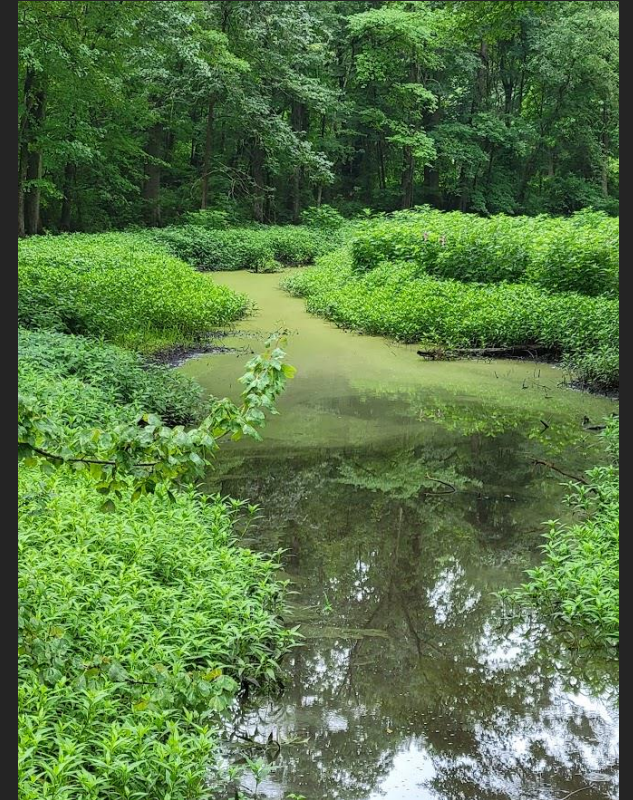
Arrows indicate a >.5 change from the 2021 data and correspond with the grade not the measurement

Excellent Good Poor Very Poor ~~NO Data~~

Black Brook -

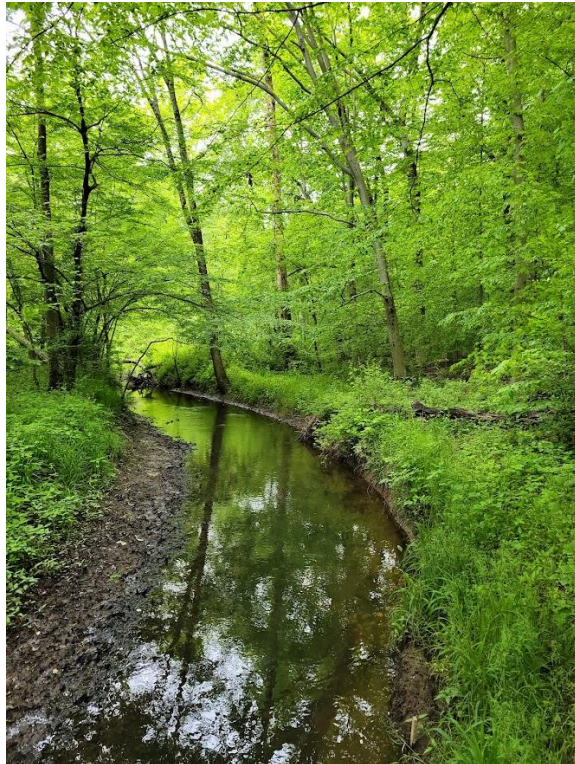


Category	2020	2021	2022
Macro-invertebrates	Poor ↑	Poor ↑	Poor
Visual Stream Assessment	Good ↑	Good	Good
Bacteria	Very Poor ↓	Very Poor ↑	Very Poor ↑
Dissolved Oxygen	Good ↓	Excellent ↓	Good ↓
Water Temperature	Excellent	Excellent	Excellent ↓
pH	Excellent	Excellent	Excellent
Road Salt	Good	Good ↓	Good ↓
Water Clarity	Poor ↓	Poor ↑	Excellent ↑
Nitrogen	Excellent ↑	Good ↓	Very Poor ↓
Phosphorus	Poor ↓	Poor	Poor



Great Brook and Silver Brook

- Great Brook
 - Footh Pond – TDS over 1400 in winter
 - Footh pond macroinvertebrates – very low
- Silver Brook
 - 2 year post restoration
 - Steady Improvement in macroinvertebrates



Silver Brook		
2020	2021	2022
Very Poor ↑	Very Poor ↑	Poor ↑
Good	Good ↑	Good ↑
Very Poor ↓	Very Poor ↑	Very Poor ↑
Excellent ↑	Excellent	Excellent ↓
Excellent	Excellent	Good ↓
Excellent ↑	Excellent	Excellent
Good	Good ↑	Very Poor ↓
Good	Poor ↓	Excellent ↑
Very Poor	Very Poor ↓	Very Poor ↑
Good	Excellent ↑	Good ↓

Category	Great Brook		
	2020	2021	2022
Macro-invertebrates	Poor ↑	Good	Poor ↑
Visual Stream Assessment	Good ↑	Good	Good
Bacteria	Poor ↑	Poor ↑	Very Poor ↓
Dissolved Oxygen	Excellent	Excellent	Excellent ↓
Water Temperature	Excellent	Excellent	Excellent ↓
pH	Excellent	Excellent	Excellent
Road Salt	Good ↑	Good ↓	Good ↑
Water Clarity	Poor ↓	Poor	Poor
Nitrogen	Poor ↑	Poor ↓	Poor ↑
Phosphorus	Good ↓	Excellent ↑	Good ↓

Loantaka Brook



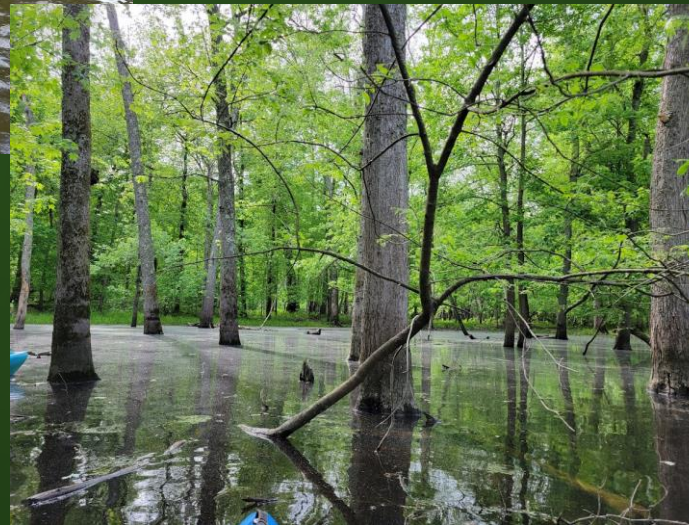
Category	2020	2021	2022
Macro-invertebrates	Very Poor ↑	Very Poor ↑	Poor ↑
Visual Stream Assessment	Good	Poor ↓	Poor
Bacteria	Very Poor ↑	Very Poor ↓	Very Poor ↓
Dissolved Oxygen	Excellent	Excellent ↓	Excellent ↑
Water Temperature	Excellent	Excellent	Excellent
pH	Excellent	Excellent	Excellent
Road Salt	Poor ↑	Poor	Poor
Water Clarity	Poor ↓	Good ↑	Good
Nitrogen	Very Poor ↓	Very Poor ↑	Very Poor ↓
Phosphorus	Poor ↓	Poor ↑	Poor



- Oil spill in August
- Macroinvertebrates improved steadily
- Bacteria levels impacted by weather and location

Passaic River – Headwaters and Upper Passaic

Passaic River (Headwaters)	Poor ↑	Excellent	Poor ↓	Excellent	Excellent	Excellent	Good ↑	Excellent ↑	Good	Excellent
Passaic River Watershed Outlet	Good ↑	Excellent	Very Poor ↓	Excellent	Excellent	Excellent	Good ↓	Poor	Excellent ↑	Good
Passaic River (Upper Passaic)	Good	Poor	Very Poor ↑	Excellent	Excellent	Excellent	Good ↑	Good ↑	Very Poor ↓	Good ↑
Passaic River (through Little Falls)	Poor ↑	Good	Very Poor ↓	Excellent ↑	Excellent ↓	Excellent	Good ↓	Poor	Poor ↓	Poor





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

Rules and Regulations -

EPA Lifetime Health Advisory Levels

- Interim updated health advisory for PFOA = 0.004 ppt
- Interim updated health advisory for PFOS = 0.02 ppt
- Final health advisory for GenX chemicals = 10 ppt

Conversion – 0.014ppb = 14000ppt

MCL – Maximum contamination limit

GWQS – Ground Water Quality Standard (well water)

NJDEP Drinking Water Standards

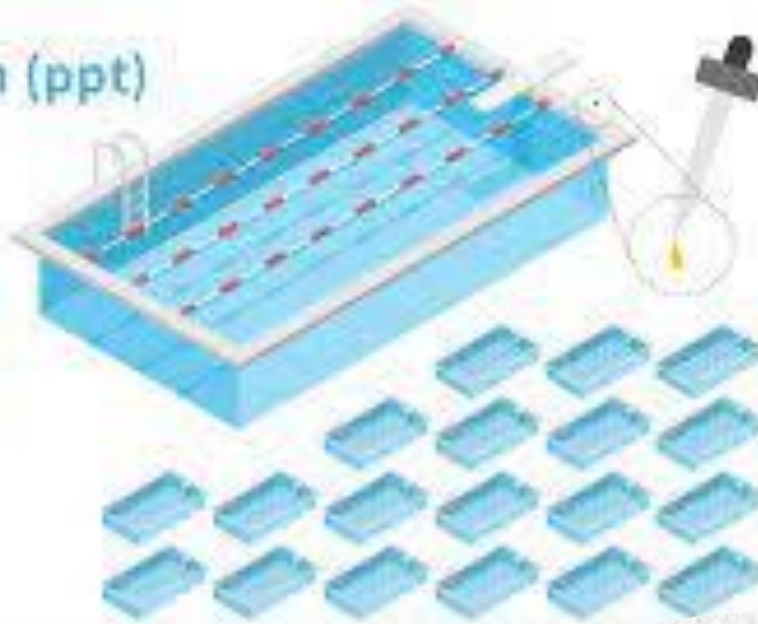
Contaminant	MCL (µg/L or ppb)*	GWQS (µg/L or ppb)*
PFOA	0.014	0.014
PFOS	0.013	0.013
PFNA	0.013	0.013

*micrograms per liter or parts per billion

1 part per trillion (ppt)

IS EQUIVALENT TO A
SINGLE DROP OF
WATER IN

20 olympic-sized
swimming pools



One part per billion (ppb) is the same as

$\frac{1}{2}$ of a teaspoon

in an

Olympic-sized

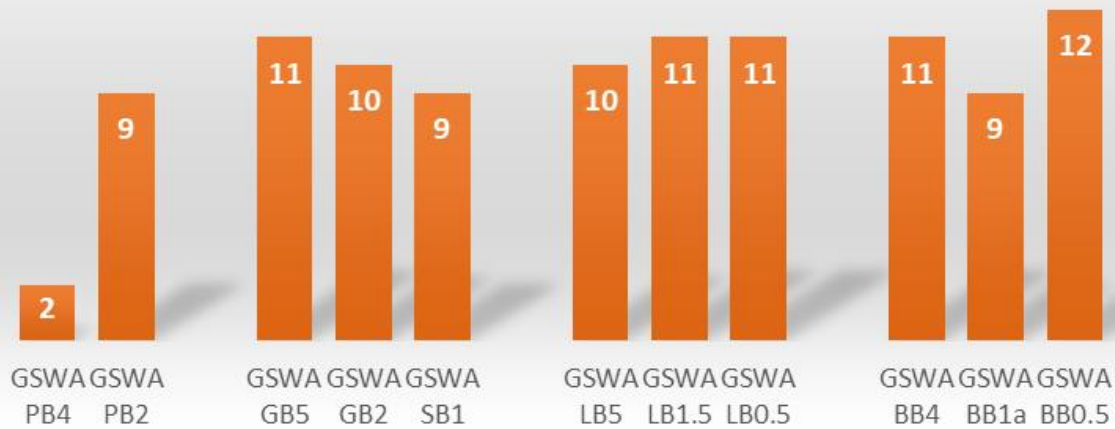
swimming pool.



How much is 1ppb vs 1ppt

PFAS Detection by site

Number of Positive Analytes per Site
Great Swamp Watershed Tributaries



Number of Positive Analytes per Site
Passaic River Sites



Cleaning up the Passaic





Questions