



**GREAT SWAMP
WATERSHED
ASSOCIATION
WATER QUALITY
REPORT CARD
2020**

*Protecting the waters of the
Passaic River region, from
source to sea.*

WHAT GSWA DOES



Underpinned with Water Quality Data

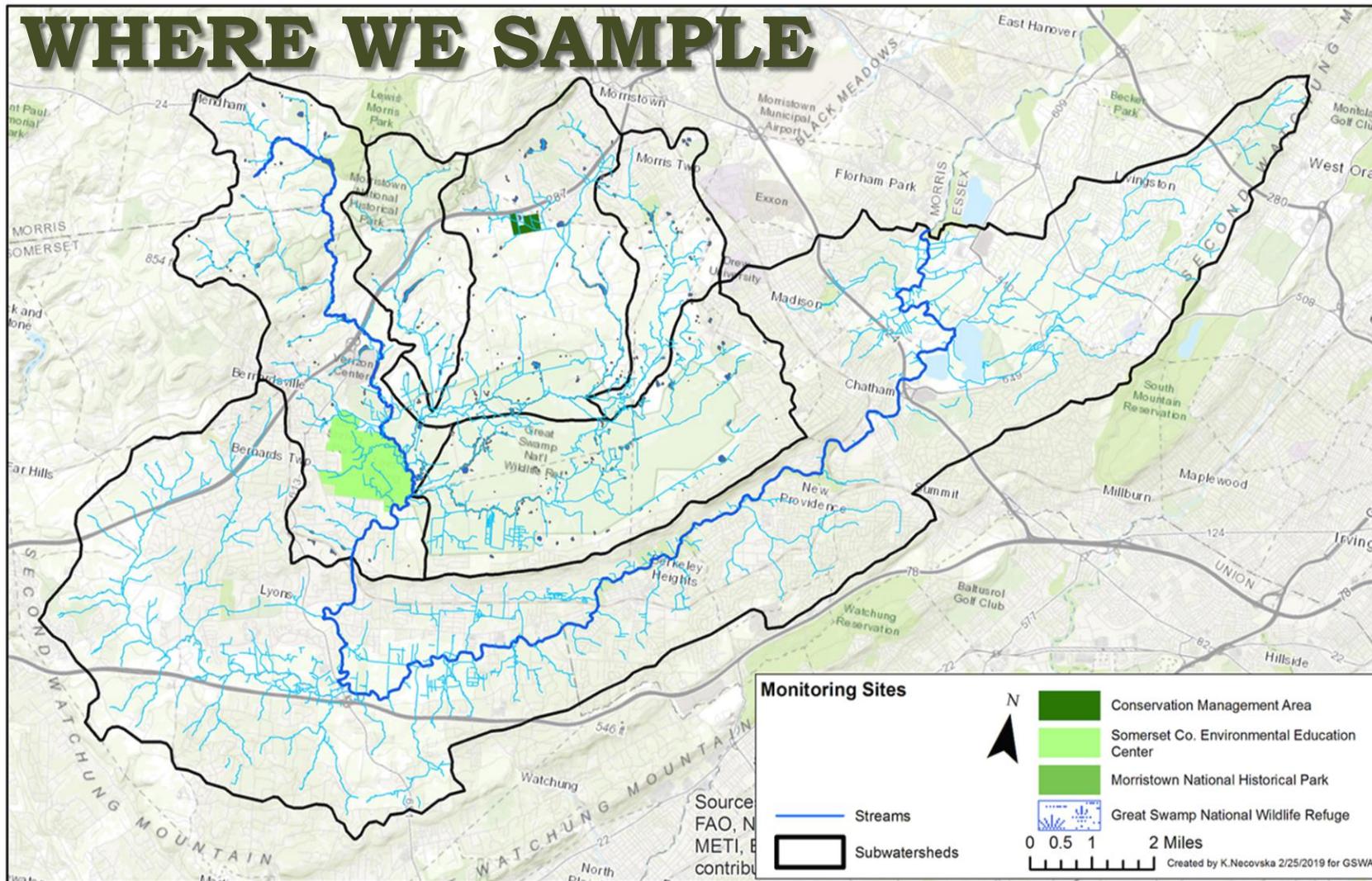
- Visual Assessments
- *E. coli*
- Macroinvertebrate
- Chemical Monitoring
- Microplastic Monitoring
- Culvert Sampling

Advocacy

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



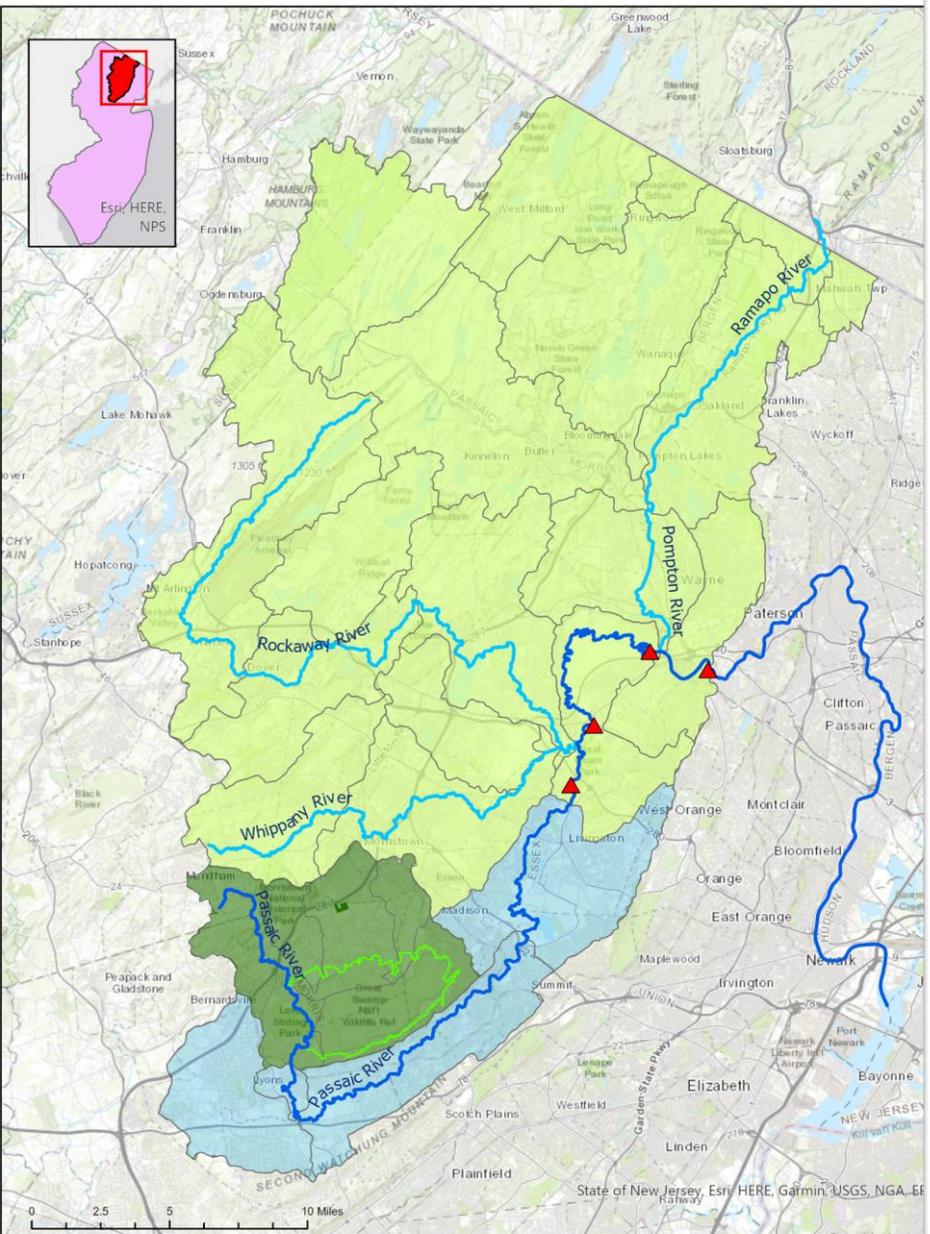
WHERE WE SAMPLE



- Through 2019
 - 5 main sub watersheds with the Great Swamp watershed
 - 1st expansion down through Livingston

2020 PASSAIC RIVER – LITTLE FALLS EXPANSION

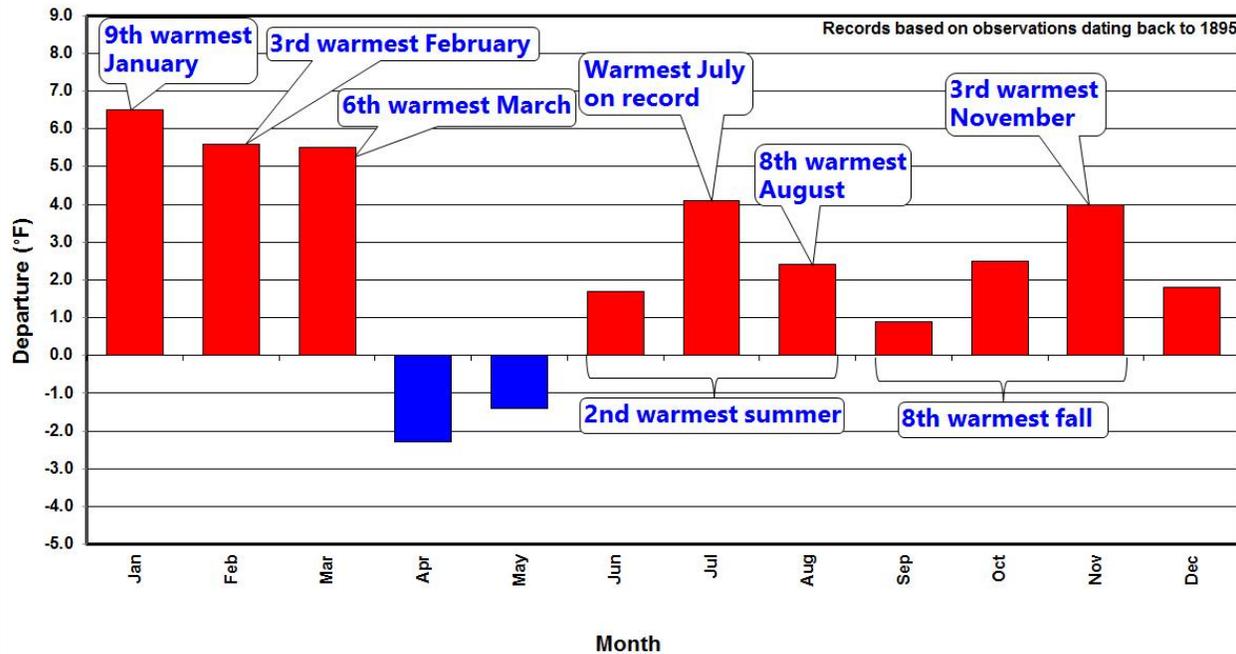
- GSWA PRD6 – Essex Environmental Center
 - Prior to major confluences in this expansion
- GSWA PRD7 – Fairfield
 - Downstream of Whippany confluence which incorporates Rockaway River also
- GSWA PRD8 – Lincoln Park
 - Downstream of Troy Meadows wetland area
- GSWA PRD9 – Little Falls
 - Indicates impacts of Wayne industrial area and flood plains.
 - Downstream of Pompton River confluence which includes Wanaque and Ramapo Rivers



IMPACTS OF CLIMATE CHANGE

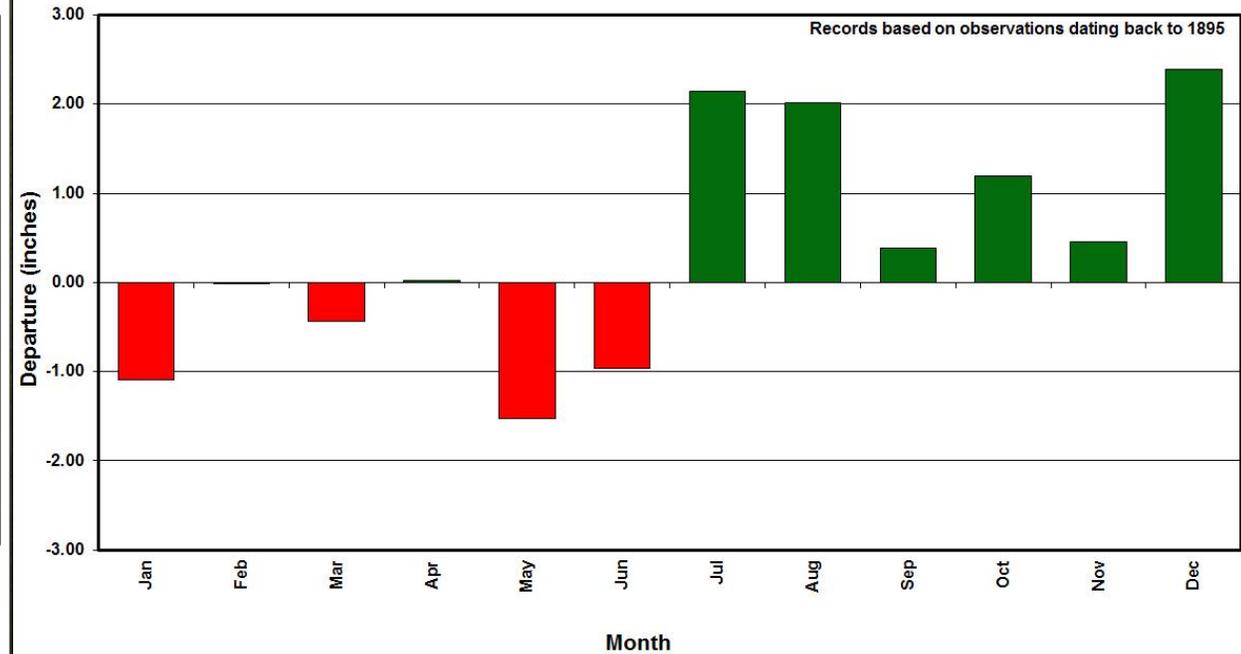
NJ Monthly Temperature Departures (January 2020 – December 2020)

Departures calculated from differences between observed monthly temperatures and 1981–2010 monthly averages



NJ Monthly Precipitation Departures (January 2020 – December 2020)

Departures calculated from differences between observed monthly precipitation and 1981–2010 monthly averages





2020 WATER QUALITY MONITORING

- **Chemical Monitoring**
 - 4 times a year
 - Handheld meters
 - Lab analysis
- **Bacteria Monitoring**
 - 21 sites
 - Five consecutive weeks July/Aug
- **Visual Assessments**
 - NJ DEP protocols
 - Spring and Fall
 - 22 sites
- **Macroinvertebrate Sampling**
 - 15 sites
- **Culvert Sampling**
 - 59 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



2020 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 ↓ | Good ↓ | Excellent | Excellent | Good | Poor ↓ | Excellent ↑ | Poor ↓ |
| Great Brook (main stem) | | Poor ↑ | Good ↑ | Poor ↑ | Excellent | Excellent | Excellent | Good ↑ | Poor ↓ | Poor ↑ | Good ↓ |
| | Silver Brook | Very Poor ↑ | Good | Very Poor ↓ | Excellent ↑ | Excellent | Excellent ↑ | Good | Good | Very Poor | Good |
| Loantaka Brook | | Very Poor ↑ | Good | Very Poor ↑ | Excellent | Excellent | Excellent | Poor ↑ | Poor ↓ | Very Poor ↓ | Poor ↓ |
| Primrose Brook (main stem) | | Good ↑ | Good | Very Poor ↓ | Excellent ↓ | Excellent ↓ | Excellent | Excellent ↑ | Excellent ↑ | Excellent | Excellent |
| Passaic River (Headwaters) | | Good ↑ | Good | Very Poor ↑ | Excellent | Excellent | Excellent | Excellent ↑ | Poor ↓ | Good ↓ | Excellent |
| Passaic River Watershed Outlet | | Poor | Good | Good ↑ | Excellent | Excellent | Excellent | Good ↓ | Very Poor ↓ | Excellent ↓ | Good |
| Passaic River (Upper Passaic) | | NO DATA | NO DATA | NO DATA | NO DATA | NO DATA | NO DATA | NO DATA | NO DATA | NO DATA | NO DATA |
| 1st | Millington through Livingston | Good ↑ | Poor | Very Poor ↑ | Excellent ↓ | Good ↑ | Excellent | Good ↓ | Very Poor ↓ | Very Poor ↓ | Very Poor ↓ |
| 2nd | Livingston through Little Falls | NO DATA | Poor | Very Poor | Excellent | Excellent | Excellent | Good | Poor | Very Poor | Poor |

KEY

Arrows indicate a >.5 change from the 2019 data and correspond with the grade not the measurement

| | | | | |
|-----------|------|------|-----------|--------------------|
| Excellent | Good | Poor | Very Poor | NO DATA |
|-----------|------|------|-----------|--------------------|

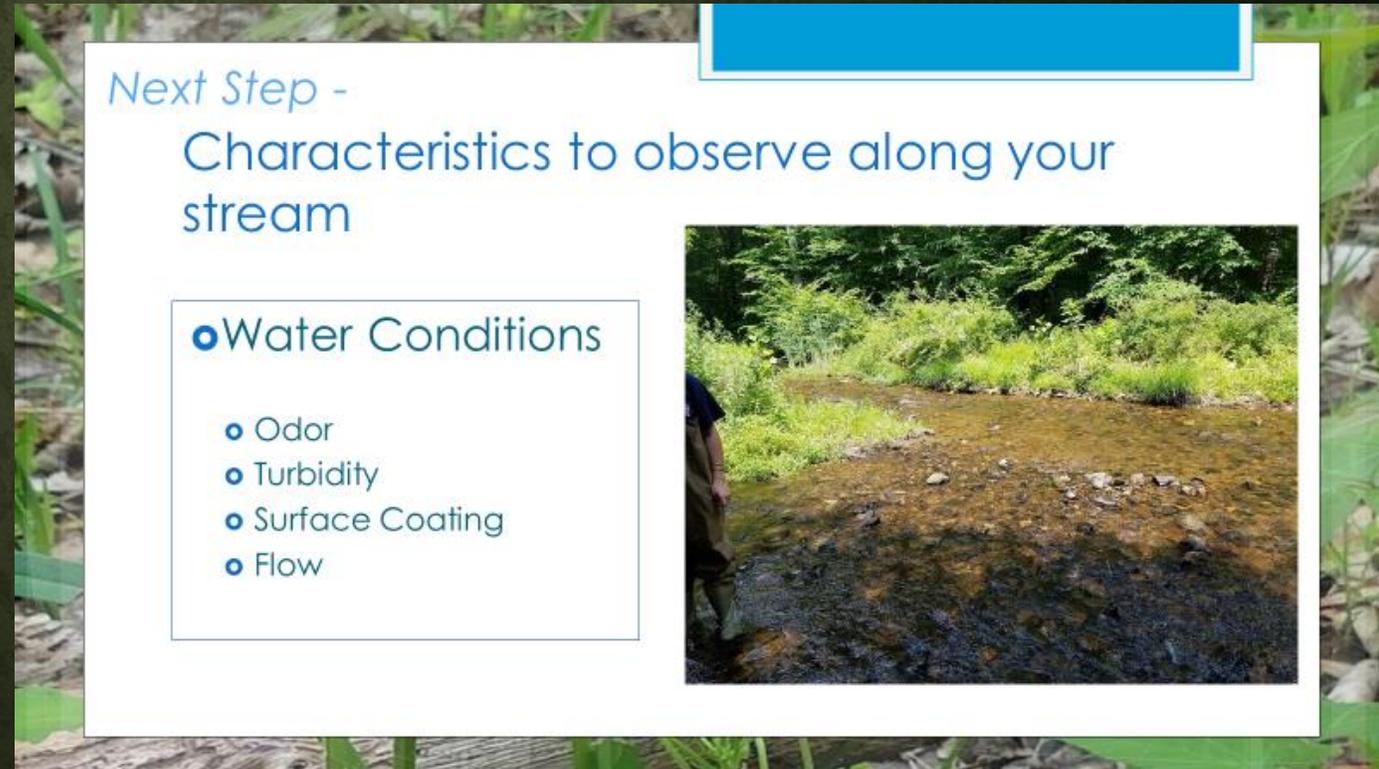


CHEMICAL FINDINGS

- TDS/Salt levels were down over all
- Water clarity elevated above normal limits more frequently
- Nutrient levels increase downstream of Millington
- In new expansion area
 - Nutrients are highest concern
 - Elevated nutrients can increase algal growth
 - Water clarity was also poor

VISUAL ASSESSMENTS

- Twice a year
 - Spring and Fall
 - 2020/21 training - virtual
- Stream Team Citizen Scientists
- Now offering self paced training on our web site
 - Covers all but flow measuring
 - Flow measuring with video – coming soon



Next Step -
Characteristics to observe along your stream

- Water Conditions
 - Odor
 - Turbidity
 - Surface Coating
 - Flow





VISUAL ASSESSMENTS

- Change in safety protocols
 - No flow
- Highlights –
 - Spring/fall sites collected with chemistry sampling
 - Water clarity impaired – more in the fall
 - Increased levels of trash
- Expansion area –
 - Canopy more open
 - Less habitat in-stream



BACTERIA SAMPLING

- Indicator of fecal pollution
- Health implications
- Monitor sites watershed wide once yearly in summer over 5 weeks
- Sites selected represent areas where people or pets are likely to be in contact with water
- 3 sites in new expanded range
- 2020 – some sites unreachable due to park closures

2020 BACTERIA RESULTS

- Overall better numbers
 - NJ State exceedances following rainstorms
 - More consistently within normal limits in Great Brook and Loantaka Brook
- Primrose Brook
 - New site added below Mt Kemble Lk
 - In Jockey Hollow – results excellent on dry days
- Passaic River
 - Headwaters – excellent results on dry days, only slight elevation following rainy days
 - Millington Gorge – Only one exceedance, much improved
 - Expansion areas –
 - Through Livingston – few exceedances which correspond to rain
 - Through Little Falls – Elevated all days at Essex Environmental
 - Fairfield and Little Falls has no exceedances





MACROINVERTEBRATE SAMPLING

- Samples collected in early June for best diversity
- Collected samples at 15 sites through Livingston
- 4 sub samples per site
- Interns from Drew University

MACROINVERTEBRATE SAMPLING RESULTS

- Overall NJ HGMI scores went up at almost all sites.
- Primrose Brook headwaters steady increase over the last three years
- Black Brook increase within the refuge but decreased at Foot's pond
- Passaic River headwaters – significant increase in density and diversity



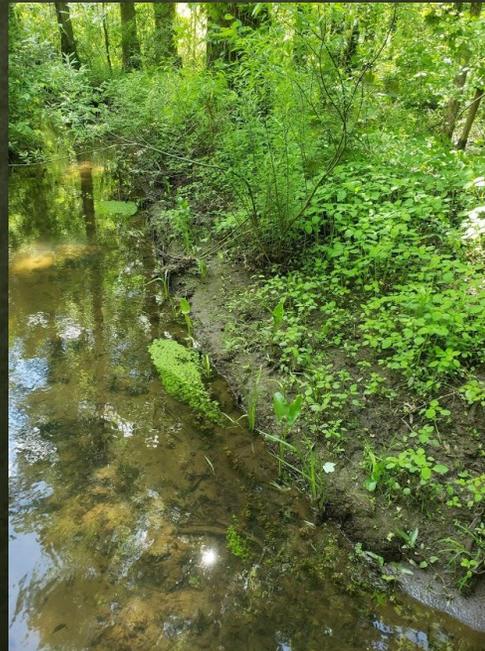


TWO SAMPLING PROJECTS OF INTEREST

Silver Brook Restoration – baseline sampling

Loantaka Brook – Follow up to Seaton Hackney – 5 years later

- Sampling locations added for bacteria, visual and macroinvertebrate up and downstream from restoration site
 - Bacteria – improved bacteria levels overall, noticeably lower than before the restoration following rain fall
 - Macros – Improved diversity and slight increase in density
 - Need further habitat restoration



- Three sites one upstream and two downstream of restoration work
- Area degraded by historic farming practices
- Sampled visual, chemistry, bacteria and macroinvertebrates
 - Macroinvertebrate low diversity and density
 - Bacteria mostly within normal limits – except following rain
 - Chemistry – elevated nutrient levels, water clarity average
 - Visual – stream bank vegetation degraded, low habitat score

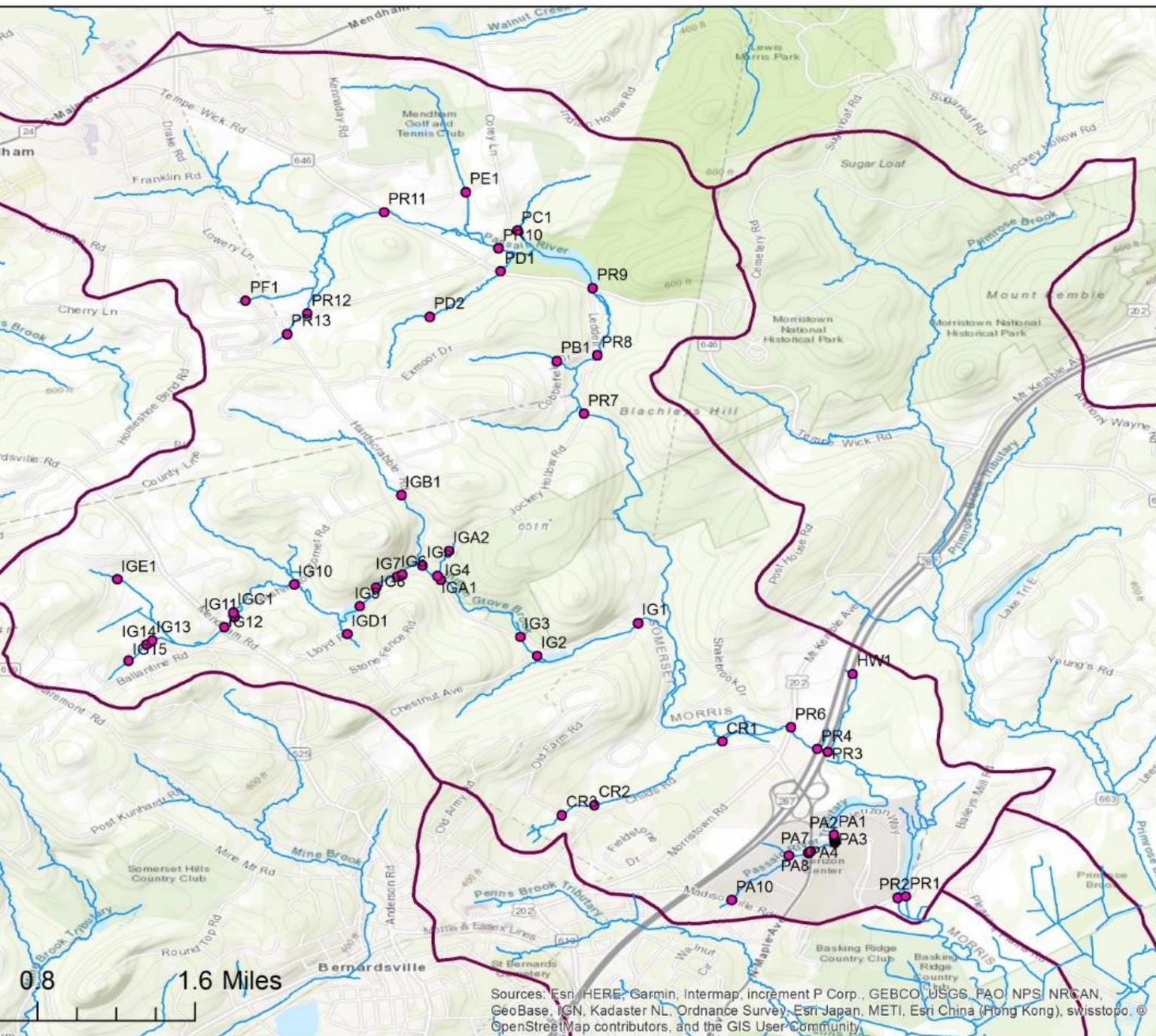
SILVER BROOK BUFFER PROJECT

- Hornaday Eagle Scout Project
- Worked with GSWA staff to improve the buffer on Silver Brook
 - Removed invasive species with the help of GSWA volunteers
 - Planted a selection of native herbaceous and woody plants in the buffer zone
 - Installed education sign explaining project purpose



CULVERT SAMPLING

- Working with NY/NJ Harbor Estuary Program(HEP)
- Data collected by North Atlantic Aquatic Connectivity Collaborative (NAACC)
- Submitted by HEP to NJDEP with recommendations for improvements
- GSWA will continue this relationship in 2021 sampling along the Primrose Brook corridor





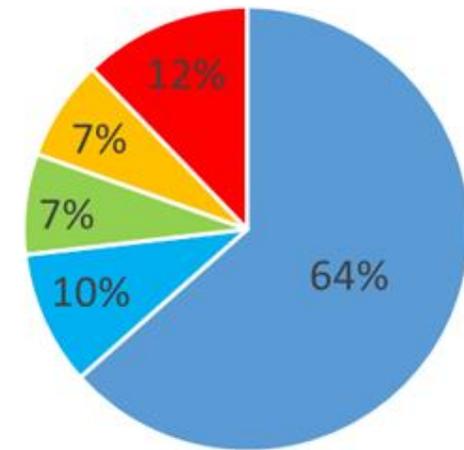
CULVERT STUDY PURPOSE

- Over 45 sites
- Range from small drainpipes to Rt 287 over pass
- Assessing aquatic and terrestrial connectivity
- Ability of the structure to accommodate 1 to 500 year storms

CULVERT STUDY RESULTS

- Most crossings were insignificant barrier
 - Most barriers were from small dams on ponds throughout the area, often adjacent to crossings
- Restoration recommendations
 - Adding a fish ladder to dam at Osborn Pond
 - One small culvert pipe along Indian Grave Brook upgraded to a larger one
 - Removal of small dam along tributary of Passaic River off Madisonville Rd

NAACC Results
45 Crossings



■ Insignificant barrier ■ Minor barrier ■ Moderate barrier
■ Severe barrier ■ Significant barrier



WATERSHED FRIENDLY LIVING

- Be aware of litter in outdoor areas and secure garbage cans at home
- Continue to use alternatives to salt for de-icing such as Calcium magnesium acetate (look for pet friendly)
- Take back the tap and use reusable bags to reduce single use plastics
- Pick up pet waste

MOVING FORWARD IN 2021

Interagency PFAS Task Force

July 30, 2019

DPH
Connecticut
DEPARTMENT of PUBLIC HEALTH
DEPARTMENT of ENERGY AND ENVIRONMENTAL PROTECTION

PFAS Overview: What are PFAS?

PFAS = Per- and Polyfluorinated Alkyl Substances

- Over 4,000 chemicals
- Developed in the 1940s
- Ubiquitous in consumer products and industry
- Common products
 - Non-stick cookware
 - Waterproof apparel
 - Stain-resistant carpet
 - Grease-resistant food packaging
- PFOA and PFOS most well-known

Good

Repels oil, grease, water, heat

Stable

Bad

Extremely persistent, Resists degradation

Bioaccumulative

Toxic

Migrates easily in air and water

PFAS

DEPARTMENT of PUBLIC HEALTH
DEPARTMENT of ENERGY AND ENVIRONMENTAL PROTECTION

6

- Continue our Little Falls Expansion sampling
- Expand culvert study
- Sampling for PFAS
 - April sampling
 - Outreach events to educate the public on new drinking water standards in NJ
 - Share data with NJ American Water on areas of elevated PFAS in surface waters

THE 2020 WATER QUALITY PROGRAM WAS FUNDED IN PART BY GENEROUS GRANTS FROM

- The Watershed Institute
- The Leavens Foundation
- Summit Area Public Foundation

Great Swamp Watershed Association would also like to sincerely thank our members, corporations, and foundation supporters whose generous contributions helped fund our water quality monitoring programs throughout 2019. It is the support of GSWA members that makes the work we do possible.



THANK YOU!

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