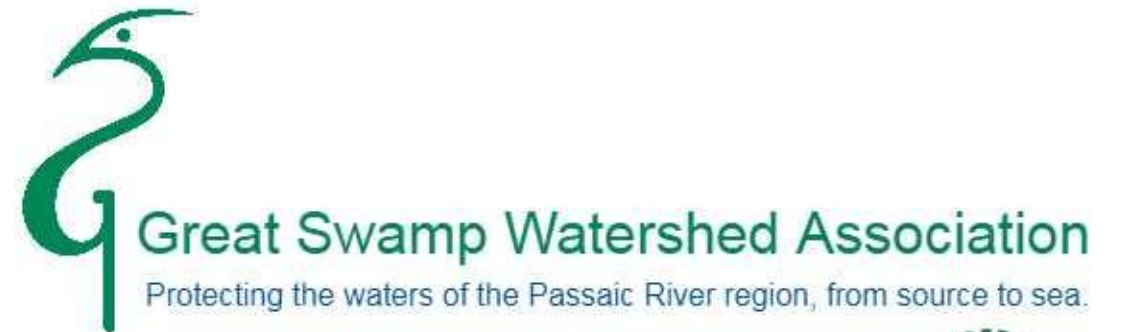


Microplastics in Our Waters

Sandra LaVigne - Director of Water Quality Programs





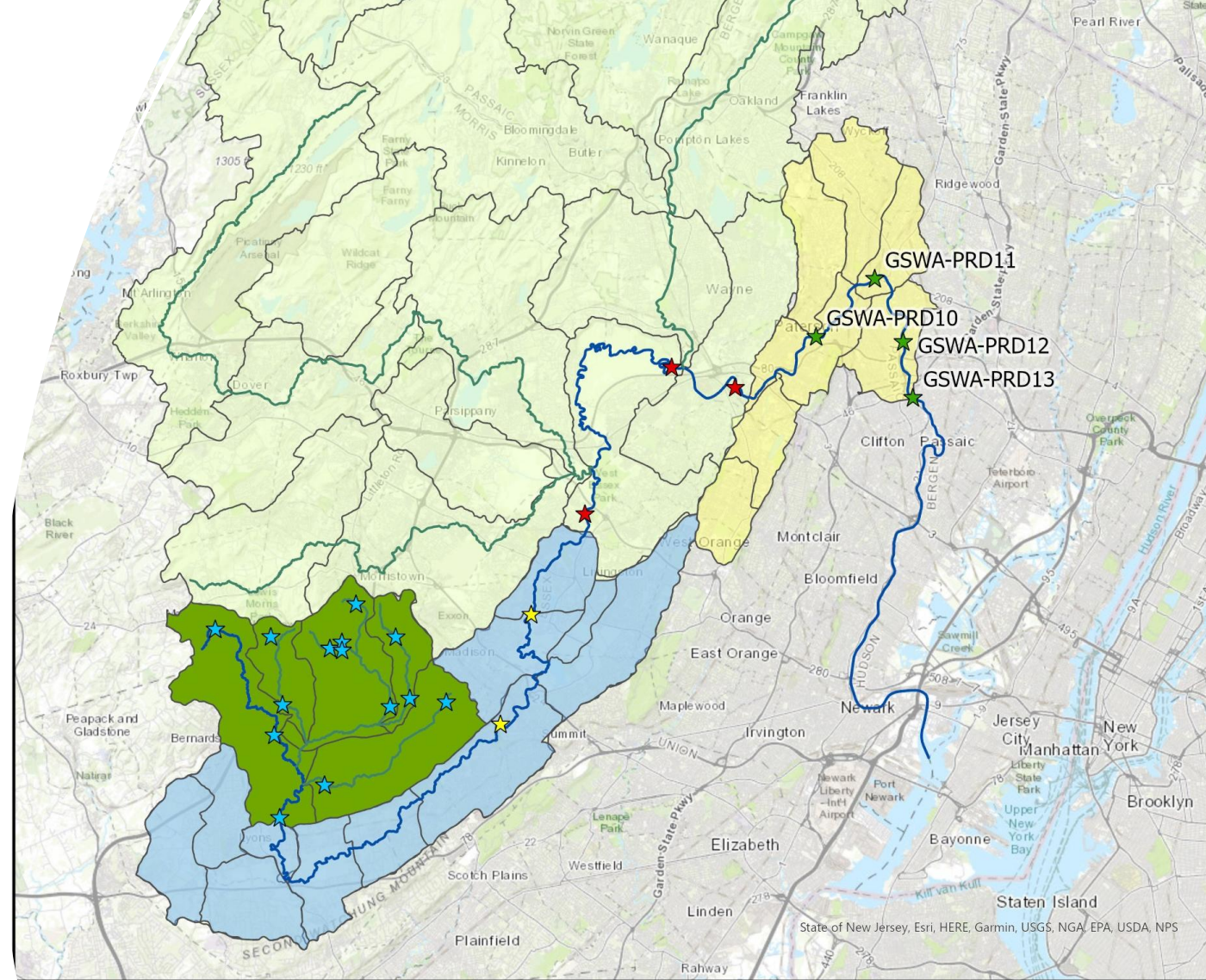
Our Mission – One River, One Community

- 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.

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

in, r Van Ryzin for GSWA Disclaimer: GSWA does not assume responsibility for spatial accuracy or timeliness of the data.



GSWA Studying microplastics in aquatic environments

- Issues in headwaters –
 - Sampling techniques
 - Equipment
 - Processing
 - Reporting results



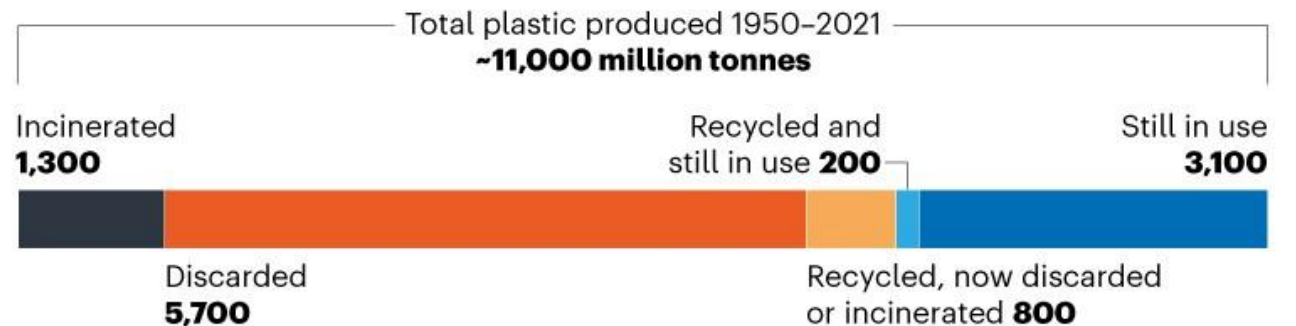
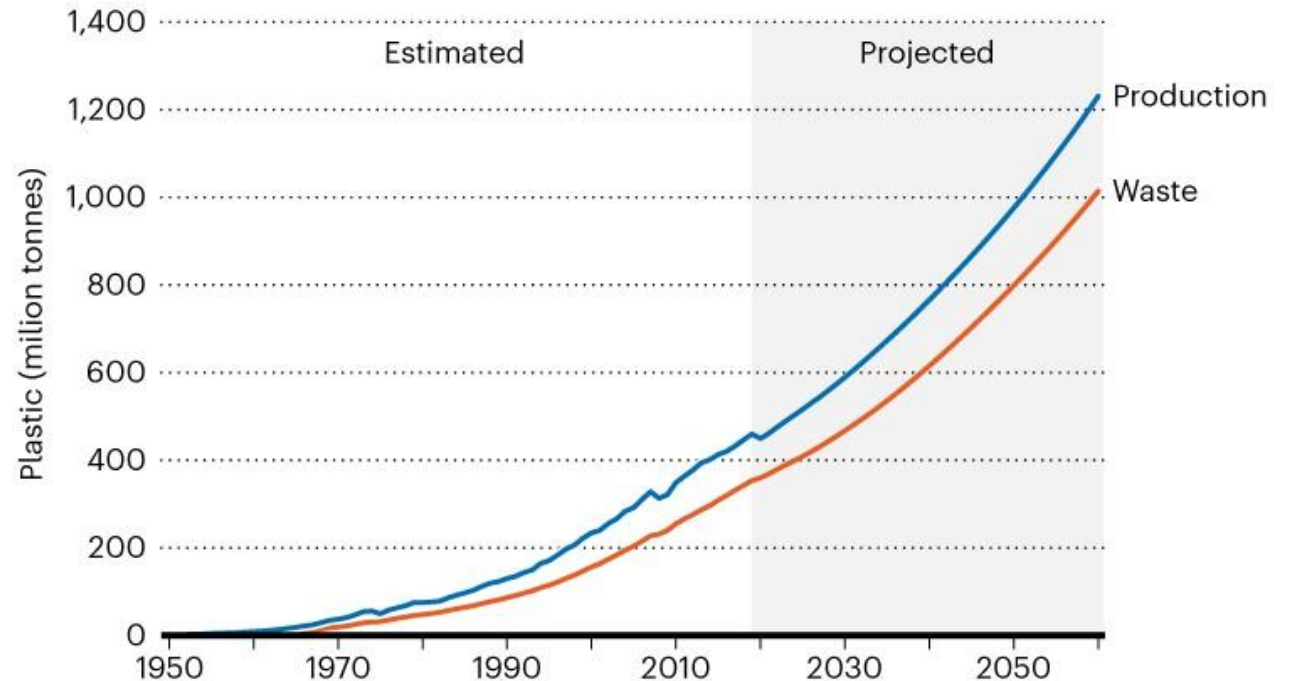
Plastic Production

- In 2023 – over 460 million metric tons of plastic were produced worldwide
- ~ 11% is recycled (Geyer 2023)
- Climate change
 - Exacerbating issue
 - Plastics are a petroleum product
 - Significant rain events carry more plastic waste into our waterways (Kelly et al, 2025)

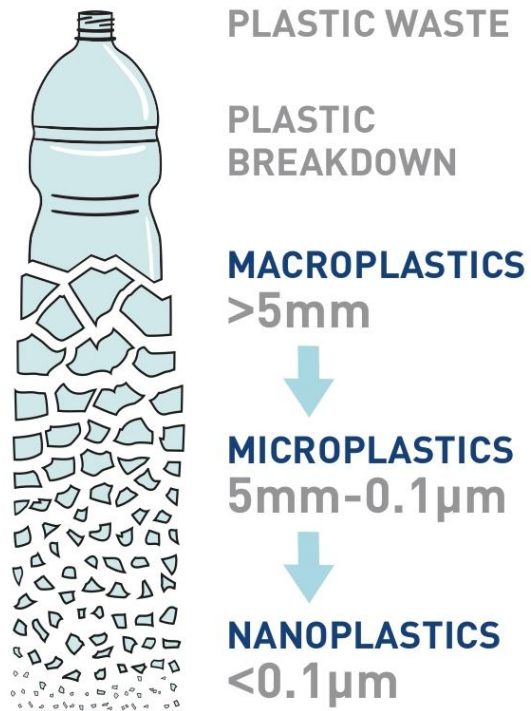
Image – Geyer 2023

A TIDE OF PLASTIC WASTE

Global production of plastic is rising, as is the build-up of plastic waste. Most of this waste is discarded or incinerated.



Plastic breakdown over time



Plastic Can Take 500 Years To Bio-Degrade In The Ocean

Estimated number of years for selected items to bio-degrade in a marine environment*

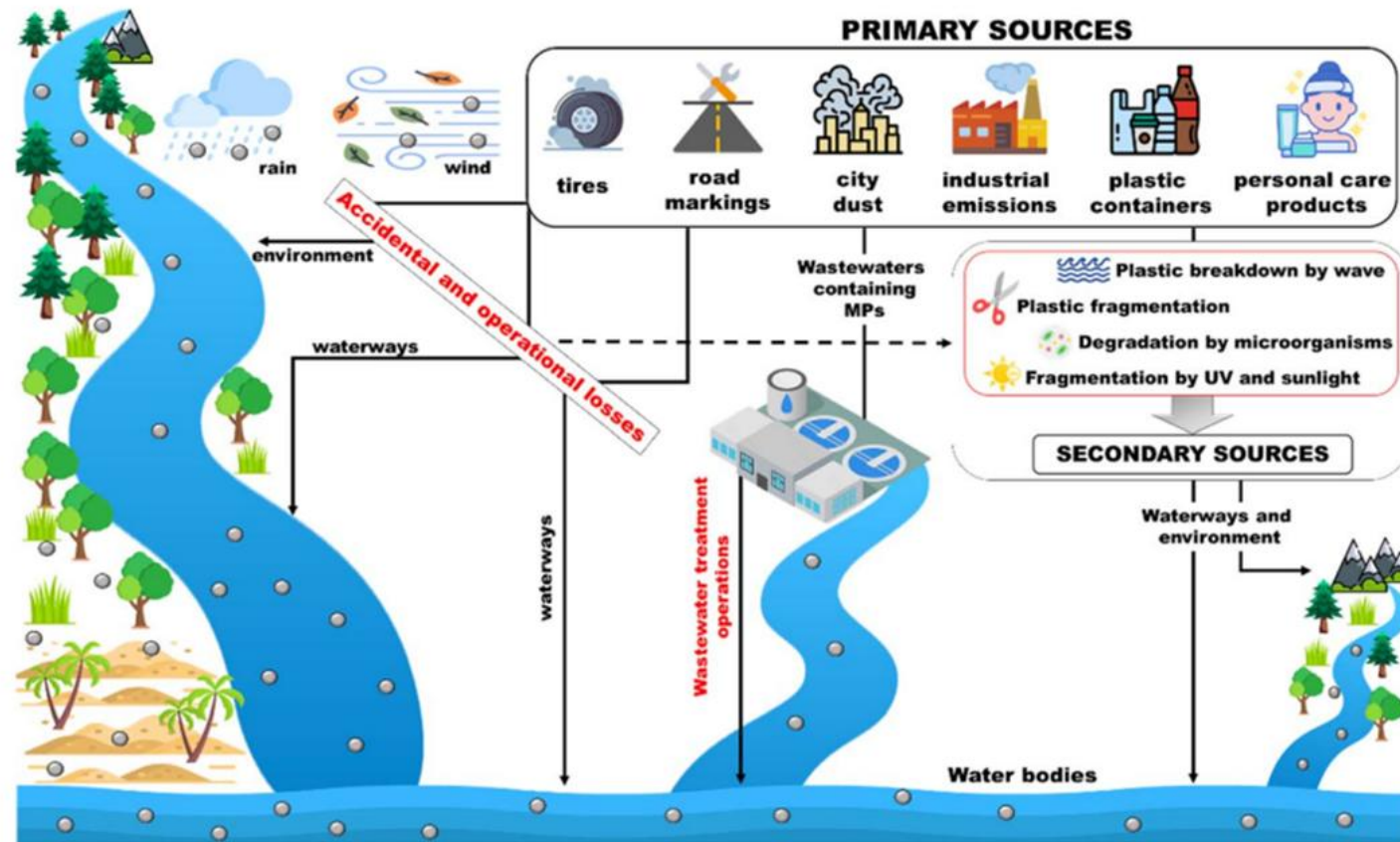


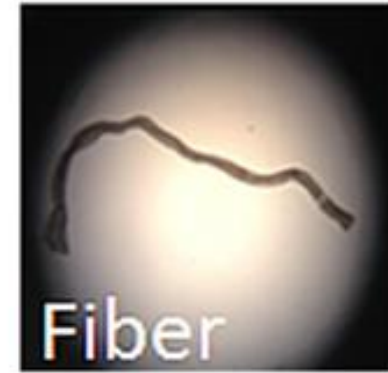
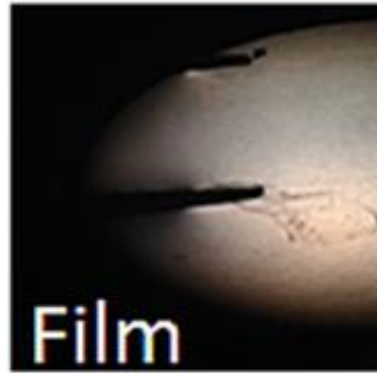
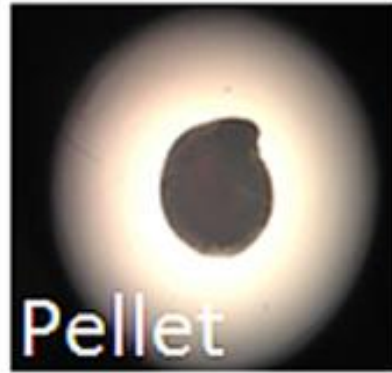
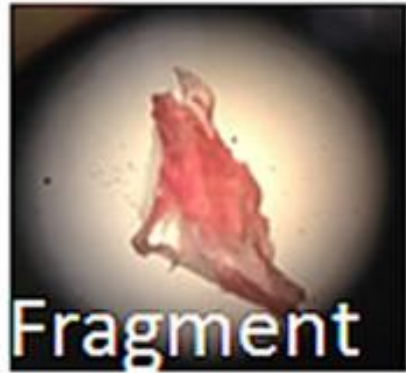
CC BY ND
@StatistaCharts

* Exact time varies by product type and marine conditions. Cigarette butts and grocery bags are an upper estimate.
Sources: NOAA, Woods Hole Sea Grant

statista

Microplastic sources and transport in the environment



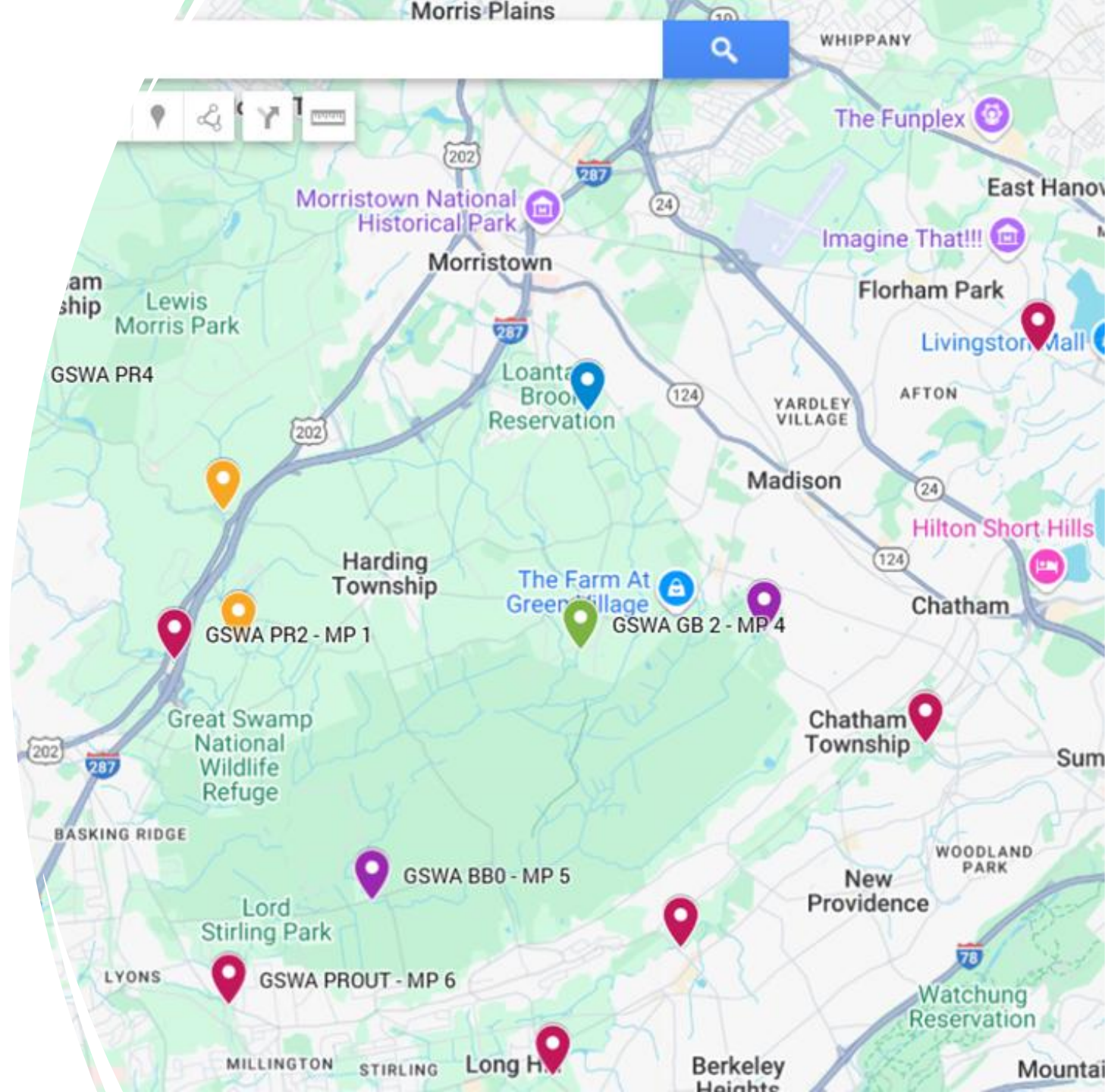


Microplastics – Shapes and structure

- Fragment – hard plastics chips
- Pellet – round, hard plastics
- Film – pliable, flexible plastics
- Fiber – thin strand plastics
- Foam – polystyrene

GSWA – 2018/19 Microplastics Study

- 2018 –
 - Pilot Study
 - In-house sorting
 - Presence absence and some differentiation
 - 10 sites
- 2019 –
 - Worked with New Jersey City University
 - Lab processed samples
 - Fenton digestion to remove organics
 - 13 sites

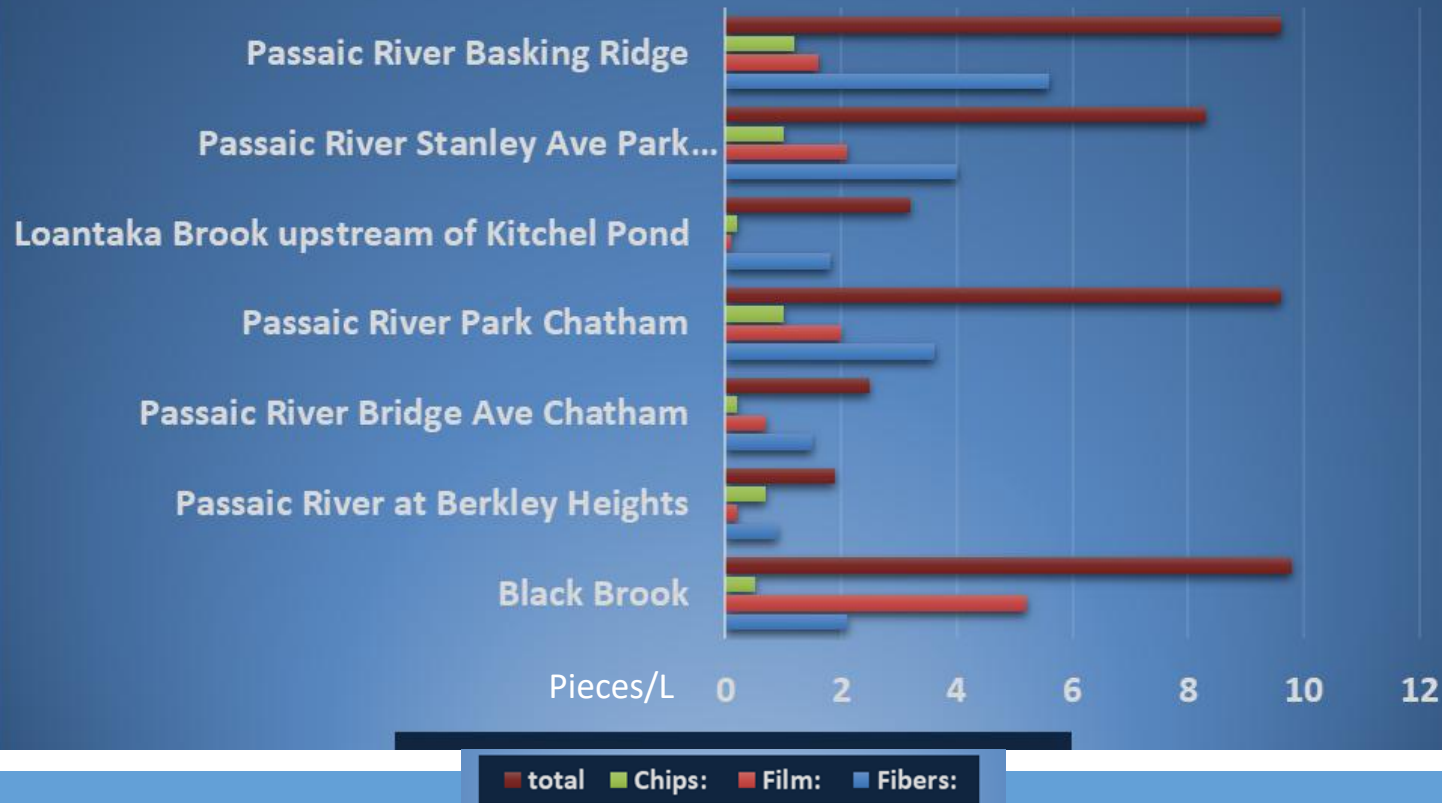




Study Sampling

- Stream Team Volunteers
- Interns – Drew University/William Patterson University
- 30-minute sample collection
- NJDEP Visual Assessment
- Rinsed into mason jar
- Flow meter

Microplastic Breakdown in our Watershed



Results & Challenges

- Elevated results in Black Brook
- Loantaka Brook
 - Lower than expected
- Passaic River - Elevated
 - Basking Ridge
 - Chatham
 - Stanley Ave
- Samples
 - Net
- Temperature

2019 Study – Raw data

- Results
 - Predominantly fibers
- Sample Methods
 - 30 min net
 - Jar Grab
- Id methods
 - Organic matter digested off – Fenton Reaction method
 - Plastic type determined under microscope and with spectrometry

	Sample Name													
Material	PRD 2.25 11/11/19 30 MIN	PRD 5 11/20/19 30 MIN	PRD 2.75 11/11/19 30 MIN	PB2 9/30/19 30 MIN	LB4 9/5/19 12:50 PM 30 MIN	PR2 9/5/19 30 MIN	BB1 11/17/19 30 MIN	BBO 9/13/19 30 MIN	3.75 11/27/19 30 MIN	GB2 9/16/19 30 MIN	PB3 9/30/19 30 MIN	PROUT 10/11/19 30 MIN	PR4 10/11/19 30 MIN	Total by material
Filament*	52	12	30	3	28	25	33	46	106	61	66	94	65	75
Bead									2					0
Styrofoam		1											6	6
Foil									7					0
Fragment												1	1	8
Total by sample	52	13	30	3	28	25	33	46	115	61	66	95	72	89

NJ Get Past Plastics Law

GET  PAST
PLASTIC



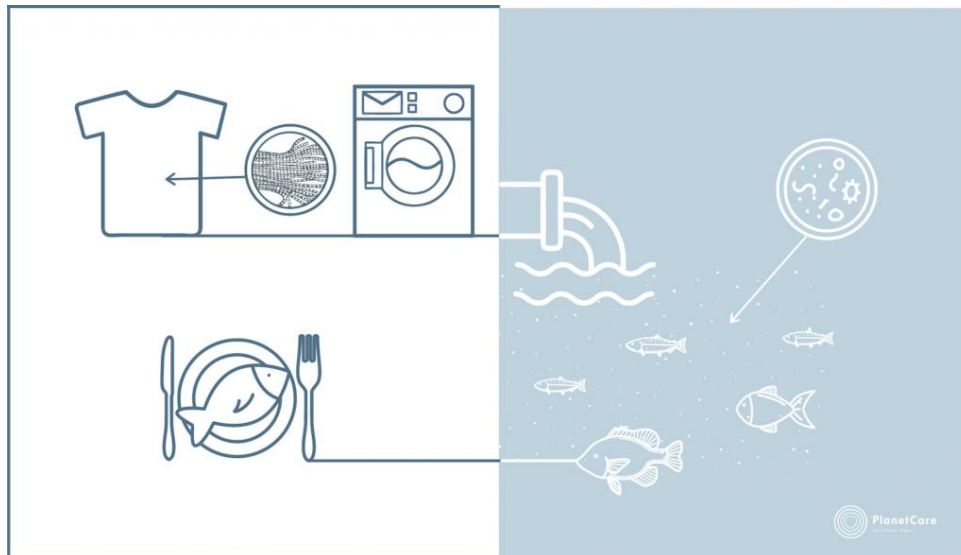
Image - Clean Water Action

- Get Past Plastic –
 - Promulgated on Nov 4 2020
 - Single use carryout bags
 - Single use straws
 - Polystyrene foam takeout containers
 - Fully implemented in 2022
- NJ Plastics Advisory Council
 - Yearly reports on progress
 - Recommendations on next steps
- Skip the Stuff – Aug 2026
 - Disposable utensils and straws on request only



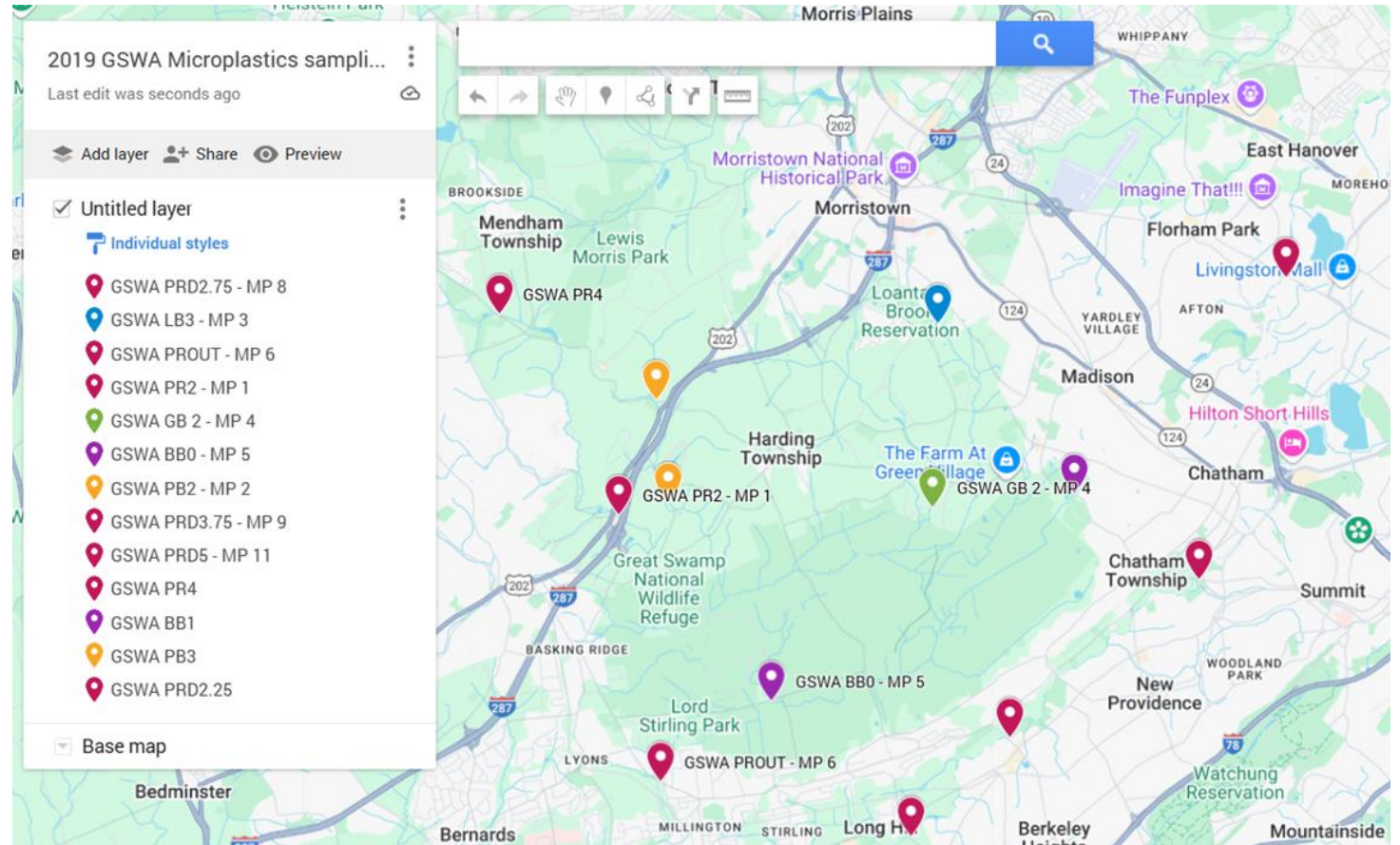
NJ Plastics Advisory Council Reports

- Year 1 - 2023 Stopped
 - 16.5 billion single use plastic bags
 - 110 Million single use paper bags
- Year 2 – 2024
 - Data from Clean Ocean Action
 - Straw reduction not as successful as bags
 - 35% of microplastics enter from washing machine effluent



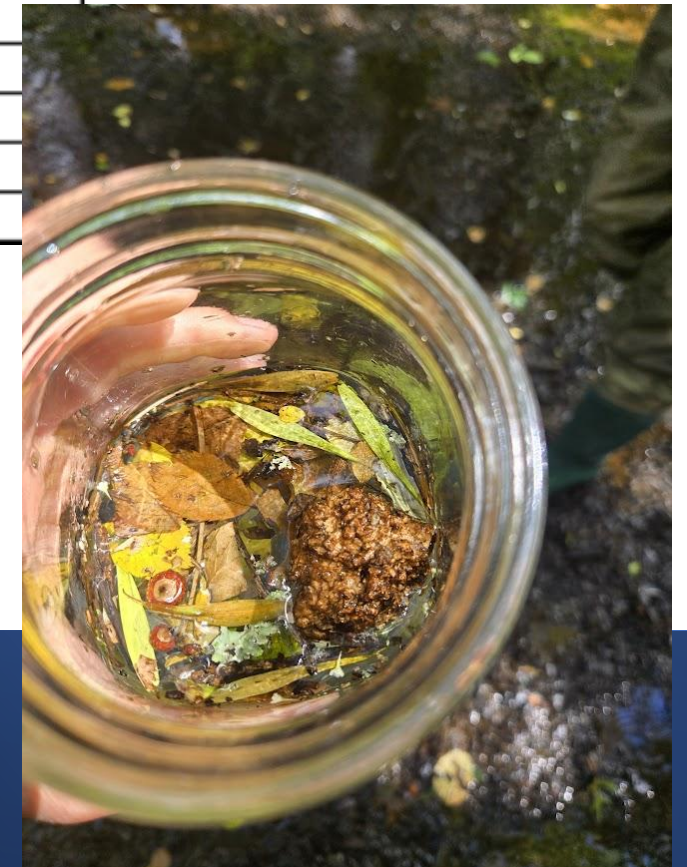
5 Years later

- 2025 - follow up study
 - Working with New Jersey City University
 - Sampling same 13 sites
- Drought conditions
- Same SOP
 - 30 min samples
 - Much lower volume of water through the sample net



Sample name	Sample date	# plastics	Type of plastic
PRD-5	9/4/25	0	
GB-6 Foots pond	8/27/25	1	styrofoam piece (small)
BBO	8/27/25	2	Rough fragments; pink color
GB-2	8/27/25	2	styrofoam piece (small), large styrofoam block
PR-2	8/28/25	1	styrofoam piece (small)
PRD-2.75	9/4/25	0	
PR-4	8/28/25	0	
PB-2	8/27/25	0	
PRD-4	9/4/25	0	
LB 2.5	8/27/25	0	
PR-OUT	8/28/25	0	

- Minimal plastics found
- Many sites had no plastics
- Polystyrene most common



2025 Results

Next steps for GSWA

- Repeat sampling in 2027
 - Monitor weather patterns
 - Determine stream flow to help decide length of time net should be in the water
 - In sites downstream of WWTP sample on two days – effluent release and non release days
- Expand range
 - Utilize manta trawler to sample downstream Passaic
- Nurdle study along lower Passaic River
- Continue to educate public





GSWA – Passaic River Clean-up

- May 2026
 - First GSWA Passaic River – headwaters to bay – Clean-up
 - 10 sites
 - 6 counties
 - Over 180 volunteers
 - Almost 300 bags of trash
 - 45 bags of recycling
- May 2027 – Next clean-up event!



The background image shows a shallow stream with a bed of rocks and moss. On the left bank, a clear plastic bottle lies on the ground. The right bank is covered in a thick layer of dry, brown leaves and some green plants. A large white diamond shape is centered over the image, containing the text.

Next Steps

Continue to use data to
support change

What can you do?

- **Reduce Plastics one room at a time**

- Laundry Room –
 - Microfiber filter on washer
 - Use washing bag
- Kitchen –
 - Reusable containers
 - Cleaning products
- Bathroom –
 - Bar shampoo/conditioner
 - Tablet toothpaste
 - Refillable deodorant





Questions?

Great Swamp Watershed Association Water Quality and Community Connections

Keeping our waters clean for everyone

Sandra LaVigne
sandral@greatswamp.org

