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# Plastic Pollution: Local Solutions & Watershed Strategies

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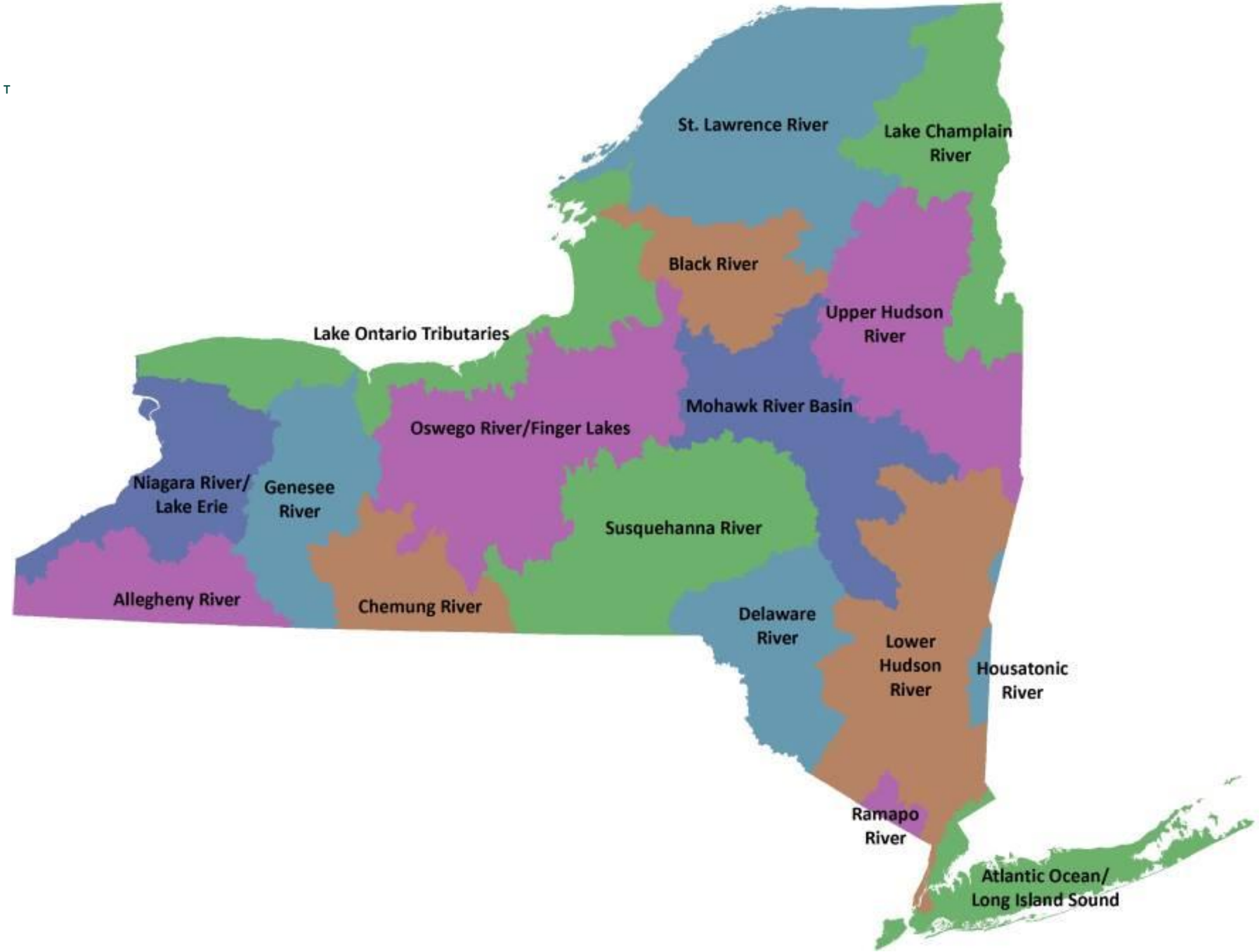

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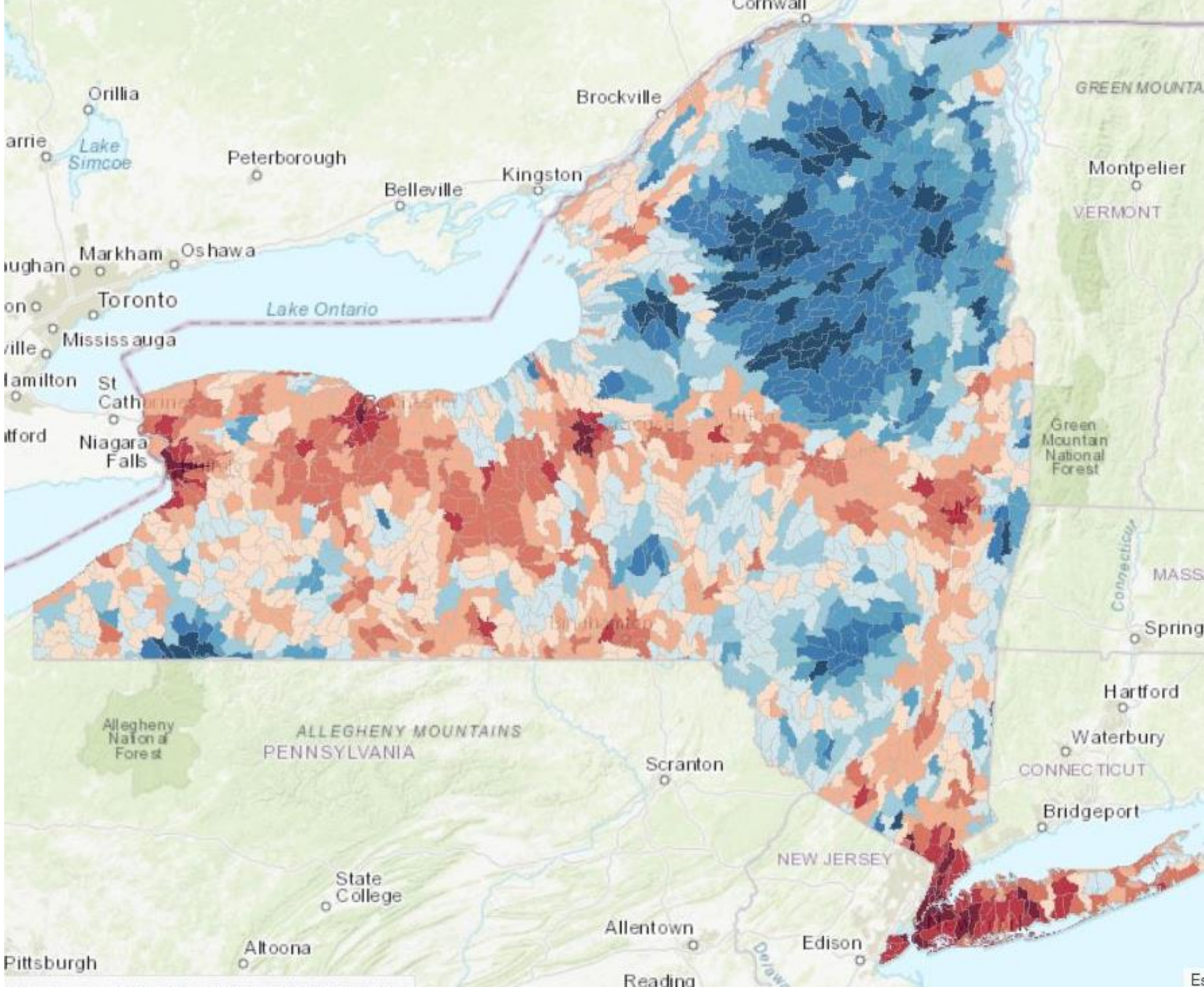

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# Focus on marine debris, microplastics

- U.S. EPA, NOAA
- United Nations
- NYS DEC / Hudson  River Estuary Program
- SUNY Fredonia, Rutgers, Marist, Cornell, Union, Columbia, Pace Law
- Clearwater, HRPT, Riverkeeper, Clean Ocean Action, NY/NJ Baykeeper, Cary Institute
- NY/NJ Harbor Estuary Program
- Hudson Valley Regional Council
- Trash-Free Waters (EPA), City governments

**How can communities understand and address plastic pollution in waterways?**

**What roles and values are useful for citizens to support monitoring and mitigation of local stream pollution?**

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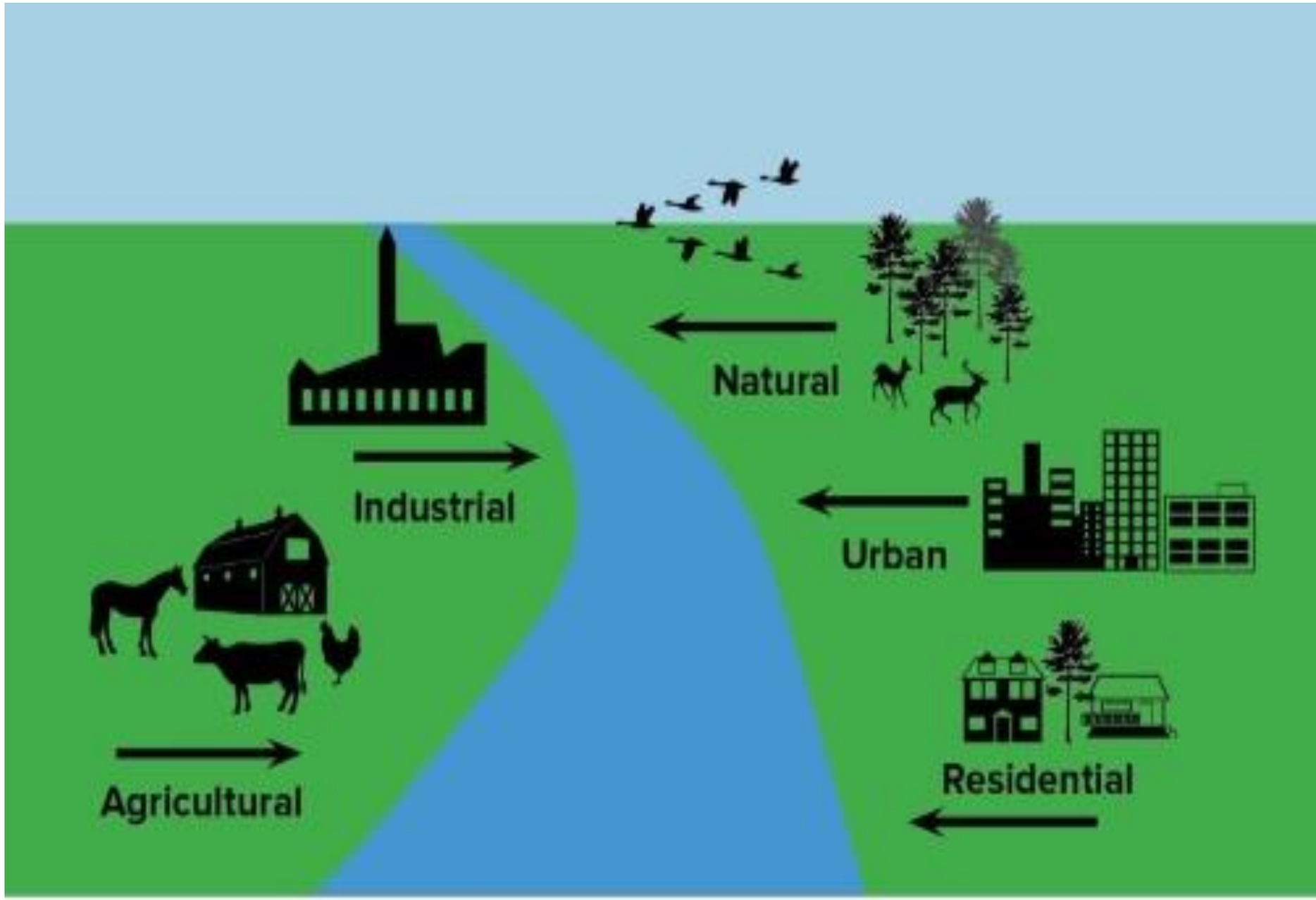


There are many possible sources of pollution in a watershed.

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## Local Solutions - Understanding:

1 Load of Laundry

can discharge

700,000 synthetic microfibers into wastewater

Source: Pace Law / Roger Williams

# Local Solutions - Understanding:

- Dutchess County uses approximately 100 million single-use plastic bags annually, according to the County legislature, which passed the bag ban by a 23-1 vote, going into effect in 2020.

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# Local Solutions - Understanding:

## Microplastics Research in the Harbor Estuary

| Organization | Dates of study | Average Estimated Abundance of particles/km² |
|---|---|---|
| Baykeeper (Marine) | March – Aug 2015 | 256,000 |
| Rutgers University/Baykeeper (Freshwater) | May – August 2016-2017 | 28,000 – 3,000,000 |
| Clearwater, Inc. | Aug 2014 – Aug 2015 | 3,000,000 |
| Hudson River Park Trust | June – October 2016, 2017 | 100,000 – 189,000 |
| Lamont Doherty/Riverkeeper | 2017 | 15,000 – 80,000 plastic particles per liter |

**Source:**
**NY NJ HEP**

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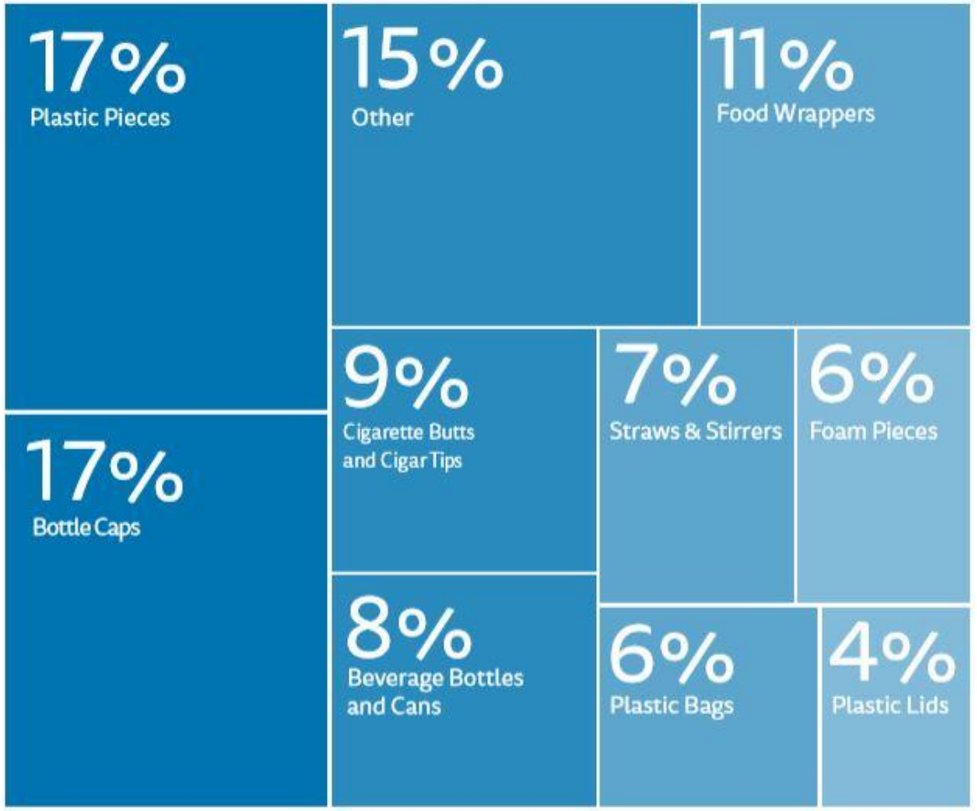
# Local Solutions - Understanding:

Long Term Trend: Improving
Short Term Trend: Improving

Floatable Debris or garbage in our estuary waters and shorelines affects the ability to swim and fish, and with larger debris, can interfere with navigation. Floating trash, that can enter the waterways by flowing out of sewer and stormwater drains, being dumped on shorelines, or being blown to the water by the wind, is an easily distinguishable indicator of water pollution.

**Ocean Conservancy (NJ) 2016 Beach Cleanups**
**Dominant debris types by volume**




## DEBRIS COLLECTED ON BEACHES

### Background

Shoreline cleanups have been an increasingly popular method of stewardship, bringing together community and business partners for an activity with tangible benefits. Many of the environmental groups that organize beach cleanups keep track of the amount of garbage they remove and some even inventory what kind of garbage they find.

### Analysis

This analysis used only shoreline cleanup programs that have long-term datasets and additionally keep track of the mileage of shoreline they cover while collecting. Some of the data sets also track the number of volunteers per day; this metric was used where available. Keeping a consistent measure of effort allows us to make assumptions about how much trash is on the beach per year and thus, whether the problem of debris is getting better or worse. The annual amounts of debris collected in pounds per mile of shoreline or pounds per mile of shoreline per person were calculated and reviewed from Ocean Conservancy, the American Littoral Society, and the NJ Clean Shores Program.

**Source: NYNJ HEP**

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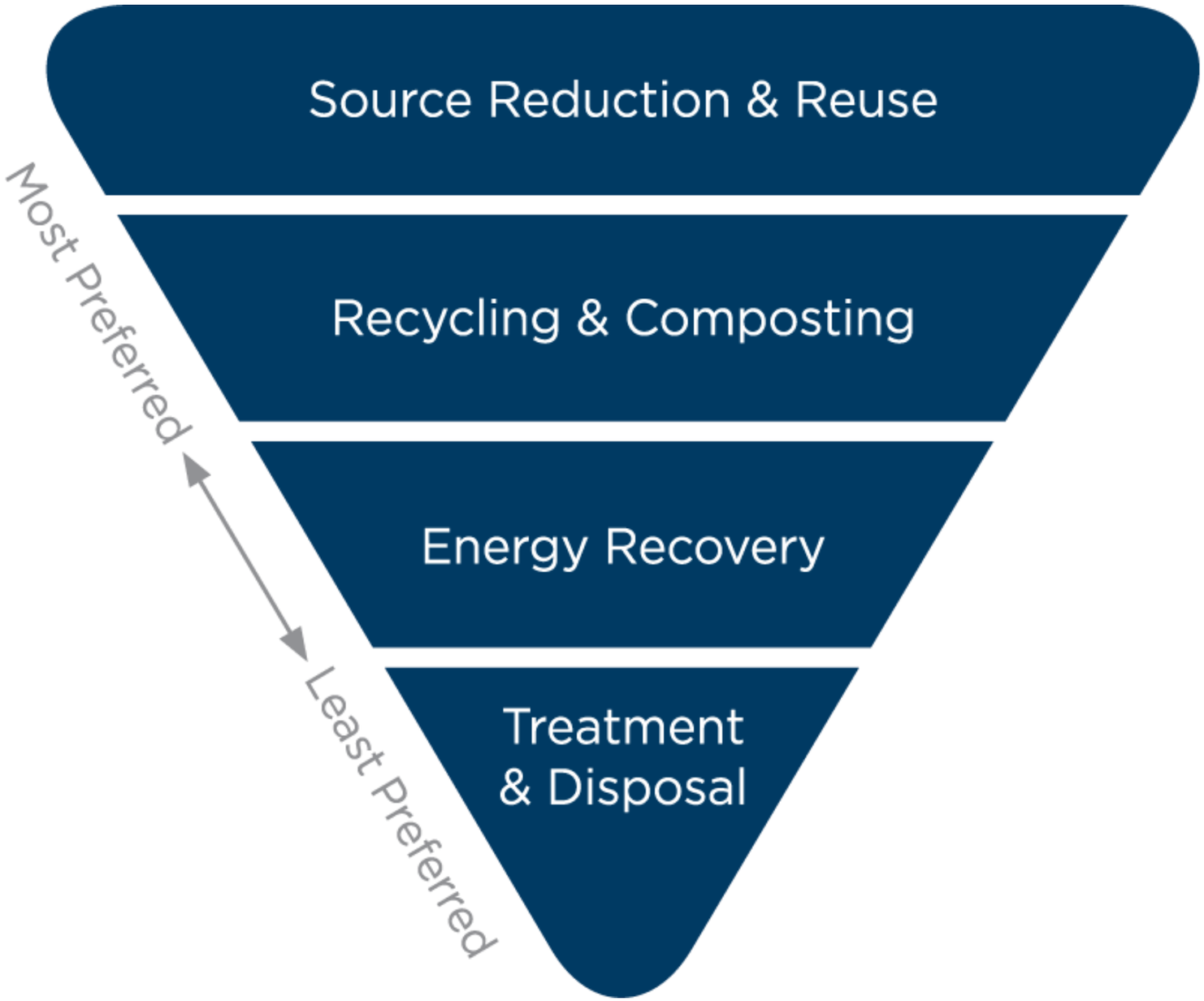


# U.S. EPA - Waste Management

**Source:**
**EPA**

# Local Solutions – Roles & Values

- Common Goals (health, economy, etc)
- Everyone is an educator
- Empowerment to improve
- Stakeholder commitment
- Direct cleanup
- Personal behavior
- Business participation

# Watershed Approach (EPA)

**Local Solutions – Roles & Values**

**A watershed approach to address today's water resource challenges --**

- **Is hydrologically defined**
  - geographically focused
  - includes all stressors (air and water)
- **Involves all stakeholders**
  - includes public (federal, state, local) and private sector
  - is community-based
  - includes a coordinating framework
- **Strategically addresses priority water resource goals (e.g. water quality, habitat)**
  - integrates multiple programs (regulatory and voluntary)
  - is based on sound science
  - is aided by strategic watershed plans
  - uses adaptive management

# Clean Water Plan from: NYS DEC

The **process to develop a clean water plan**

- Identify pollutant loads and sources
- Engage the watershed community
- Develop an implementation plan (outlines how the loads will be reduced from each pollutant source)
- Draft document
- Public comment (**required for TMDL**) or public review of the draft document
- Final approval

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# Local Solutions - Personal:

- Reduce, Reuse, Recycle (still!)
- Limit single-use behavior
- Cleanups on Creeks, Rivers and oceans – access points, beaches, sides, mobile

**Source:**
**EPA**

# 10 WAYS
## TO UNPACKAGE YOUR LIFE!

**Tip 1**
Bring your own shopping bag.

**Tip 2**
Reduce the use of plastic bags for produce & bulk items.

**Tip 3**
Bring your own food container and utensils.

**Tip 4**
Carry a reusable water bottle.

**Tip 5**
Pack a waste-free lunch.

**Tip 6**
Bring your own cup.

**Tip 7**
Slow down and dine in.

**Tip 8**
Say no to disposable straws.


**Tip 9**
Avoid heavily packaged foods.

**Tip 10**
Share these tips with friends!

RethinkDisposable.org

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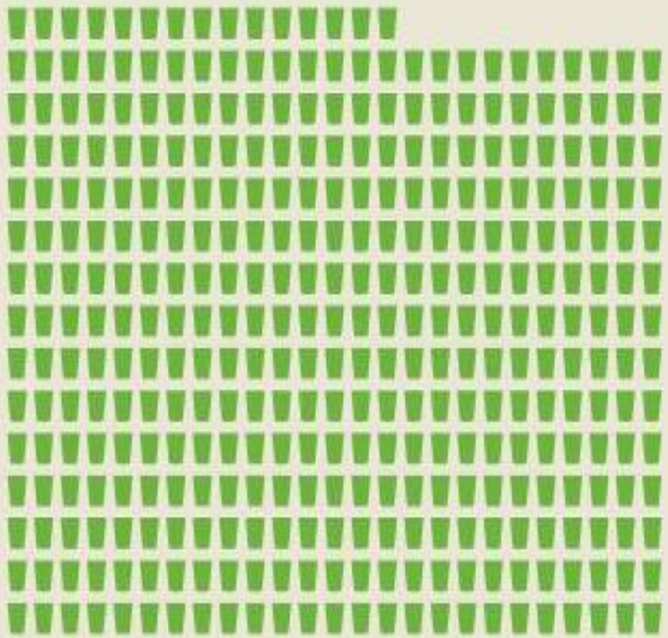
# By replacing one disposable cup a day for one year with a reusable mug you prevent:



OR

- $CO_2$ 23 lbs. greenhouse gas emissions
- 281 gallons water usage
- 16 lbs. of solid waste
- 1 tree from being chopped down
- and Save $91
  *assumes 25¢ discount per use

*Cup impacts data sourced from Franklin Associates Report, 2011. Tree data sourced from Environmental Paper Network.[1,3]

CLEAN WATER ACTION
CLEAN WATER FUND

ReThink Disposable is a program of Clean Water Action and Clean Water Fund conducted in partnership with local businesses and government agencies. Generous support is provided by public and private funders. To learn more about the program, its partners and funders, visit www.rethinkdisposable.org.

ReThink Disposable
STOP WASTE BEFORE IT STARTS


# WHAT IS A PLASTIC FOOTPRINT?

Up to 12.7 million tonnes of plastic enters our ocean every year. We need governments and businesses to take action to reduce the plastic waste in our everyday lives - but have you ever wondered how much plastic you actually use?

**Find out your Plastic Footprint - enter your name to get started!**

Firstname

Next

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# Local Solutions

- **Collaborative Cleanup efforts**

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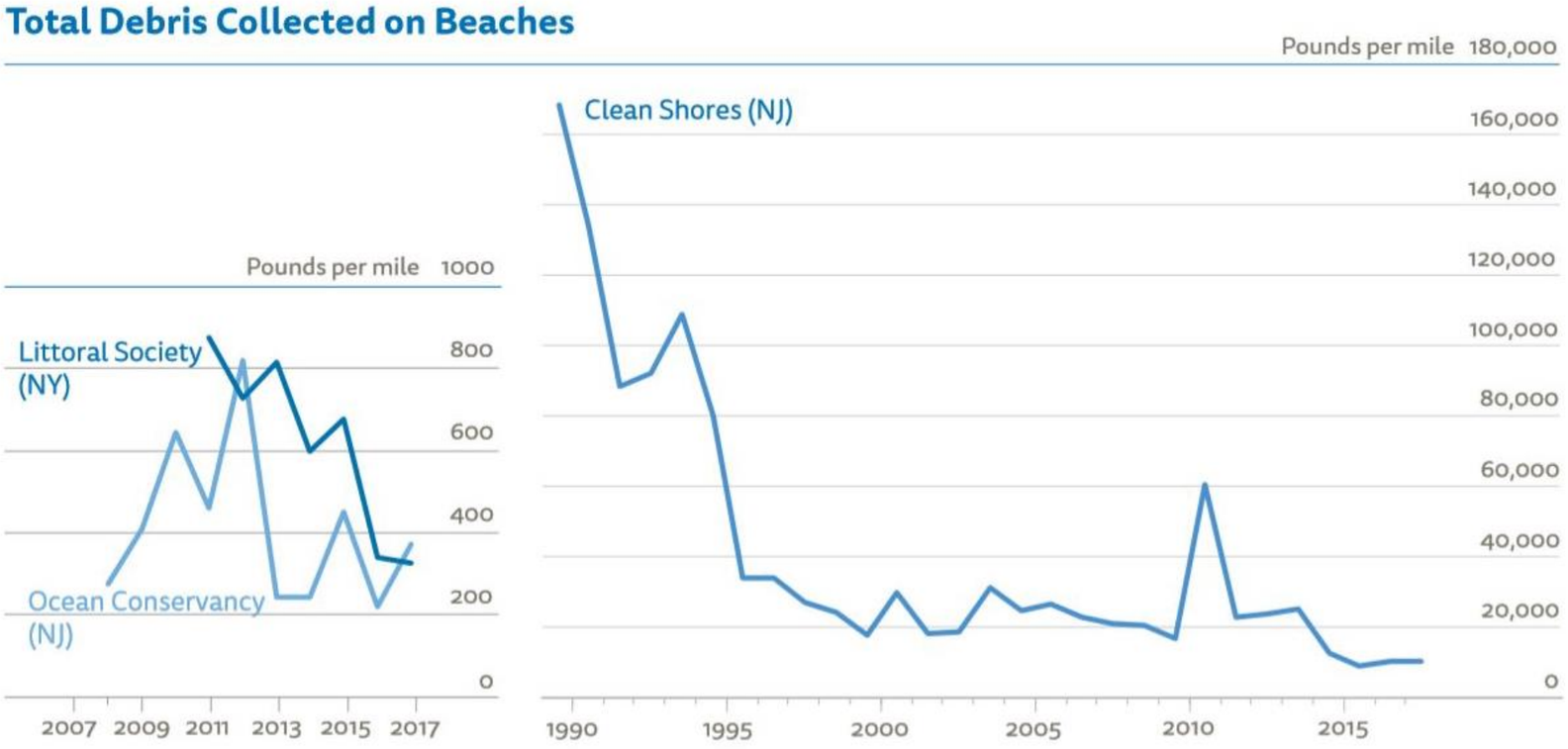
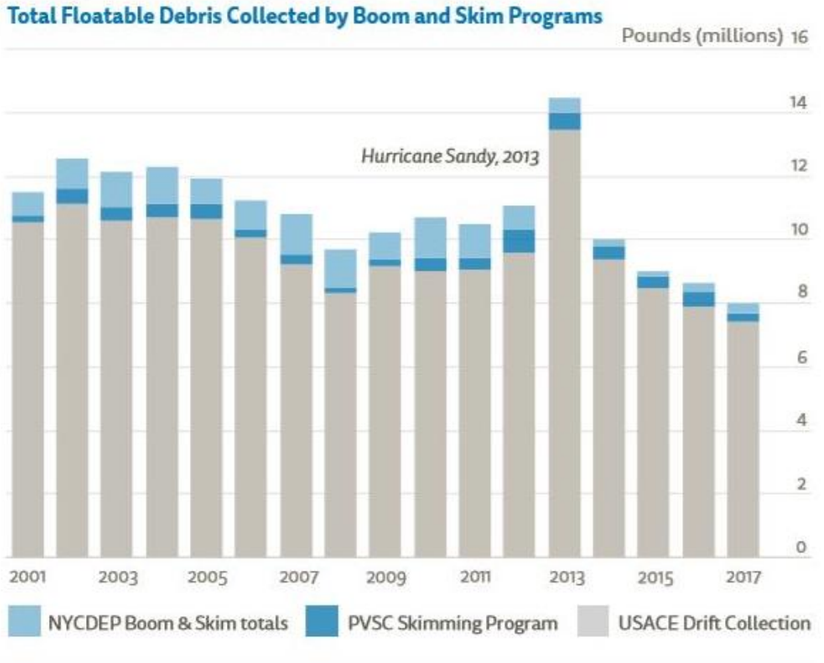
# Success stories:

- NYNJHEP Floatables



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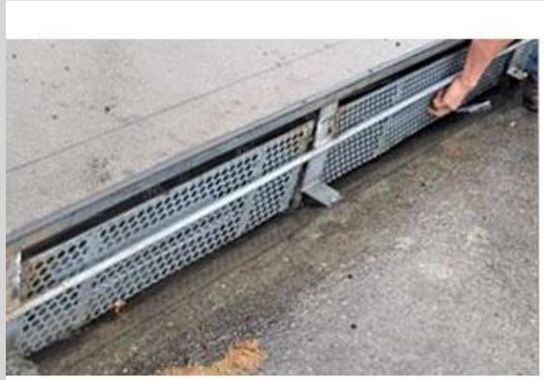
# Local Solutions:

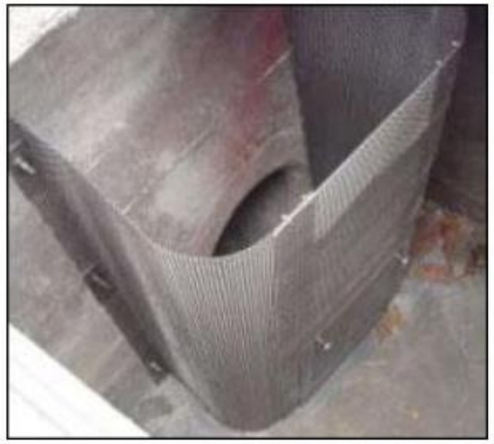
- On-site

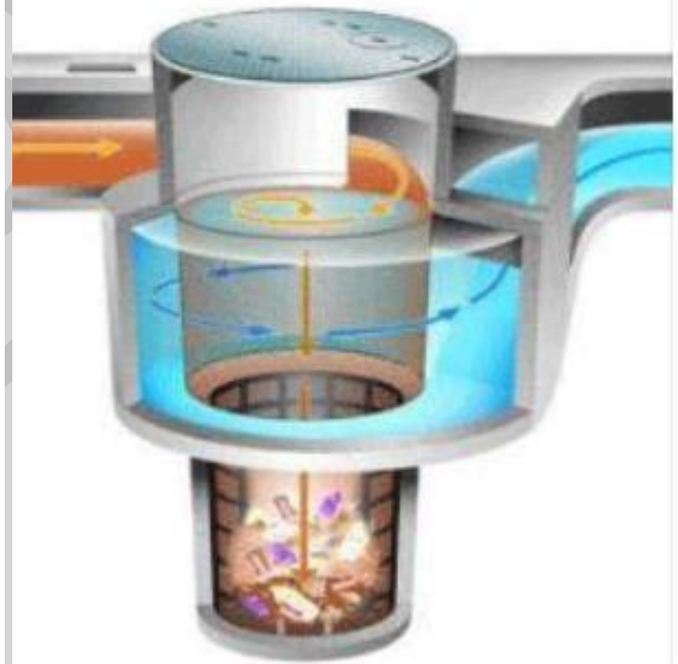
Source: U.S. EPA

# Local Solutions:

- Stormwater/Wastewater retrofits







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# Local Solutions:

- Innovative, fun, engaging

## USING THE POWER OF NATURE TO KEEP OUR HARBOR CLEAN

The Inner Harbor Water Wheel, or “Mr. Trash Wheel” to locals, combines old and new technology to harness the power of water and sunlight to collect litter and debris flowing down the Jones Falls River.

**Source: Baltimore Waterfront.com**

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# Success Stories

## New York State — *Final* 2016 Section 303(d) List — November 2016

### Part 3c - Waterbodies for which TMDLs Are Deferred (Pending Development/Implementation/Evaluation of Other Restoration Measures)

| Water Index Number | Waterbody Name (WI/PWL ID) | County | Type | Class | Cause/Pollutant | Suspected Source | Year |
|---|---|---|---|---|---|---|---|
| | Atlantic Ocean/Long Island Sound Drainage Basin | | | | | | |
| (MW1.1) LB/GB-253 | Coney Island Creek (1701-0008) [69] | Kings | Estuary | I | D.O./Oxygen Demand | Urban/CSO,Municip | 2016 |
| (MW1.1) LB/GB-253 | Coney Island Creek (1701-0008) [69] | Kings | Estuary | I | Pathogens | Urban/Storm/CSO | 2016 |
| (MW2.1) ER-LI- 4 | Newtown Creek and tidal tribs (1702-0002) [69] | Queens | Estuary | SD | D.O./Oxygen Demand | Urban/CSO,Municip | 2016 |
| (MW2.1) ER-LI- 4 | Newtown Creek and tidal tribs (1702-0002) [69] | Queens | Estuary | SD | Pathogens | Urban/Storm/CSO | 2016 |
| (MW2.4) ER-3 | Bronx River, Lower (1702-0006) [69] | Bronx | Estuary | I | Pathogens | Urban/Storm/CSO | 2016 |
| (MW2.4) ER-3 | Bronx River, Middle, and tribs (1702-0106) [69] | Bronx | River | B | Pathogens | Urban/Storm/CSO | 2016 |
| (MW2.4) ER-4 | Westchester Creek (1702-0012) [69] | Bronx | Estuary | I | D.O./Oxygen Demand | Urban/Storm/CSO | 2016 |
| (MW2.5) ER-LI-12 | Flushing Creek/Bay (1702-0005) [69] | Queens | Estuary | I | D.O./Oxygen Demand | Urban/Storm/CSO | 2016 |
| (MW2.5) ER-LI-12 | Flushing Creek/Bay (1702-0005) [69] | Queens | Estuary | I | Pathogens | Urban/Storm/CSO | 2016 |
| (MW2.5) ER/LIS-LNB-19 thru 20 | Alley Creek/Little Neck Bay Trib (1702-0009) [69] | Queens | Estuary | I>SC | D.O./Oxygen Demand | Urban/Storm/CSO | 2014 |
| (MW2.5) ER/LIS-LNB-19 thru 20 | Alley Creek/Little Neck Bay Trib (1702-0009) [69] | Queens | Estuary | I>SC | Pathogens | Urban/Storm/CSO | 2014 |
| (MW3.2) LIS- 2 | Hutchinson River, Lower, and tribs (1702-0003) [69] | Bronx | Estuary | SB | D.O./Oxygen Demand | Urban/Storm/CSO | 2016 |
| (MW5.4g) LIS-FI-P1101,P1102 | Beach/Island Ponds, Fishers Island (1701-0283) [70] | Suffolk | Estuary | SA | Pathogens | Urban/Storm Runoff | 2002 |
| (MW6.1a) GB-P397 | Spring Pond (1701-0230) [70] | Suffolk | Estuary | SA | Pathogens | Urban/Storm Runoff | 2012 |
| (MW6.1d) GB..GPB P495 | Mattituck/Marratooka Pond (1701-0129) [71] | Suffolk | Lake | A | Pathogens | Wildlife Sources | 2002 |
| (MW8.5b) JB | Jamaica Bay, Eastern, and tribs, Queens (1701-0005) [69] | Queens | Estuary | SB | Pathogens | Urban/Storm/CSO | 2016 |
| (MW8.5b) JB-241a | Thurston Basin (1701-0152) [69] | Queens | Estuary | I | D.O./Oxygen Demand | Urban/CSO,Municip | 2016 |
| (MW8.5b) JB-241a | Thurston Basin (1701-0152) [69] | Queens | Estuary | I | Pathogens | Urban/Storm/CSO | 2016 |
| (MW8.5b) JB-247 | Bergen Basin (1701-0009) [69] | Queens | Estuary | I | Pathogens | Urban/Storm/CSO | 2016 |
| (MW8.5b) JB-249 | Spring Creek (1701-0361) [69] | Queens | Estuary | I | D.O./Oxygen Demand | Urban/CSO,Municip | 2016 |
| (MW8.5b) JB-249 | Spring Creek (1701-0361) [69] | Queens | Estuary | I | Pathogens | Urban/Storm/CSO | 2016 |
| (MW8.6) JB-249a | Hendrix Creek (1701-0006) [69] | Kings | Estuary | I | Pathogens | Urban/Storm/CSO | 2016 |
| (MW8.6) JB-250a | Paerdegat Basin (1701-0363) [69] | Kings | Estuary | I | D.O./Oxygen Demand | Urban/CSO,Municip | 2016 |
| (MW8.6) JB-250b | Mill Basin and tidal tribs (1701-0178) [69] | Kings | Estuary | SB | D.O./Oxygen Demand | Urban/Storm,Municip | 2016 |

amount of a pollutant that a waterbody can receive in order to meet water quality standards. Regulations governing the TMDL program (40 CFR 130.2 and 130.70) define the TMDL as "the sum of the individual wasteload allocations (WLAs) for point sources and load allocations (LAs) for nonpoint sources." Mathematically the TMDL can be represented by the following equation:

$$TMDL = \sum WLA + \sum LA + MOS$$

Where MOS is the margin of safety.

WLAs are generally expressed in numeric form (e.g., 500 lbs/day phosphorus). Municipal stormwater sources, which are regulated as point sources under the NPDES program, are included as part of the wasteload allocations. Non-NPDES permitted areas are included as LAs.

# Local Solutions – What is TMDL?

- **Total Maximum Daily Load**
- **Create one for Plastics/“Floatables”**

Polluted stormwater runoff is commonly transported through municipal separate storm sewer systems (MS4s), and then often discharged, untreated, into local water bodies.

**Recent Developments**

EPA signs final MS4 General Permit Remand Rule. Visit our stormwater rules and notices page to read the rule and related materials.

An MS4 is a conveyance or system of conveyances that is:

•owned by a state, city, town, village, or other public entity that discharges to waters of the U.S.,
•designed or used to collect or convey stormwater (e.g., storm drains, pipes, ditches),
•not a combined sewer, and
•not part of a sewage treatment plant, or publicly owned treatment works (POTW).

# Local Solutions

- TMDL in Pounds, based on the particular character and tolerance of the waterbody
- Can be begun by instituting MS4 TMDL for floatables
- Based on: Area, Population, Land use, Model

# Local Solutions – Understanding: TMDL floatables model

- Pursue a HR watershed model for floatable debris
- trash, debris, plastic, microplastics

# Local Solutions – D.C. Example

- cut trash to the Anacostia by 112,582 pounds in 2015 through MS4 actions
- 5-cent fee on plastic bags
- ban on foam food containers
- enhanced street sweeping in identified hot spots
- stormwater pond, where accumulated trash is scooped up by contractors and volunteers

# Local Solutions - Regulatory:

- Bag Bans
- TMDL for plastics / trash
  (Total Maximum Daily Load)
- MS4 - Municipal Storm Sewers
- Clean Water Act provisions
  (303b Impaired Waters)

# Dutchess County New York Bans Polystyrene

*By Ted Duboise on 2018/02/16 · Comments Off on Dutchess County New York Bans Polystyrene*

November 3, 2017 , County of Dutchess, New York - Chain restaurants are now prohibited from using containers to package, sell or distribute prepared food in any disposable food service ware that contains polystyrene foam. The containers are also banned from use at all county facilities, parks or events.

The law was passed by the County Legislature and signed into law on November 3rd, 2017. Although effective immediately, the law will not be enforced until January 1, 2019.

The HIGHLANDS Current





# Having Your Cup, and Eating It Too

*By **Brian PJ Cronin** on December 23, 2017 · Comments Off on Having Your Cup, and Eating It Too*

*Beacon firm creates edible glasses, straws*

By Brian PJ Cronin

Chelsea Briganti and Leigh Ann Tucker's appearance on the ABC reality show *Shark Tank* in 2015 as nearly a year in the making. After months of interviews with producers, the entrepreneurs were presented with plane tickets to Los Angeles to … wait.

"They warn you that they don't know if they're actually going to bring you to the studio," Tucker recalls. "Then one night they tell you: 'We're picking you up in a few hours and bringing you to the studio, but you might not get picked to go on. And even if you do get picked, your part might not get aired.' "

Chelsea Briganti and Leigh Ann Tucker (Photo provided)

The pair did get picked, which meant facing down a squad of wealthy investors to introduce, as well as defend, the flagship product of their company, Loliware.

"We were fully prepared for them to rip us to shreds," says Tucker. "I mean … it's an edible cup."

## Economic

- Innovate U.S. recycling
- Invest in alternatives
- Closed-loop plastic economy
- Plastic-to-fuel
- True bioplastics

# Alternatives needed!

- Plastic bags
- Single use bottles
- Straws, lids, cups
- Packaging
- Paint
- Medical devices

# Local Solutions – Roles & Values

- Common Goals (health, economy, etc)
- Everyone is an educator
- Empowerment to improve
- Stakeholder commitment
- Direct cleanup
- Personal behavior
- Business participation

# Local Solutions - Education:

- Engage every level K-16
- Hands-on, solution oriented
- Empowerment
- Arts communication

# Field science / lab work

## Fishkill Creek 2017

# “Plastic-Free Waterways” Poster Contest

## Syracuse EFC

Funded by NYS P2I

Alan Gonzalez
SUNY Orange

Abigail Lewis
SUNY Orange

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# Plastic Pollution:

## Local Solutions &

## Watershed Strategies

# Discussion

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Director, Environmental Programs

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# Plastic Pollution:

## Local Solutions &

## Watershed Strategies

*Folow up notes on discussion:*
EPA trash free waterways – see website for great references.

Hudson Tributary proposed strategy for floatables:
Citizens and students, watershed groups (community science) can work guided by researchers to **ground truth and identify hot spots**. Then research investments can be made to firm up the daily load numbers and confirm sources and source types. Once the research is in, **targeted investments in solutions** can be made, to get the most benefit/impact for the funds.

Estimate daily loads from all tributaries - ie how many pounds of floatable debris per day. Possible to create a "citizen's TMDL" – i.e. perhaps not necessary to pursue full regulatory process?

Policy like bag bans and economic solutions like real compostable alternatives will have positive effects, but we need a larger suite of tools to address the issue.

Would not have to be a one size fits all, in fact make targeted investments
- MS4s
- CSOs

Tributary solutions: Trash traps, storm water retrofits, booms, skimming, Storm water retention ponds for floatable debris, volunteer streamside cleanups.