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THE STATE UNIVERSITY OF NEW JERSEY

Microplastics in NJ Urban Waters

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Fate & Transport Panel

March 28, 2019

Keyport Harbor – Raritan Bay

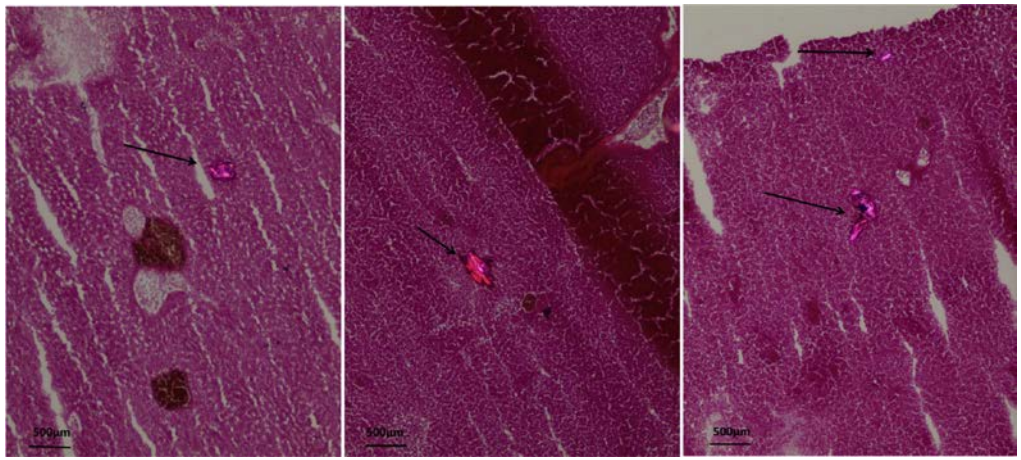


Photo Avio et al. 2015. Marine Environmental Research – Mullet liver

Photo Cole et al. 2015. Environmental Science & Technology - Crustacean

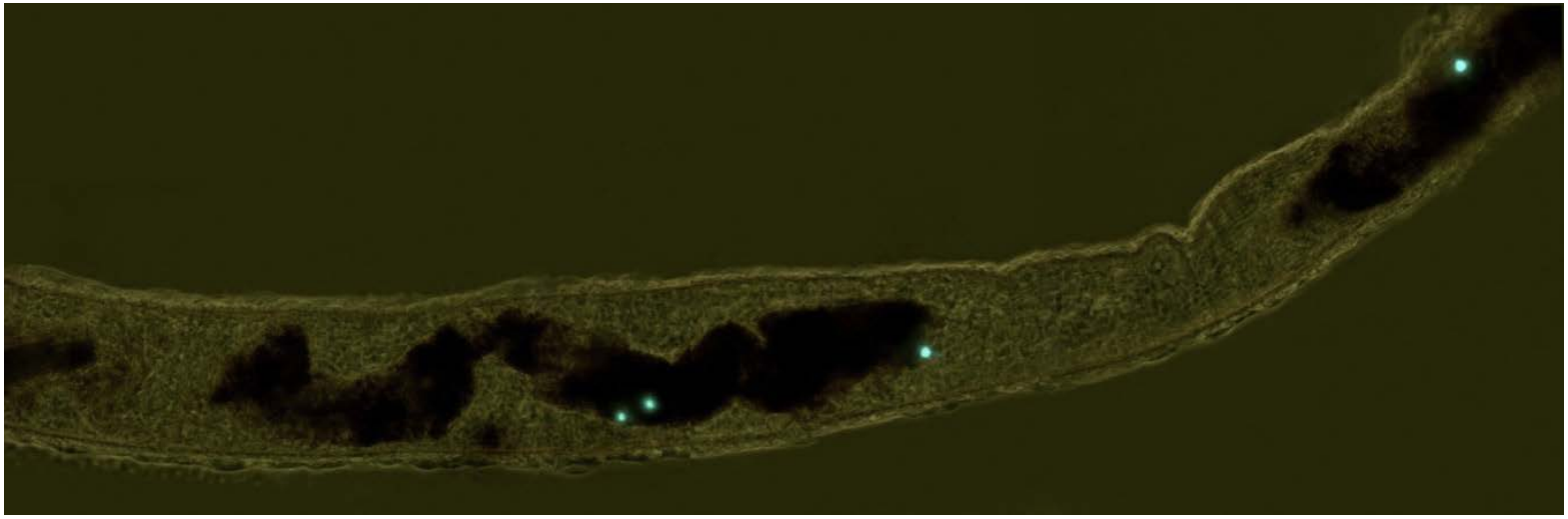
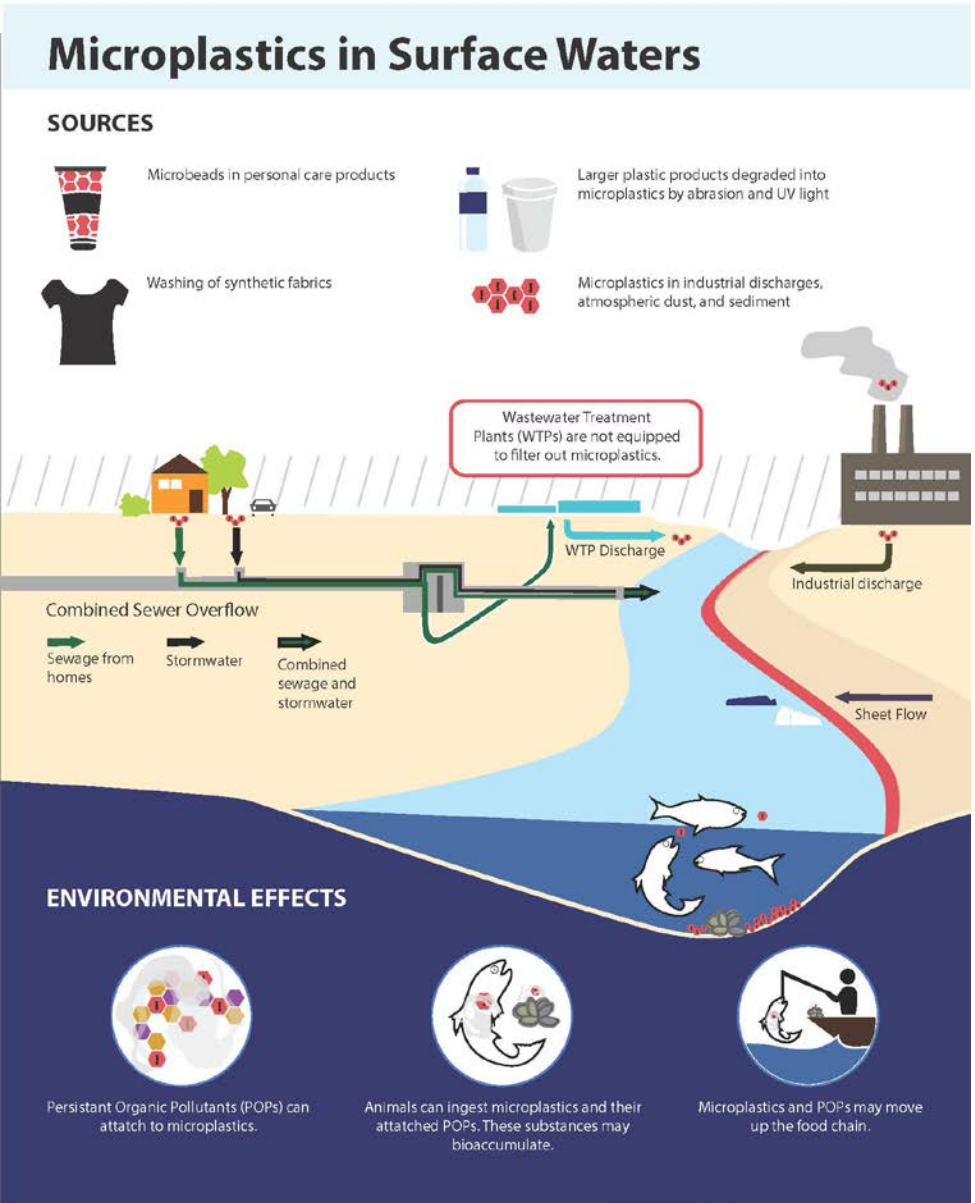


Photo Setälä et al. 2014. Environmental Pollution – Shrimp digestive tract

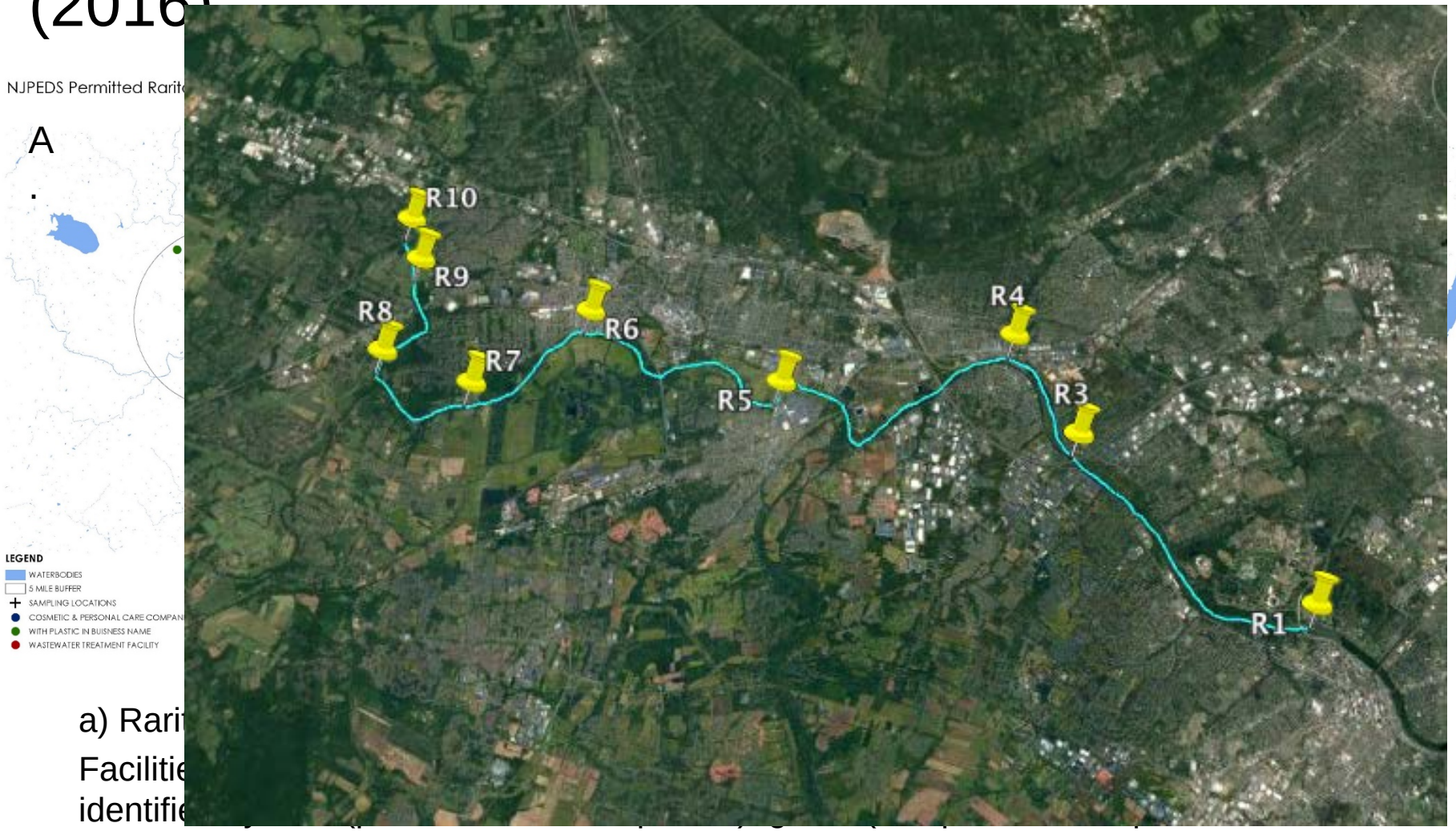
Sources, transport, and potential bioaccumulation



Research Hypothesis: Freshwater microplastic density would increase downstream adjacent to Newark and Raritan Bays

- Distribution
- Persistent Organic Pollutants (POPs)

Study Areas: Freshwater to Tidal Transects (2016)



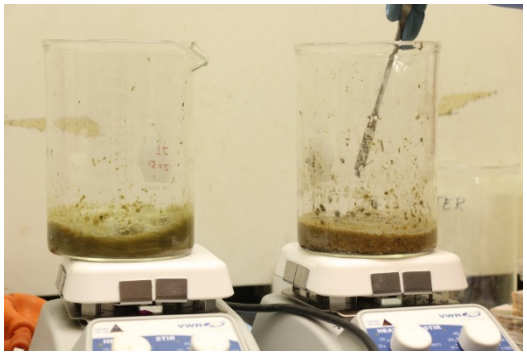
a) Rari

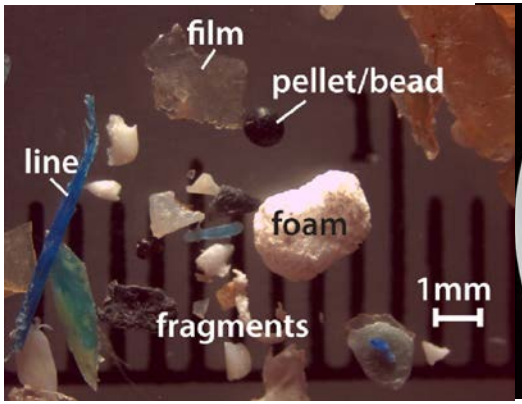
Facilitie

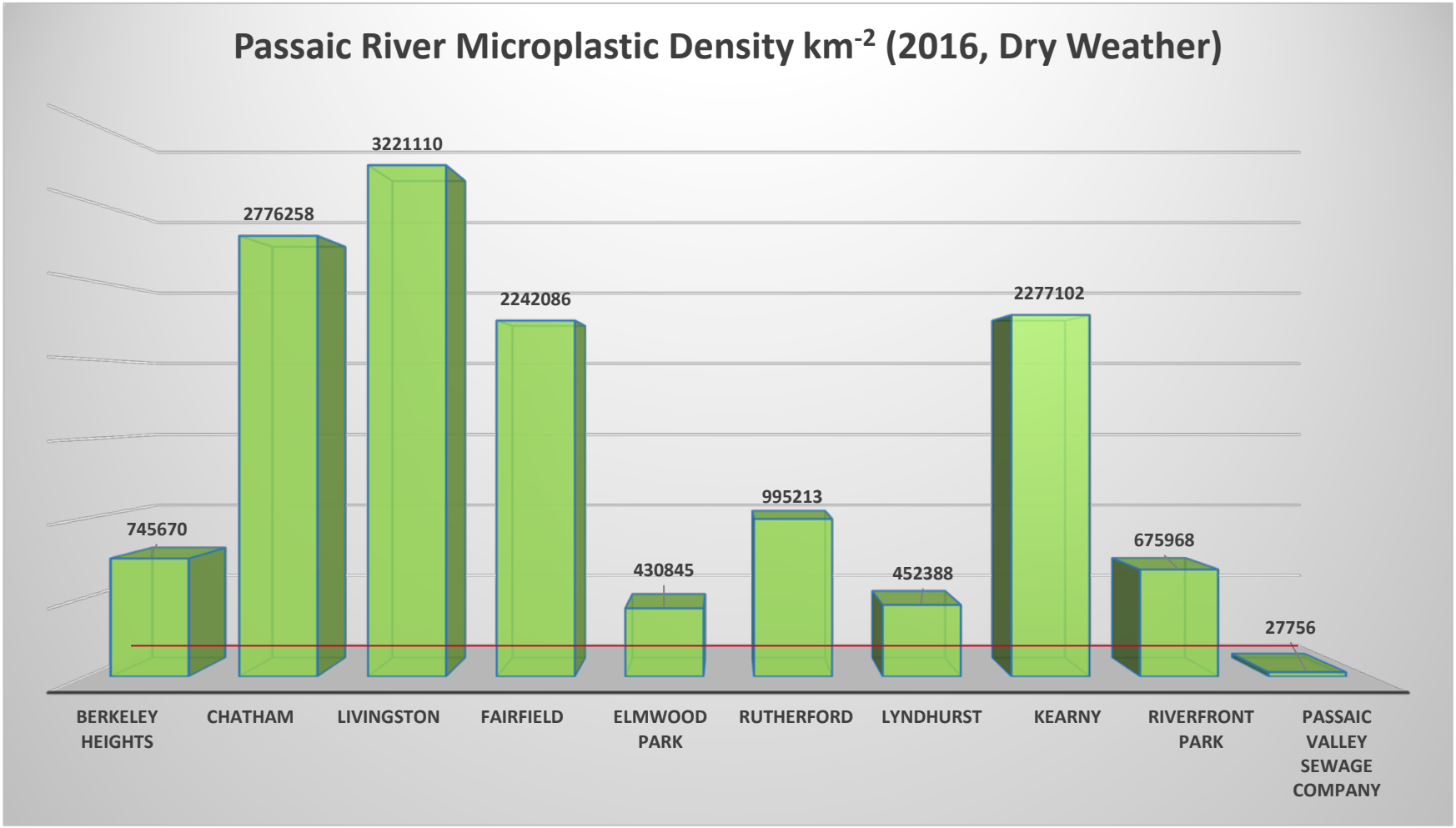
identifie

name, and red (waste water treatment plants) dots.

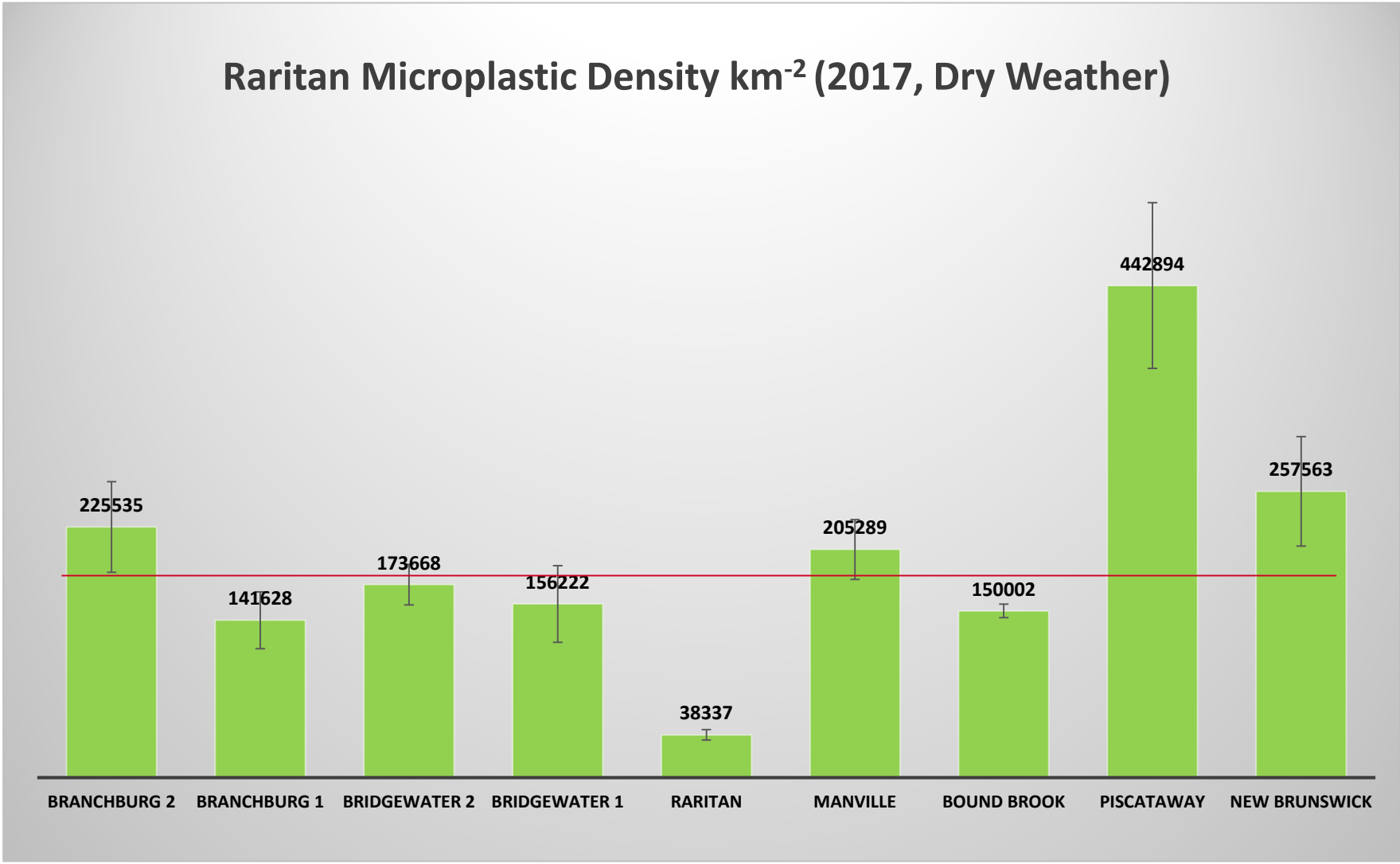
Sample Collection & Extraction



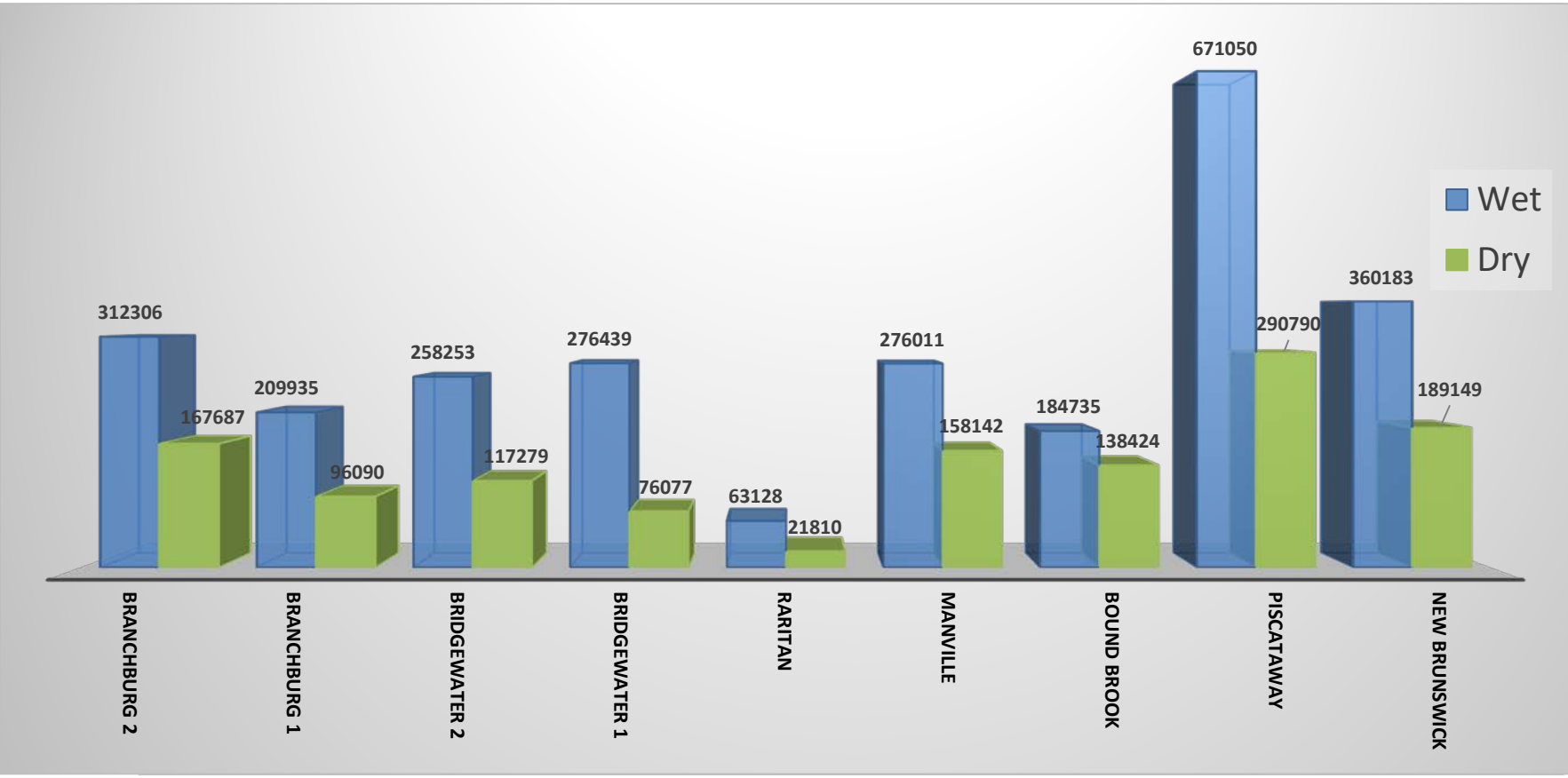




Upstream ⟶ Downstream

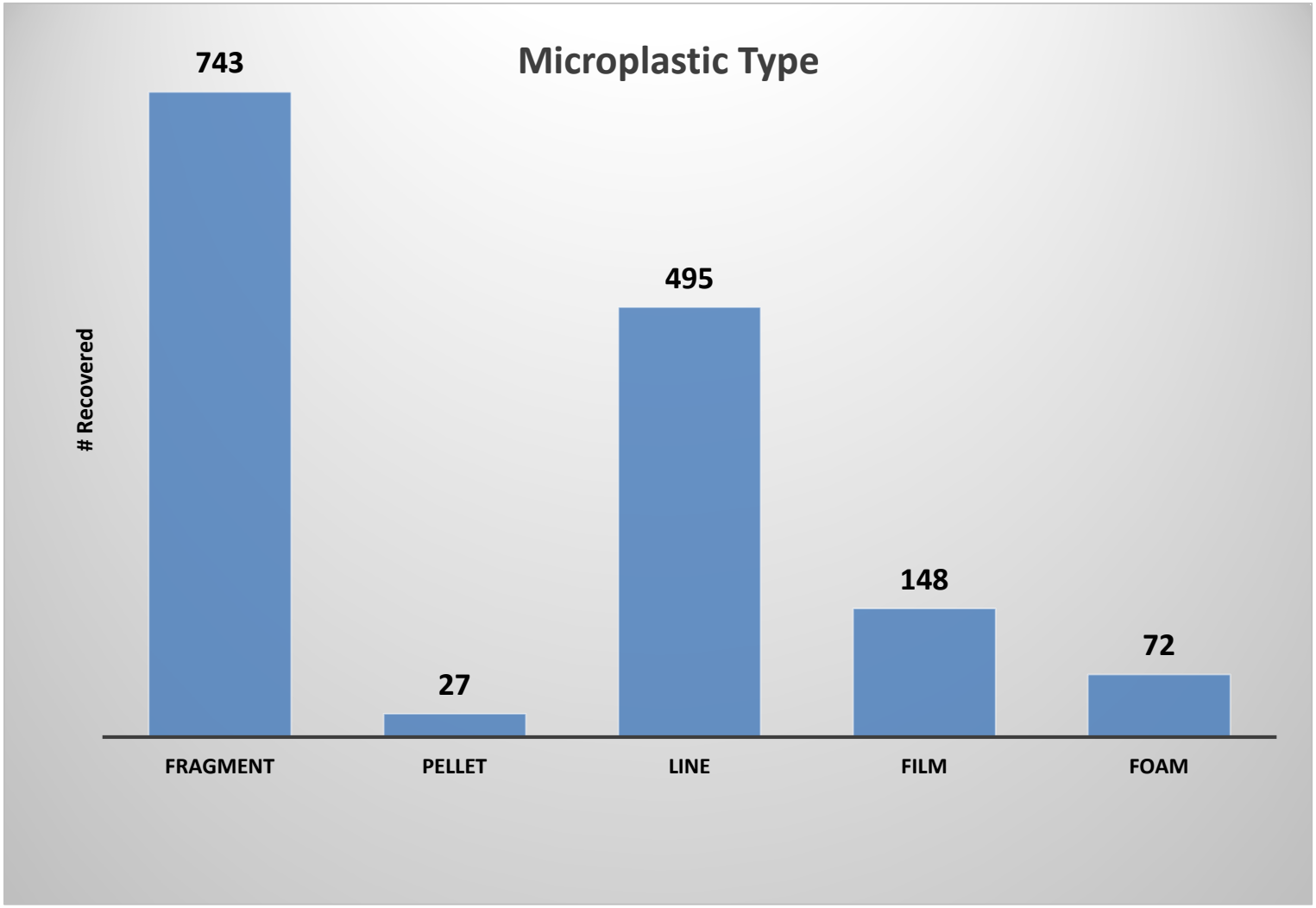


Upstream → Downstream



Upstream → Downstream

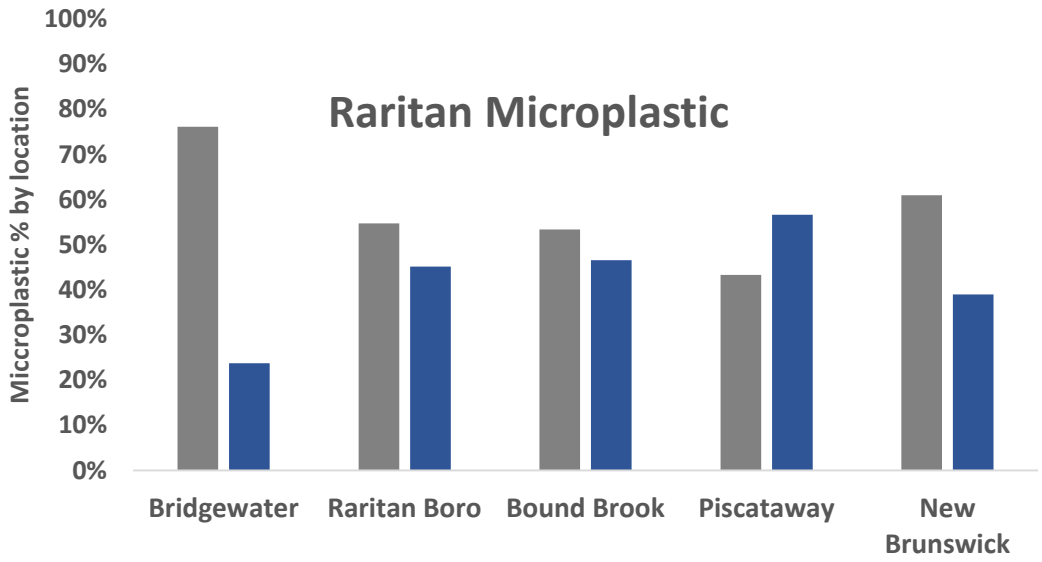
Raritan River Microplastics (2017)

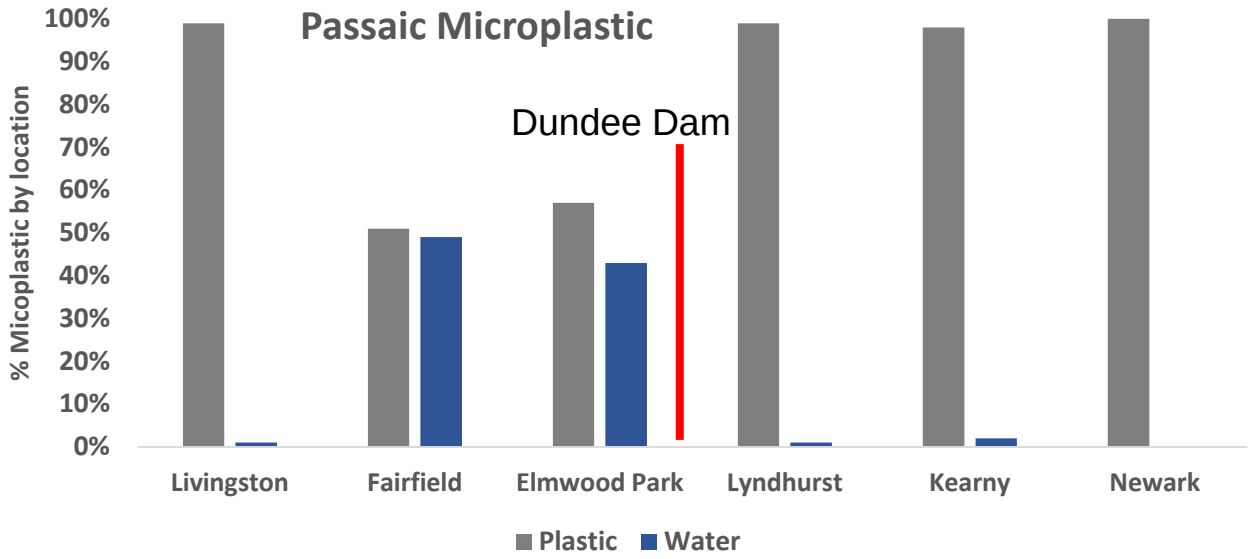


Plastic-Water Column Associated Organics

TENTATIVELY IDENTIFIED COMPOUNDS (TICS)	RARITAN RIVER		PASSAIC RIVER		RARITAN/NEWARK BAYS	
	#	mass	#	mass	#	mass
Compounds Identified	255	1,746	299	732	81	197
TICS Identified (>10 ng)	16	1,443	23	148	5	67
Other Identified TICS (<10 ng)	236	303	271	584	74	130

Organics: Plastic-Associated vs. Water Column

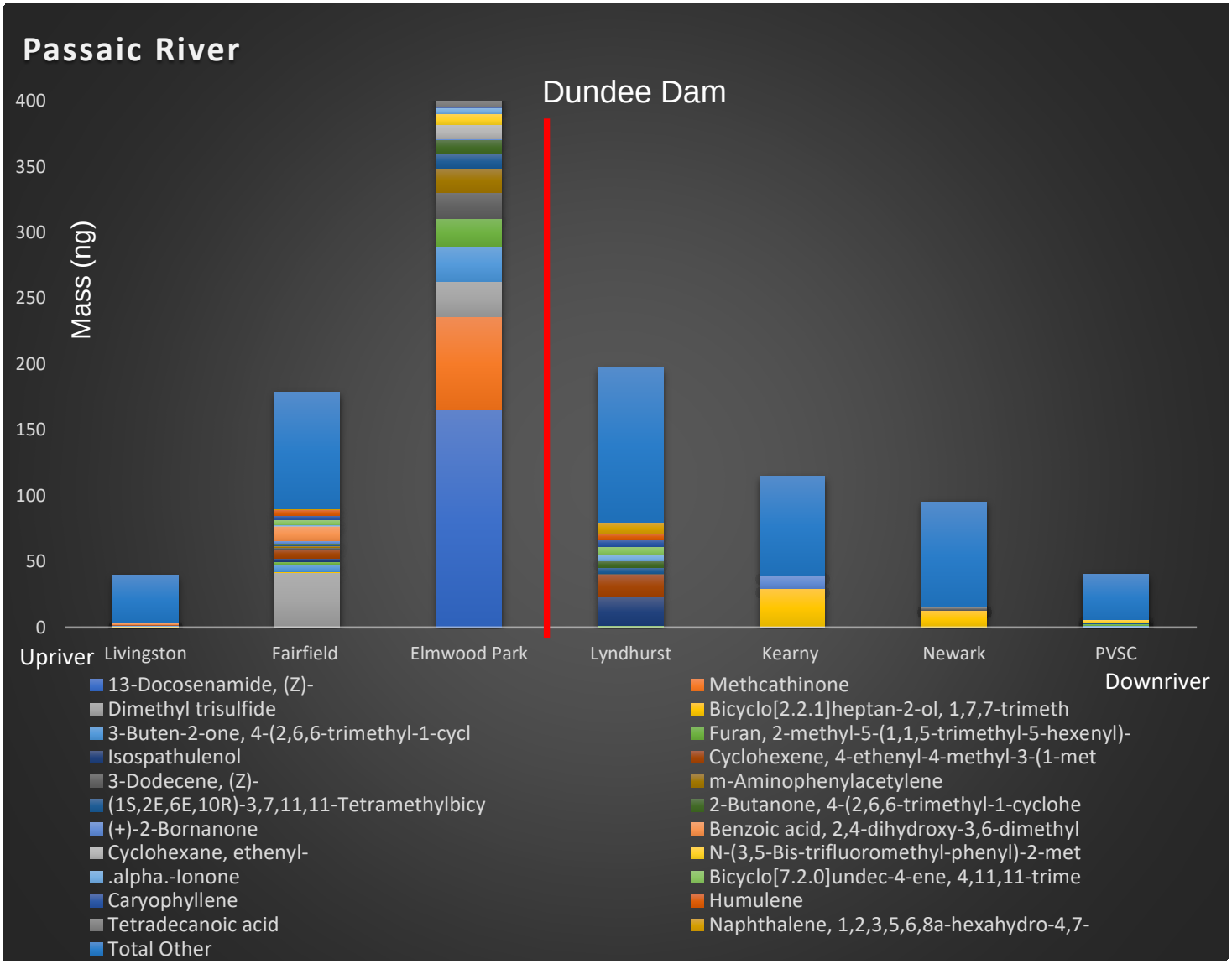




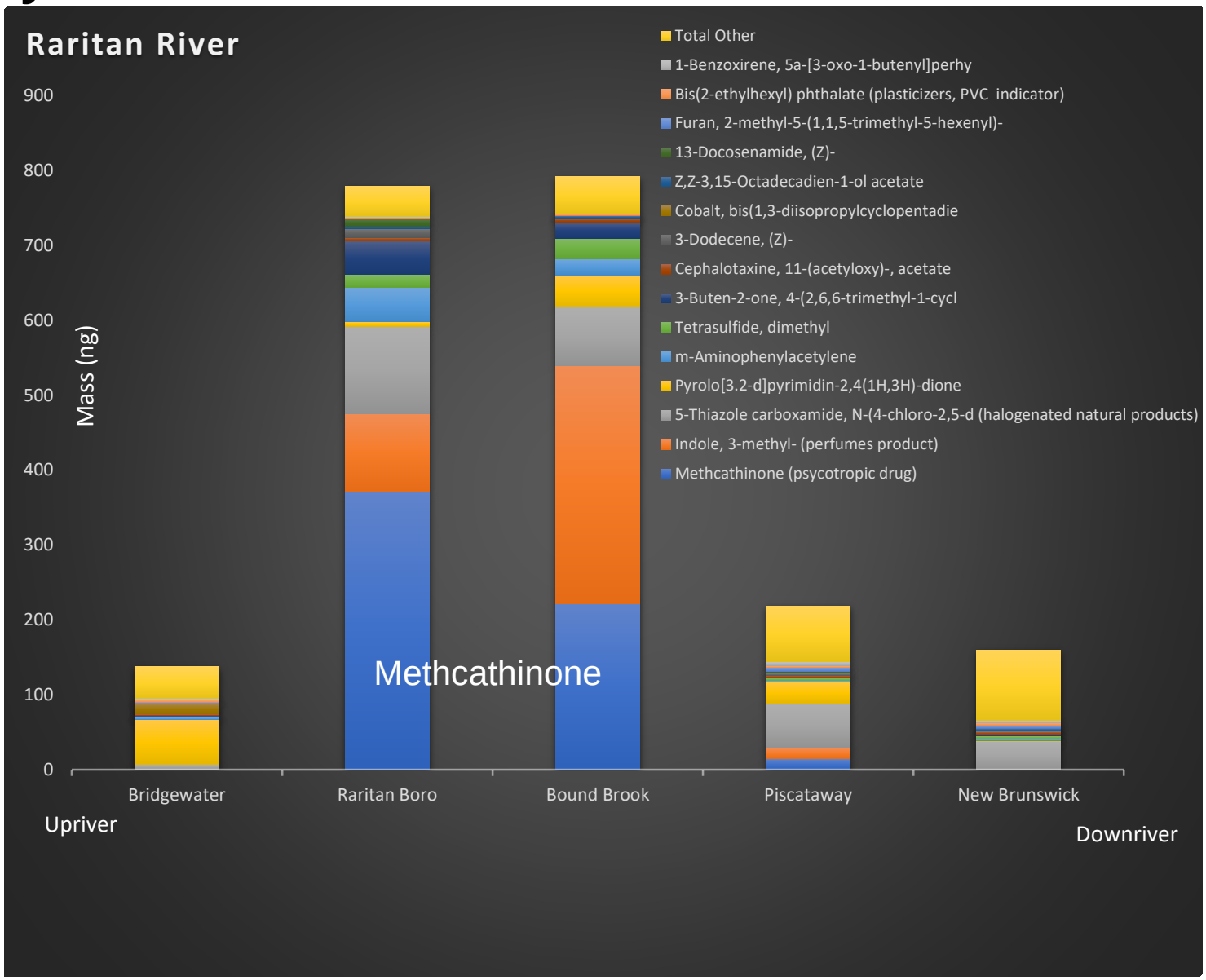
Tentatively Identified Compounds (TICs)

USE TYPE	# OF COMPOUNDS	% TOTAL
COSMETIC ADDITIVE	6	3%
FRAGRANCE	6	3%
INDUSTRIAL (1 PLASTICIZER)	12	7%
PHARMACEUTICAL/BIOMEDICAL	13	7%
FOOD ADDITIVE	20	11%
FLAVOR & FRAGRANCE	27	15%
LABORATORY/RESEARCH CHEMICAL	63	35%
NATURAL COMPOUND	73	41%

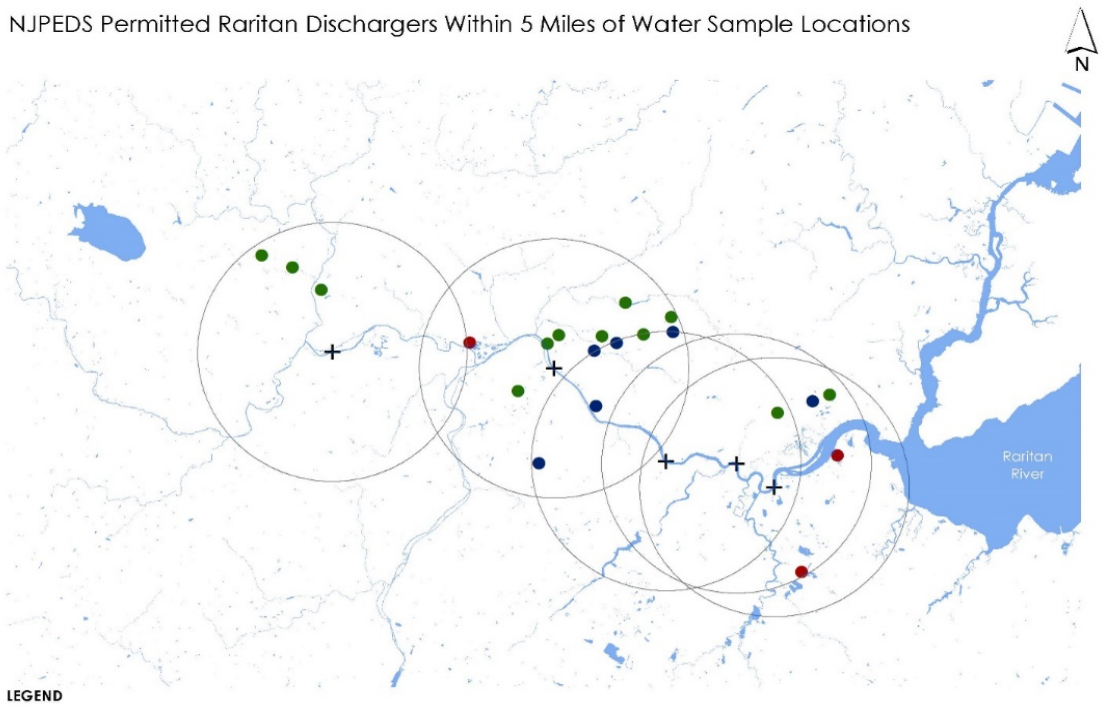
TICs by Location

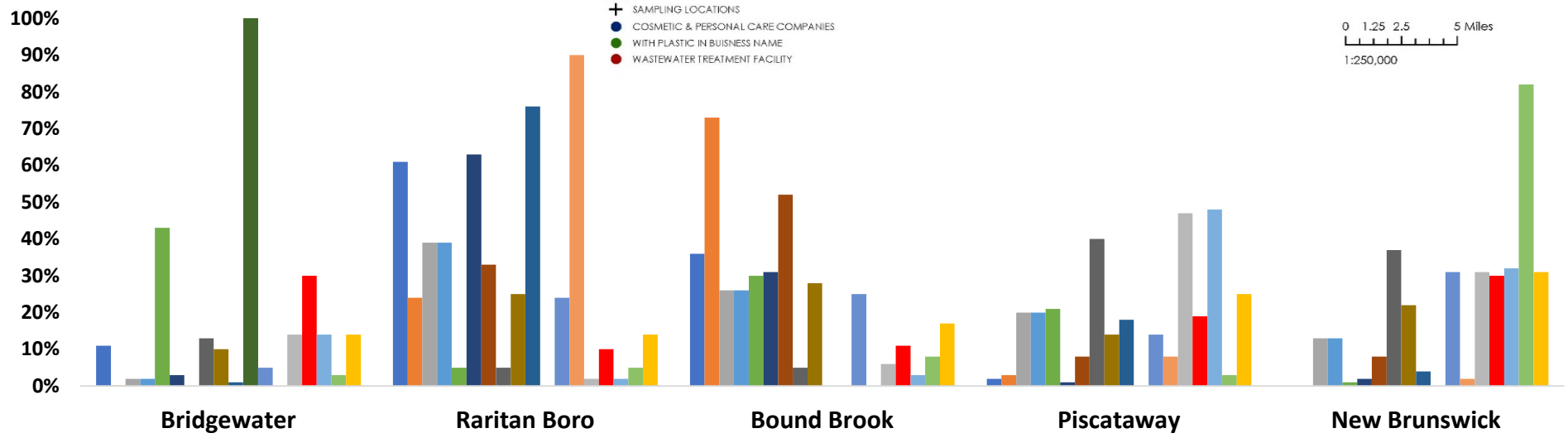


TICs by Location



"Fingerprint" for Pollution Source Tracking?





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Questions?

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References

Ravit et al. 2017. *Microplastics in urban New Jersey freshwaters: Distribution, chemical identification, and biological affects.* AIMS Environmental Science 4(6):809-826.