



GIF: GYFYCAT

RACHAEL Z. MILLER
FOUNDER, ROZALIA PROJECT
CEO, CORA BALL



GIF: GYFYCAT

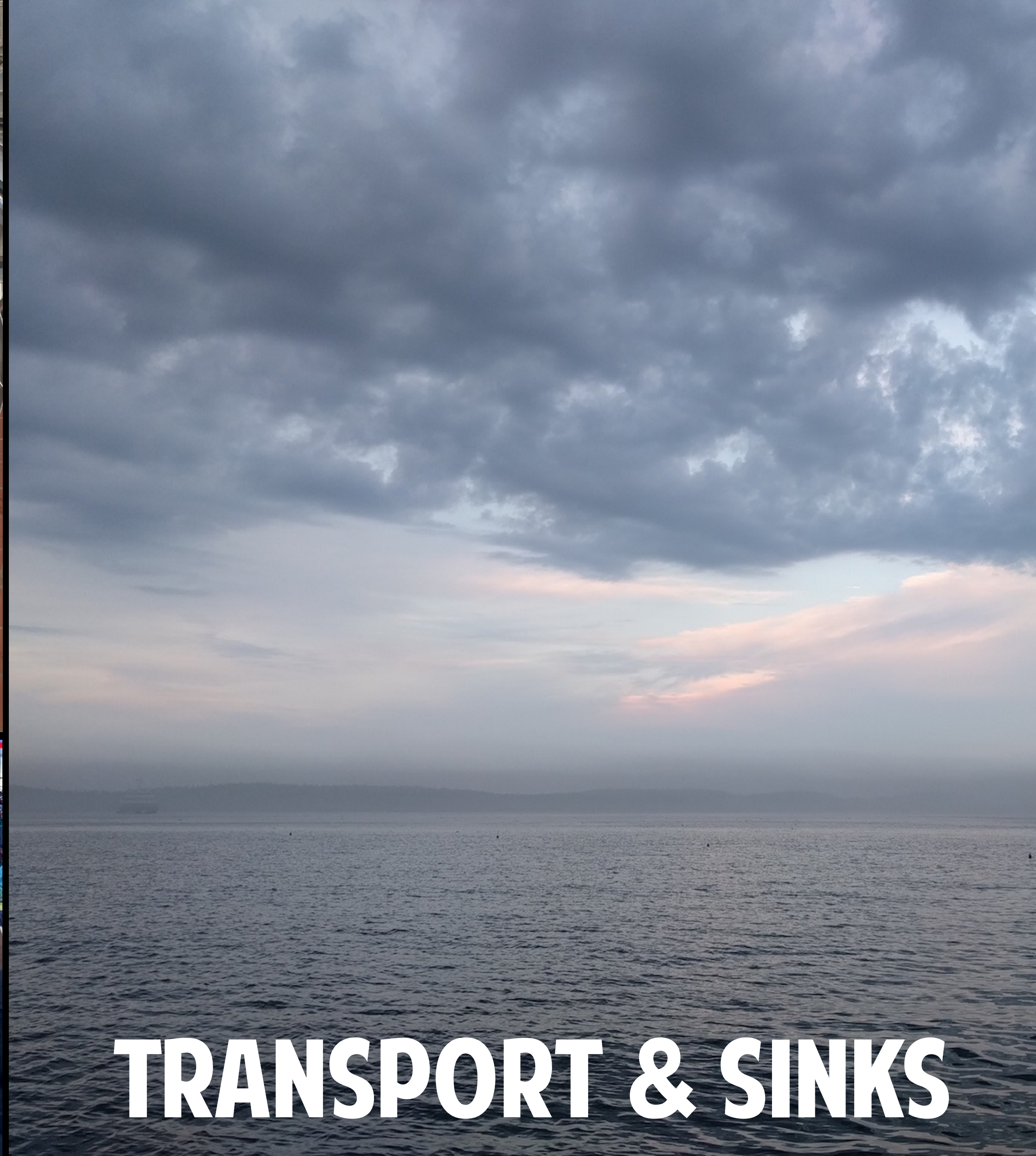
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FOUNDER, ROZALIA PROJECT
CEO, CORA BALL

Test 2.42 Effluent

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rozalia
project



SOURCES

MECHANISMS

TRANSPORT & SINKS



AIR

1.5m (whole river)
9.0m (Lower Hudson)
8L/min pumps
30 minute duration



American Promise

rozalia project
for a clean ocean





SOIL

6" deep via auger or trowel
3 samples between water's edge
and top of bank per location
Double-wrapped in foil





SURFACE

- 1L grab sample
- Galvanized bucket
- Triple washed hands, bucket and jar
- Control samples of all lines/textiles taken



American Promise

rozalia project
for a clean ocean





MID WATER COLUMN 1M FROM RIVER BOTTOM

5L Niskin Bottle
1L sample taken
4.7mm aperture

Promise
Research Vessel

rozalia project
for a clean ocean

NANOPLASTIC

0.5ml

From surface sample bucket
(after surface sample taken)

Triple rinsed pipetter, Eppendorf tubes



CONTAMINATION STUDY: ARE OUR CLOTHES SHEDDING INTO THE SAMPLES?



WASTEWATER TREATMENT PLANT STUDY

2.0N 1.5N 1.0N 0.5N 0 0.5S 1.0S 1.5S 2.0S

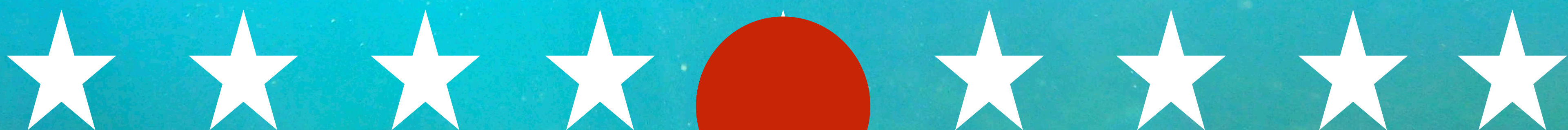
SURFACE



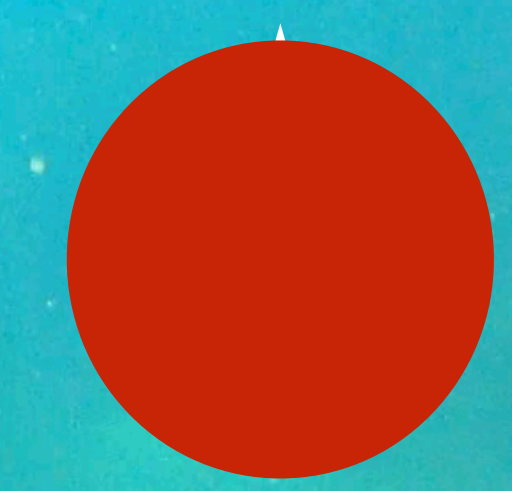
MID-WATER



1M ABOVE
BOTTOM



WWTP OUTFLOW



DIRECTION OF CURRENT

CONTAMINATION STUDY

■ Contamination

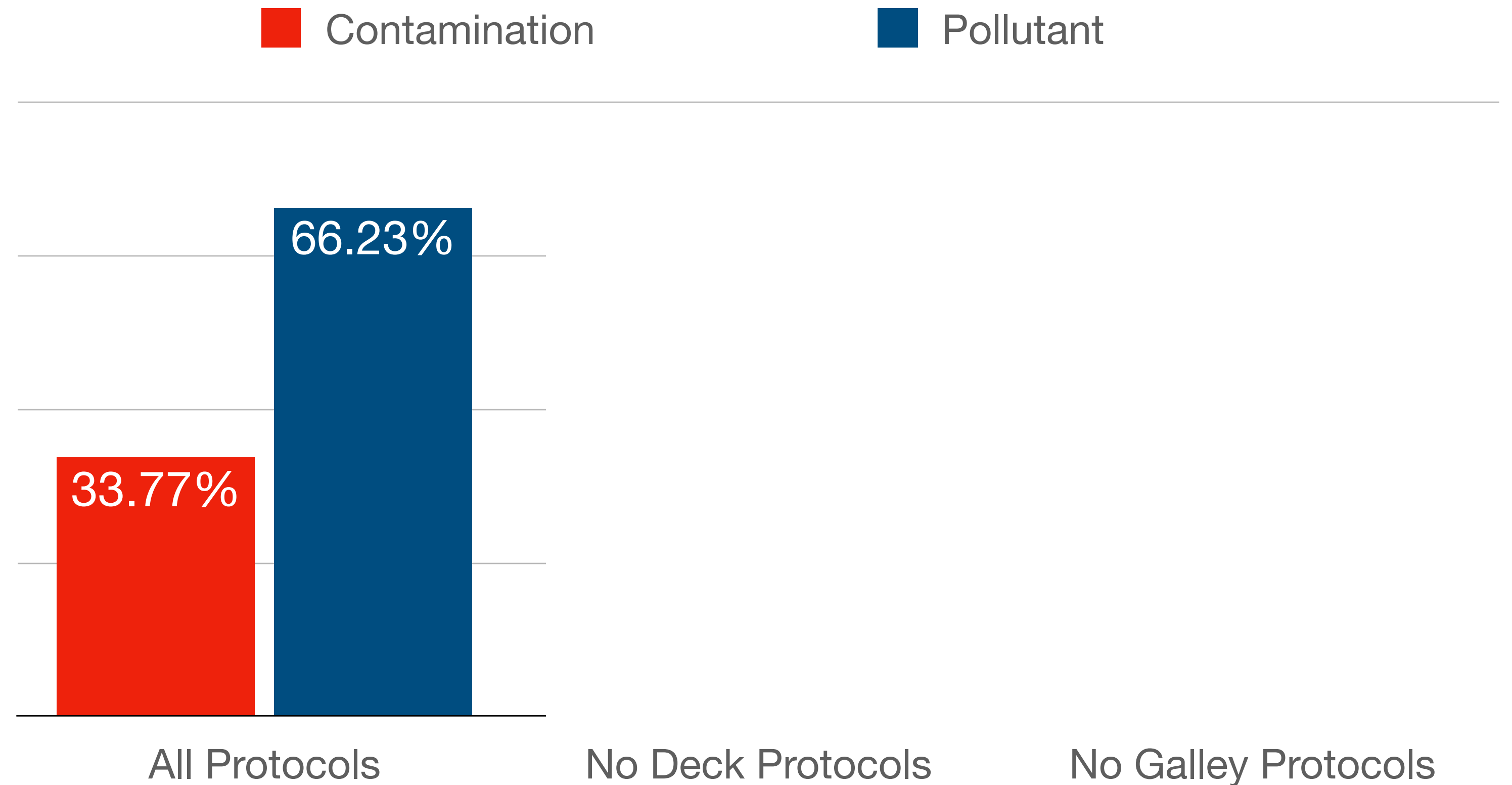
■ Pollutant

All Protocols

No Deck Protocols

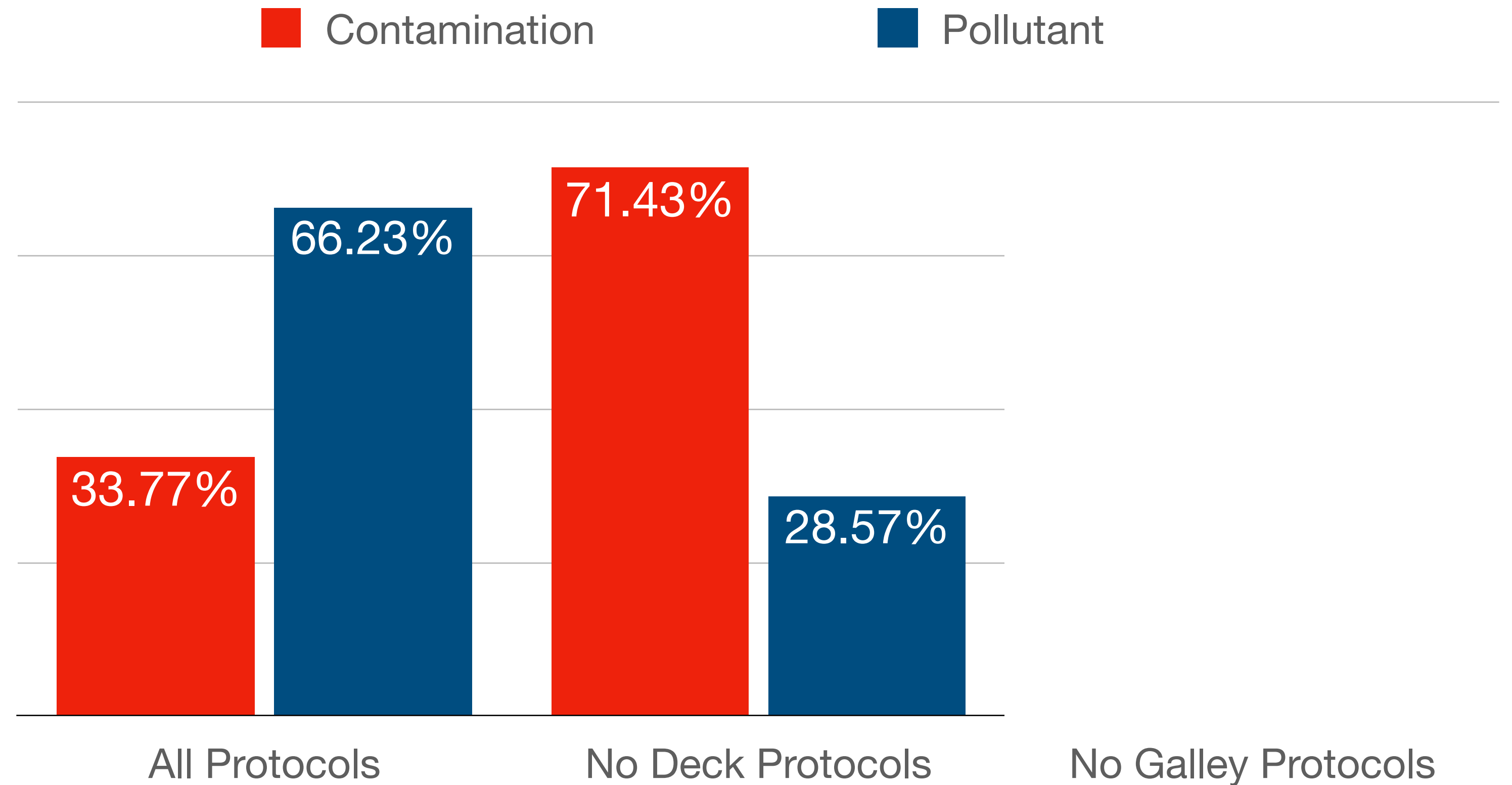
No Galley Protocols

CONTAMINATION STUDY



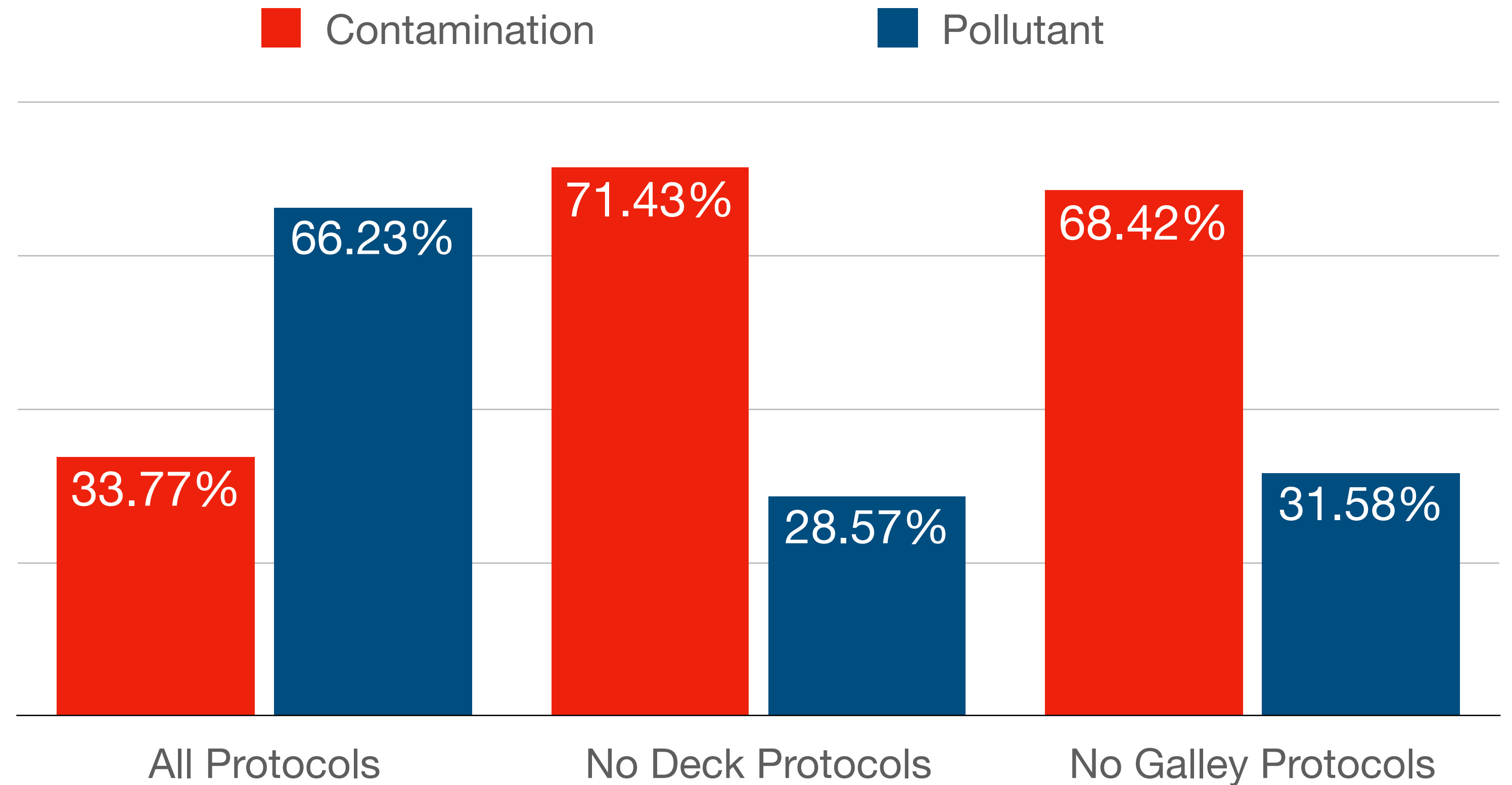
Gwinnett & Miller, Are we contaminating our samples? A preliminary study to investigate procedural contamination during field sampling and processing for microplastic and anthropogenic microparticles, Mar Pollut Bull. 2021

CONTAMINATION STUDY



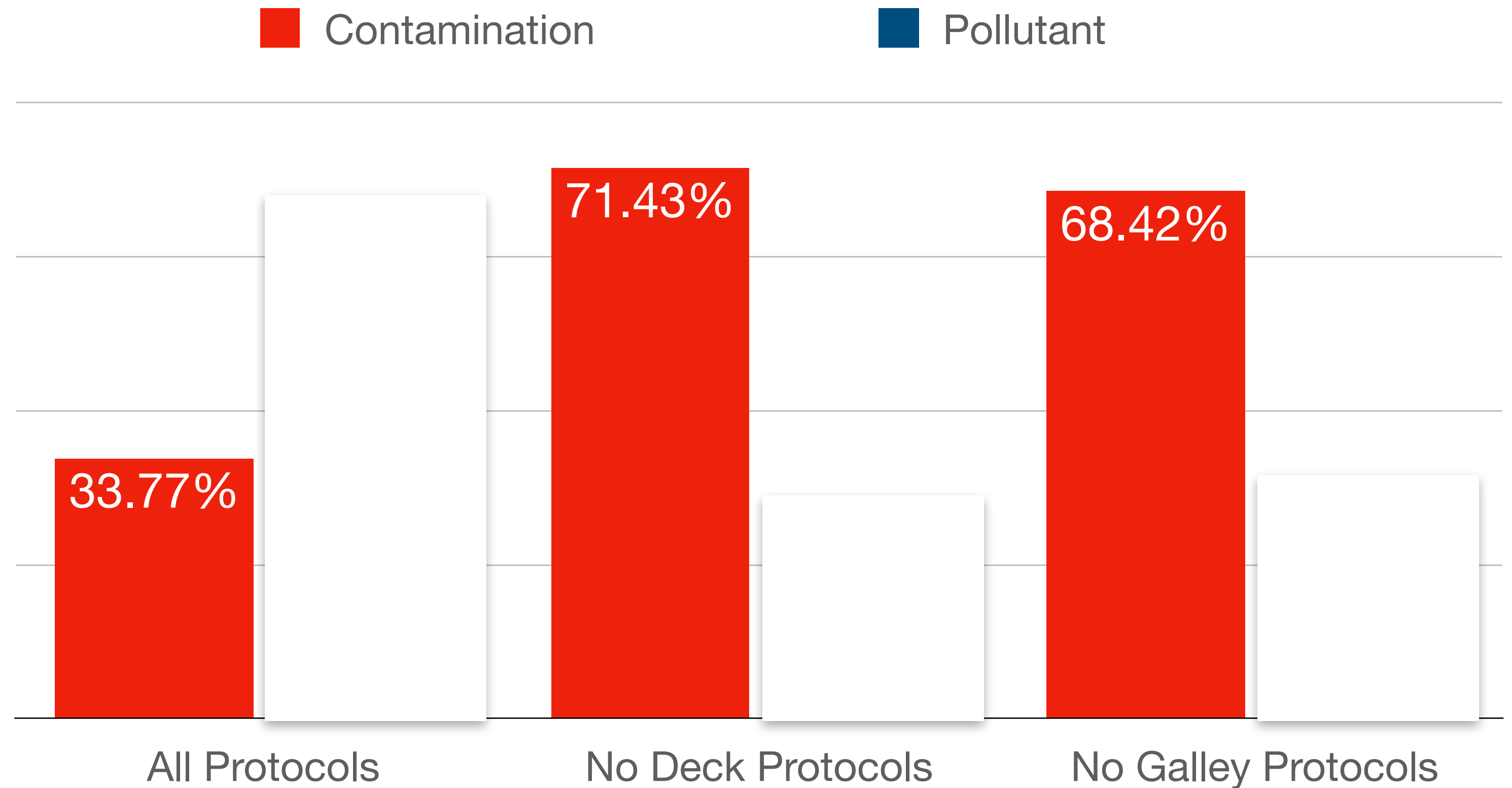
Gwinnett & Miller, Are we contaminating our samples? A preliminary study to investigate procedural contamination during field sampling and processing for microplastic and anthropogenic microparticles, Mar Pollut Bull. 2021

CONTAMINATION STUDY



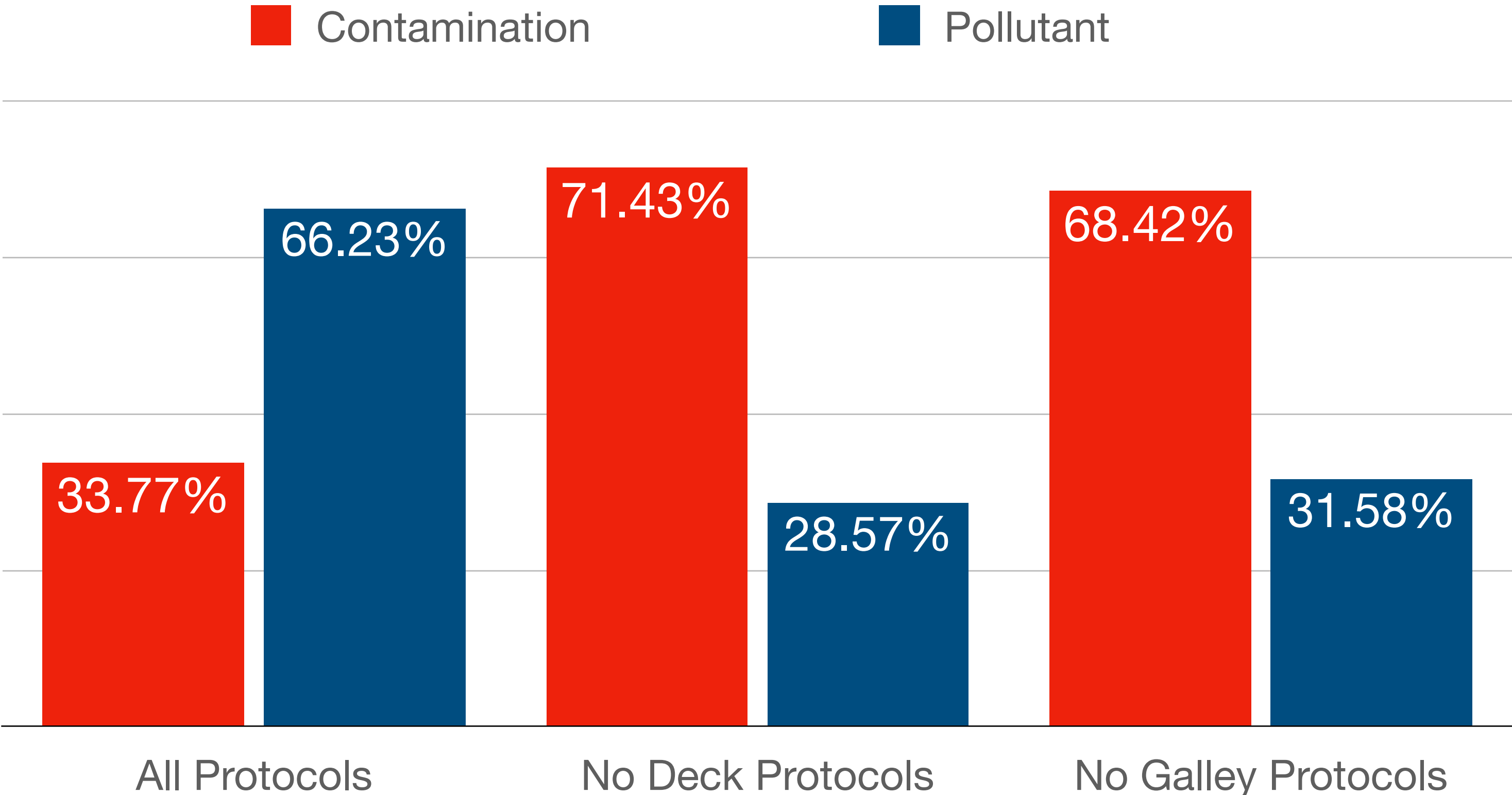
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CONTAMINATION STUDY

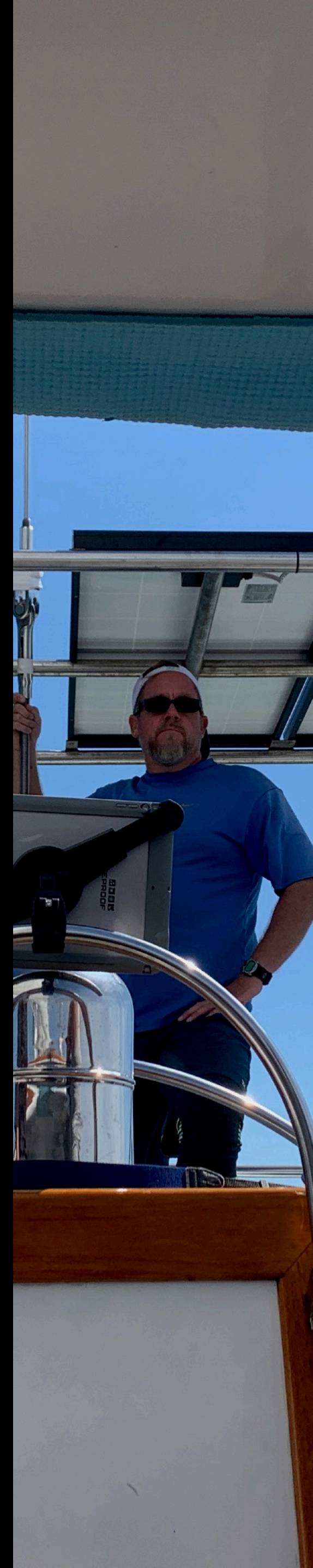


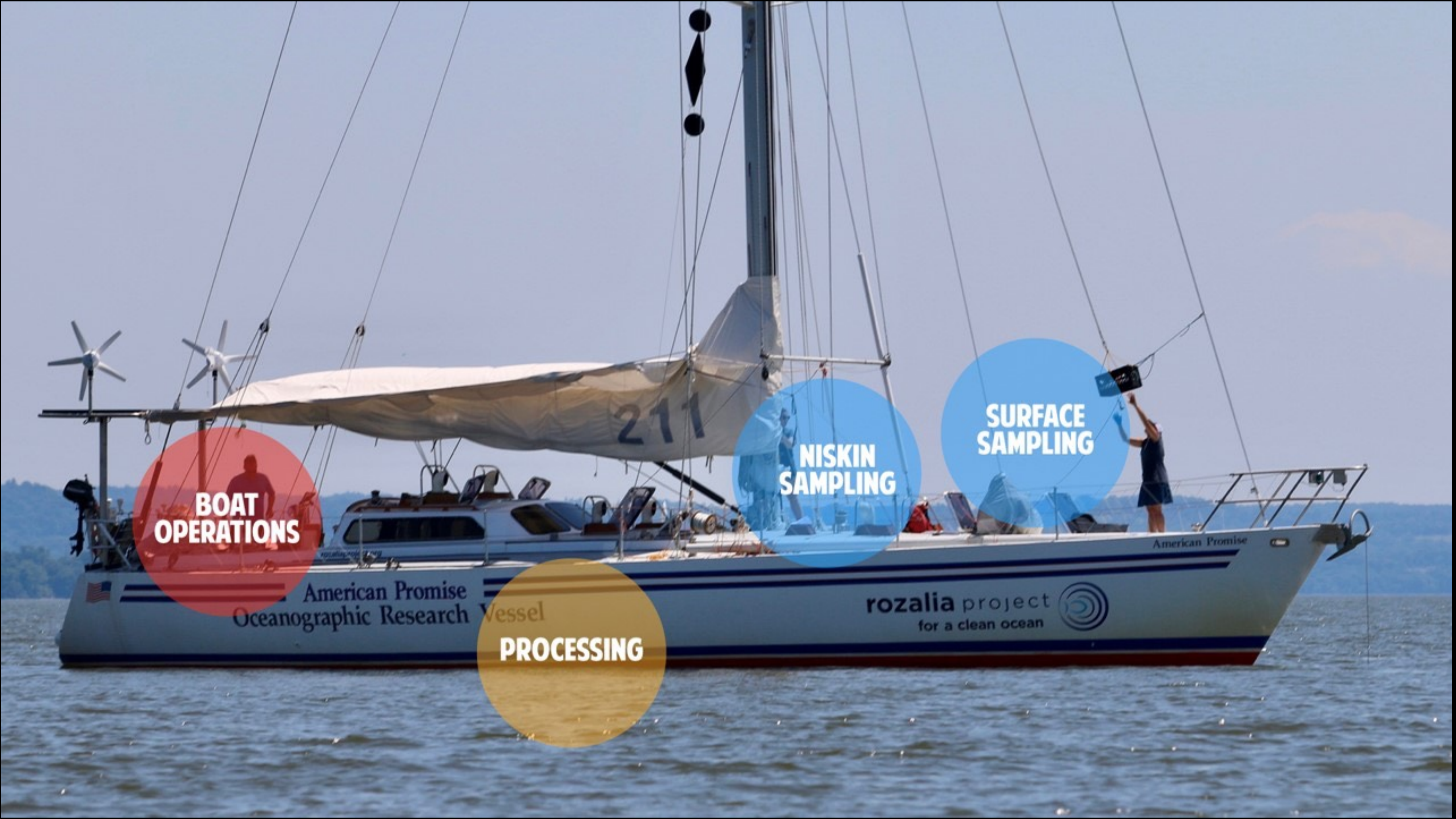
Gwinnett & Miller, Are we contaminating our samples? A preliminary study to investigate procedural contamination during field sampling and processing for microplastic and anthropogenic microparticles, Mar Pollut Bull. 2021

WE ARE ALL PIGPEN: CONTAMINATION STUDY



Gwinnett & Miller, Are we contaminating our samples? A preliminary study to investigate procedural contamination during field sampling and processing for microplastic and anthropogenic microparticles, Mar Pollut Bull. 2021





**BOAT
OPERATIONS**

**NISKIN
SAMPLING**

**SURFACE
SAMPLING**

PROCESSING

GLOBAL CITIZEN SCIENCE MICROPLASTIC MONITORING PROJECT



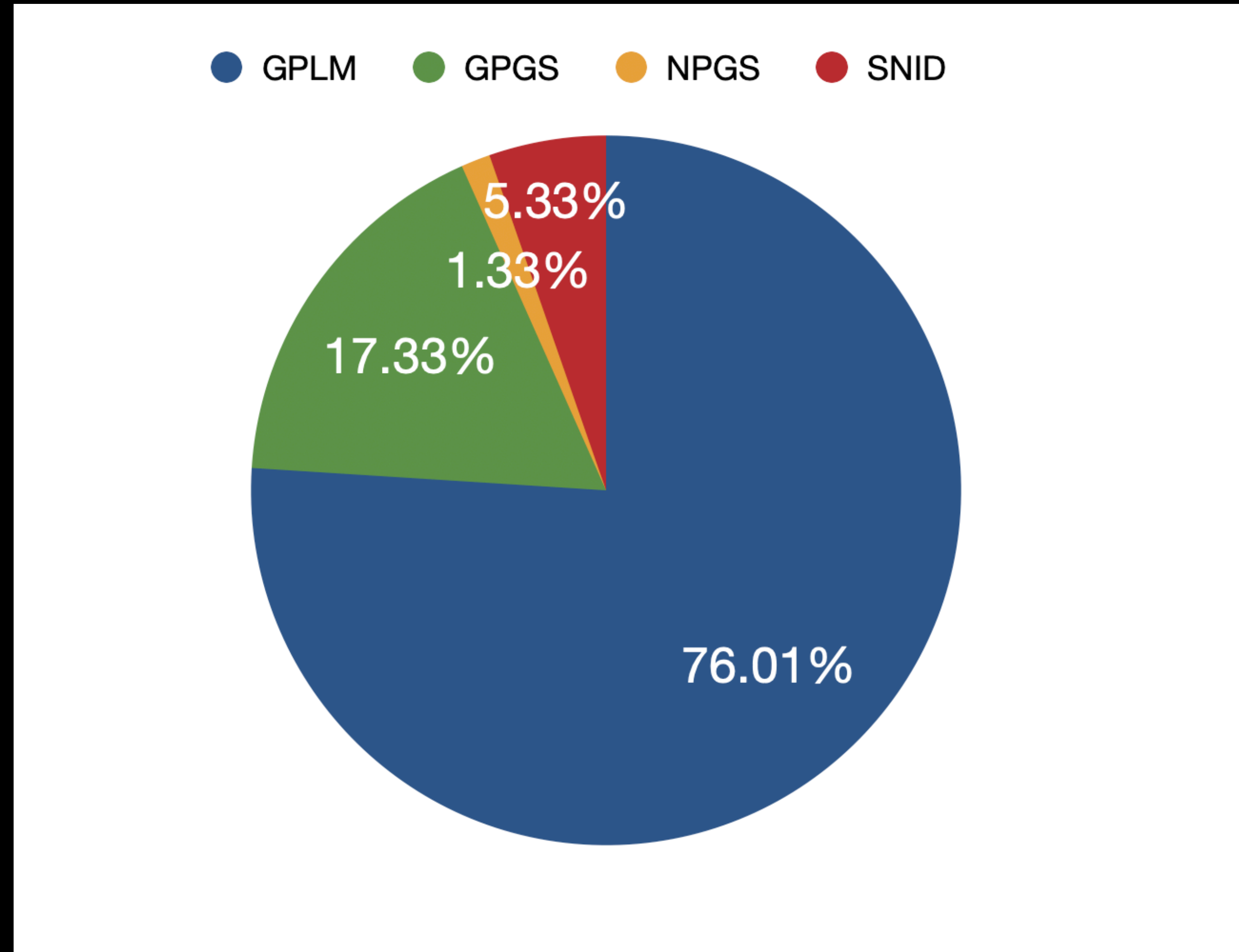
**TEAM NAVIGATORS
2019 GEOCHALLENGE WINNERS**

CONTAMINATION CONTROL



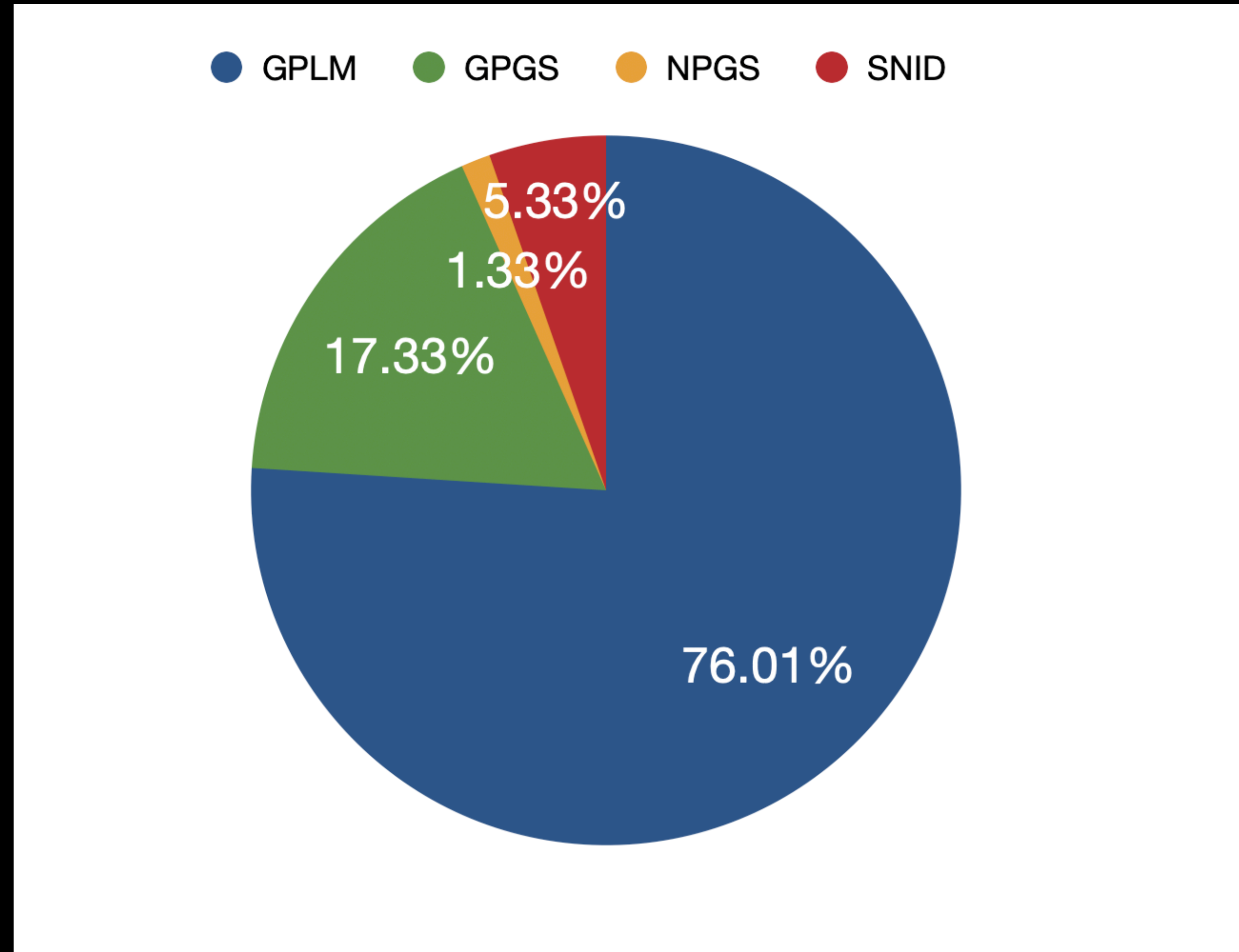
TIDES PROGRAM @ NORRIE POINT ENVIRONMENTAL CENTER, STAATSBURG, NY

MORE AFFORDABLE IDENTIFICATION METHODS



GPLM: good PLM
GPGS: good PLM/good spectra
NPGS: no PLM, good spectra
SNID: synthetic, no ID

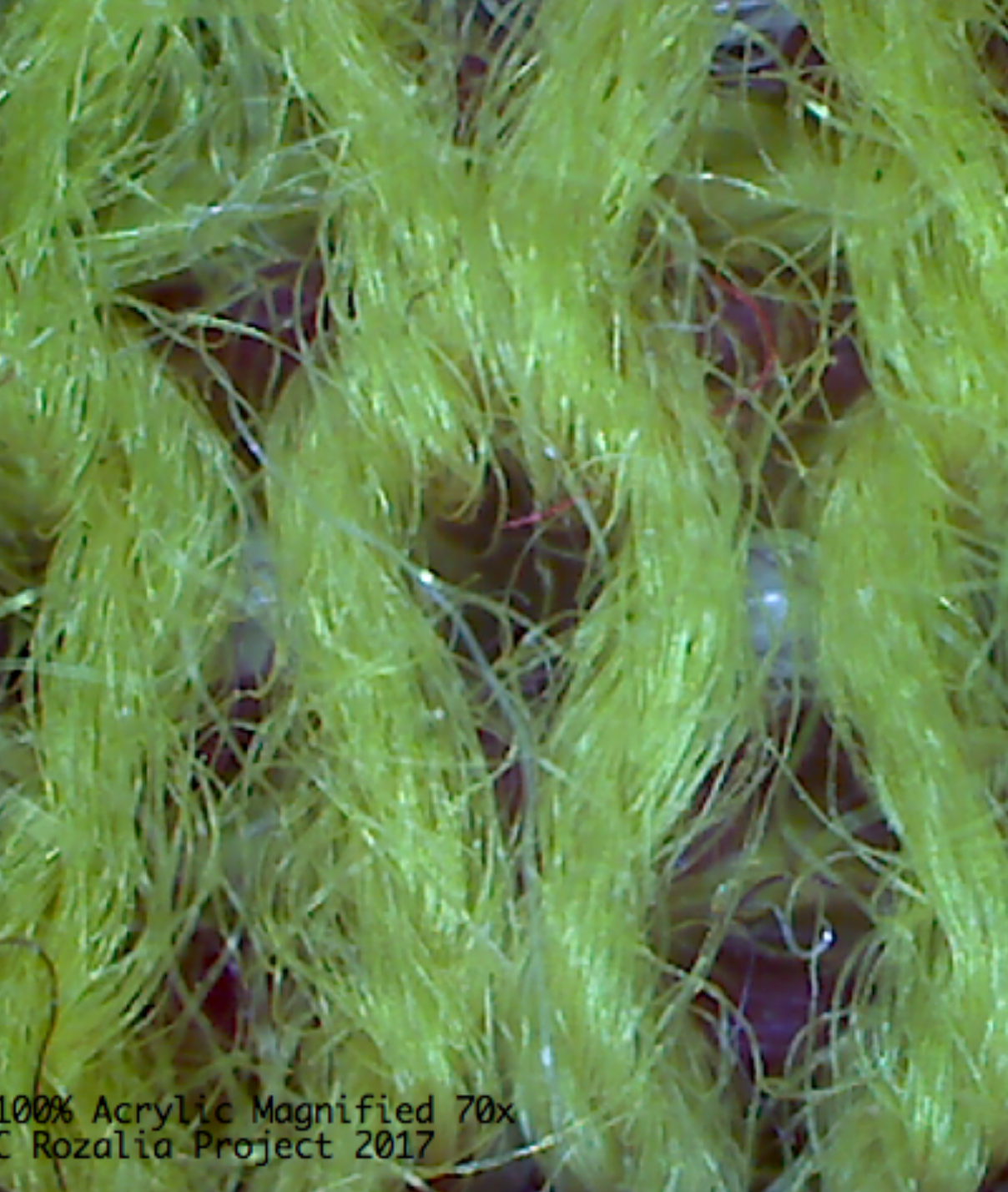
MORE AFFORDABLE IDENTIFICATION METHODS



GPLM: good PLM
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SNID: synthetic, no ID

93.34% of fibers were identified to the material level using a \$3,000 polarizing light microscope (and rainbows and crystals)

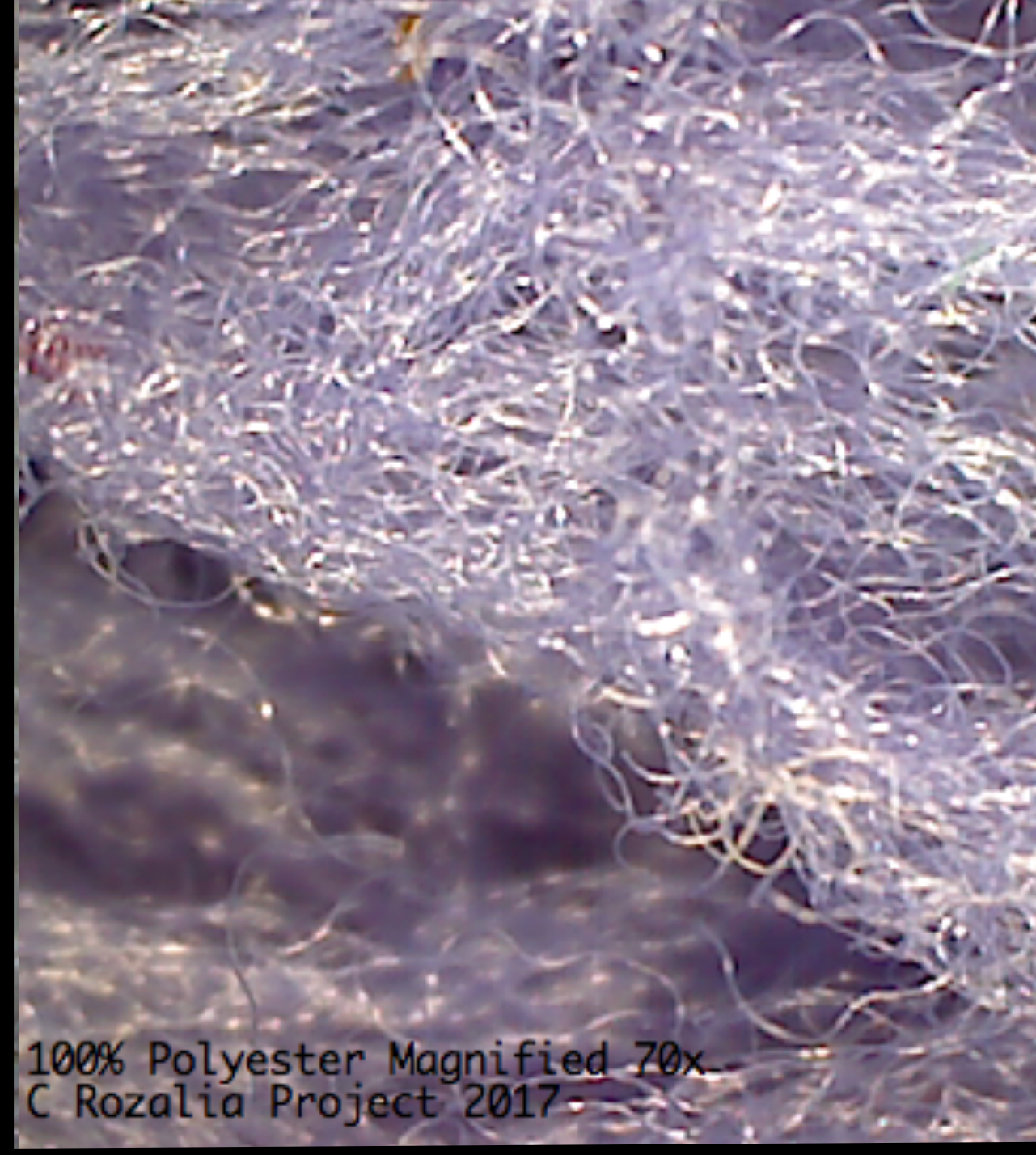
-from procedural contamination study



100% Acrylic Magnified 70x
C Rozalia Project 2017



100% Polyester Magnified 130x
Rozalia Project 2017



100% Polyester Magnified 70x
C Rozalia Project 2017



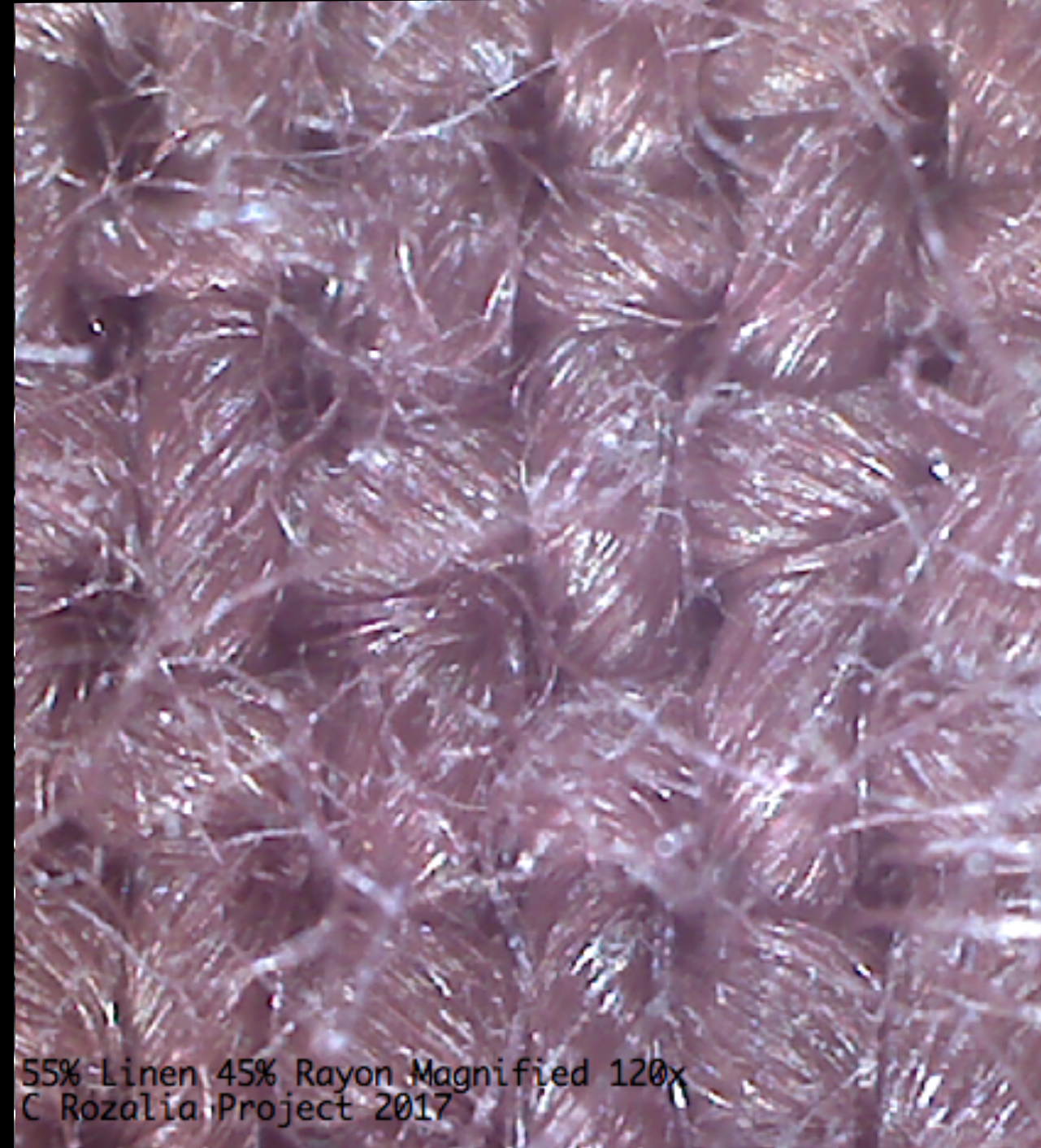
80% Polyester 15% Cotton Magnified 130x
Rozalia Project 2017



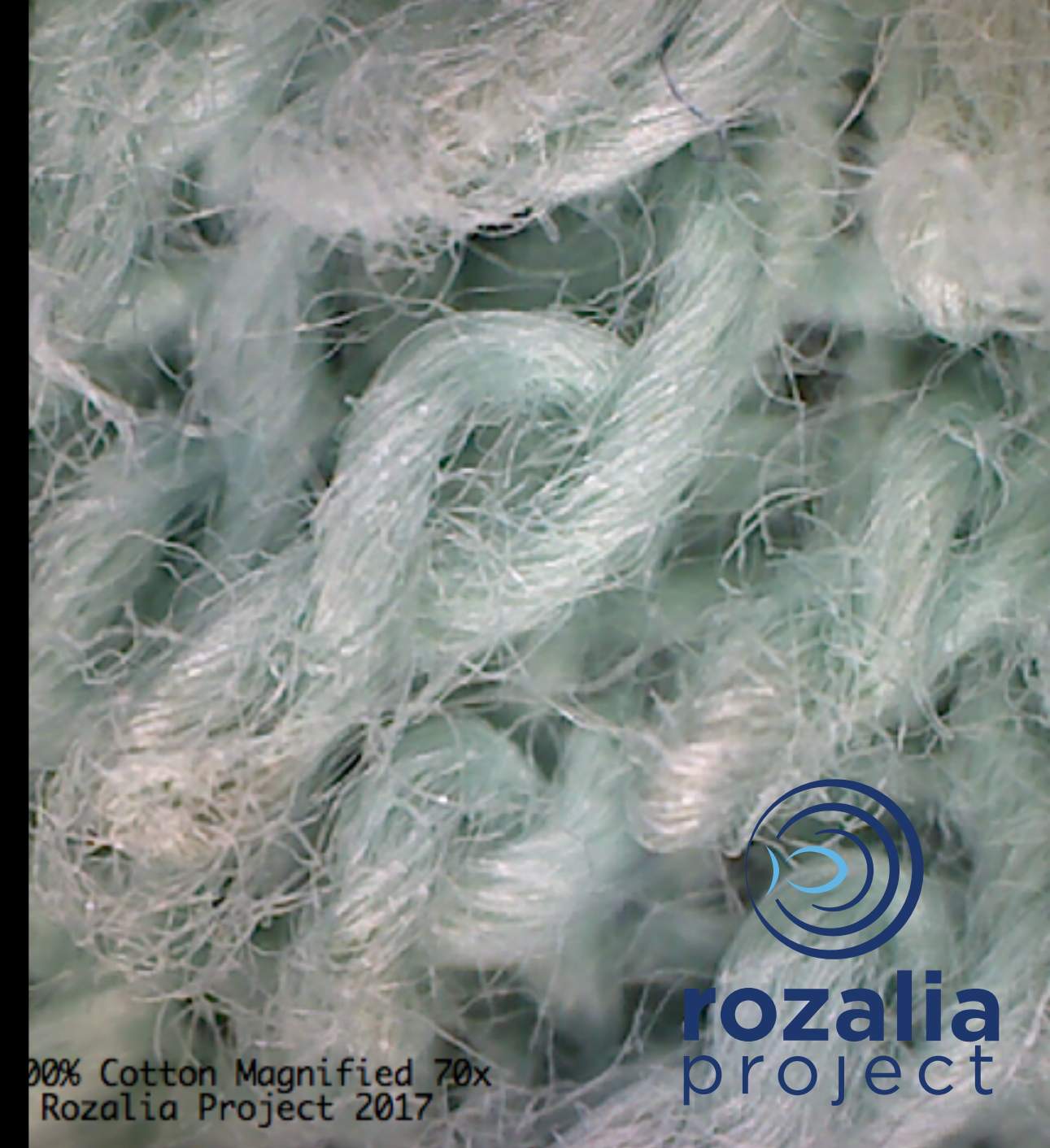
100% Nylon Magnified 130x
Rozalia Project 2017



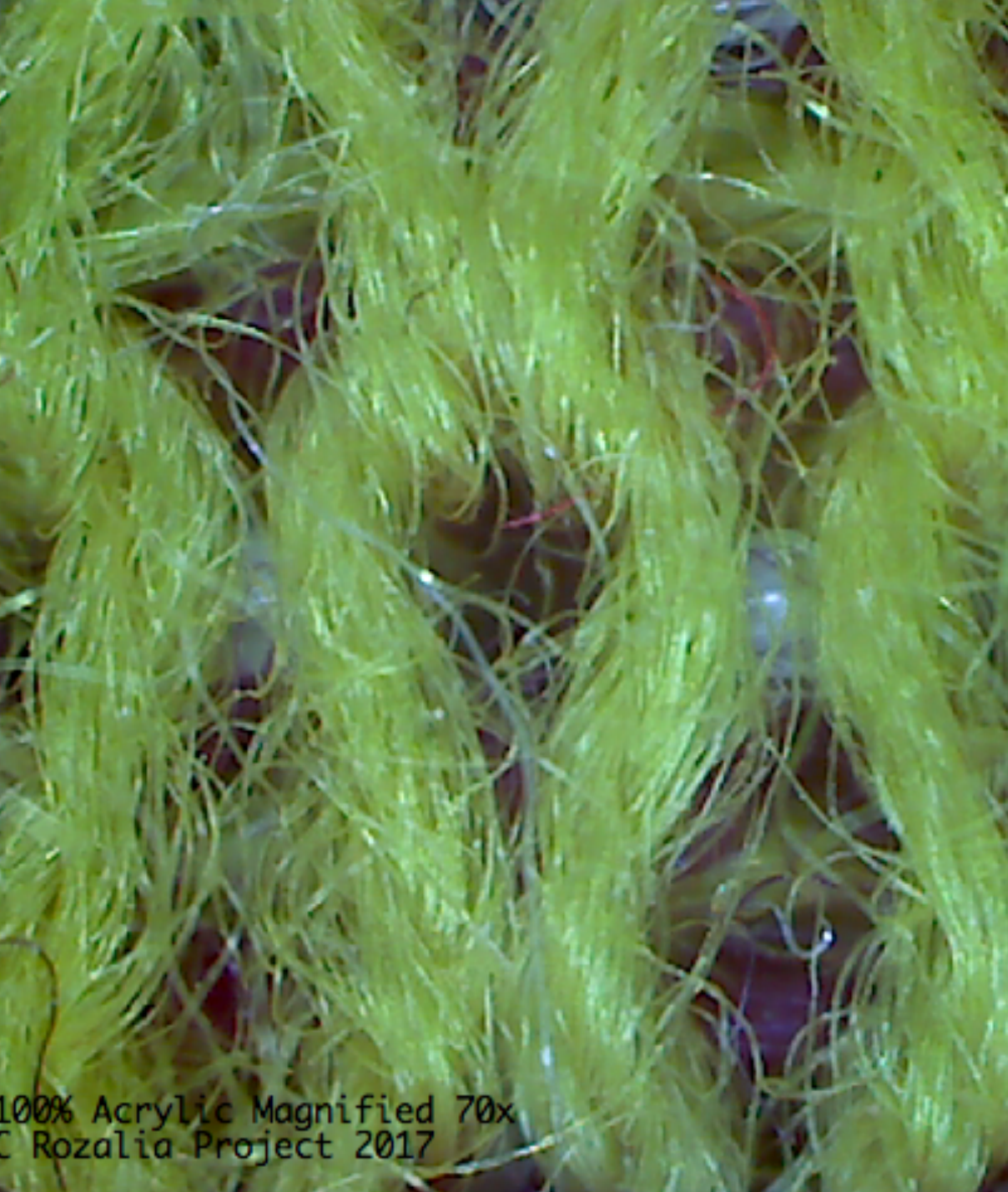
88% Nylon 12% Spandex Magnified 130x
Rozalia Project 2017



55% Linen 45% Rayon Magnified 120x
C Rozalia Project 2017



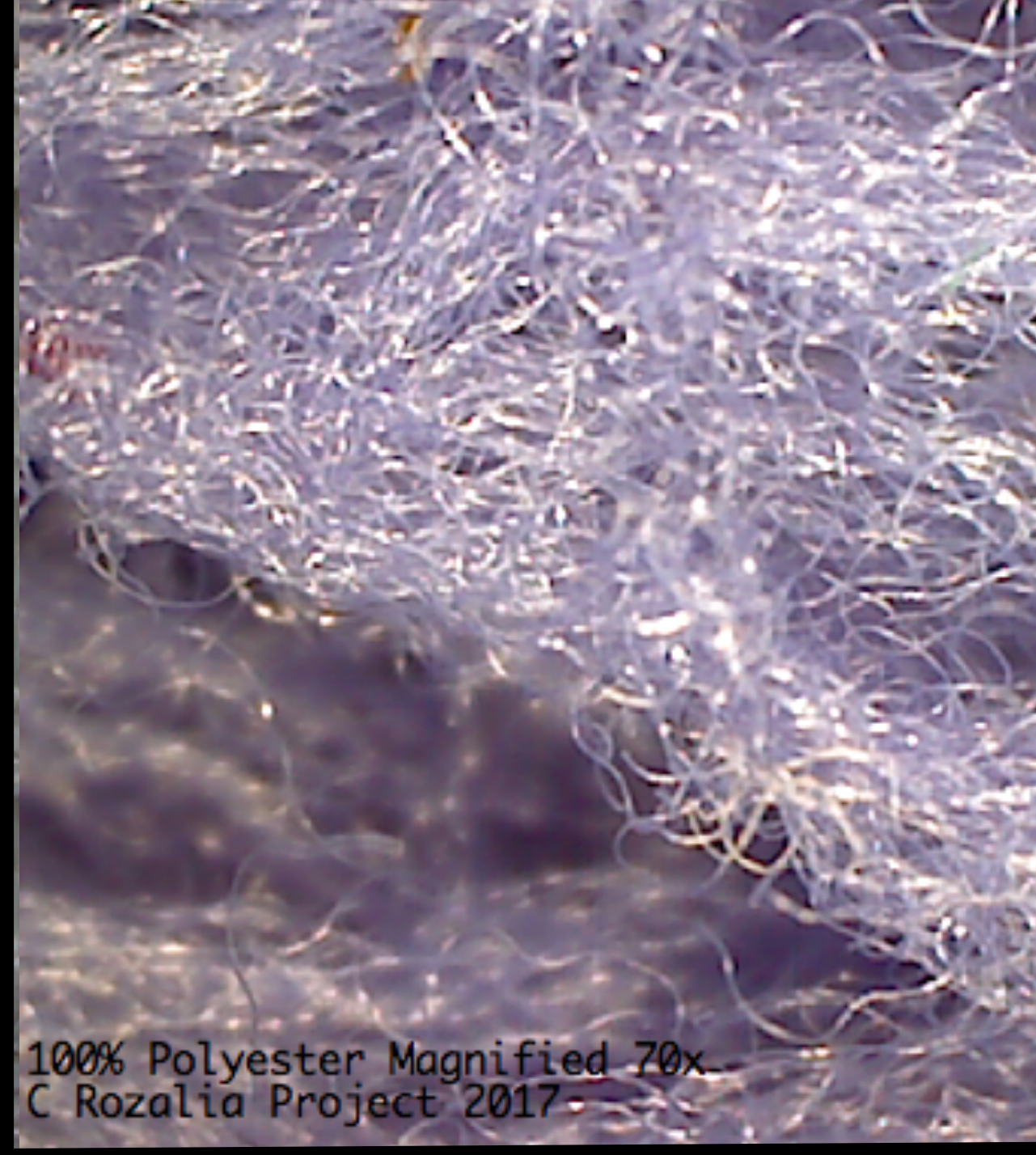
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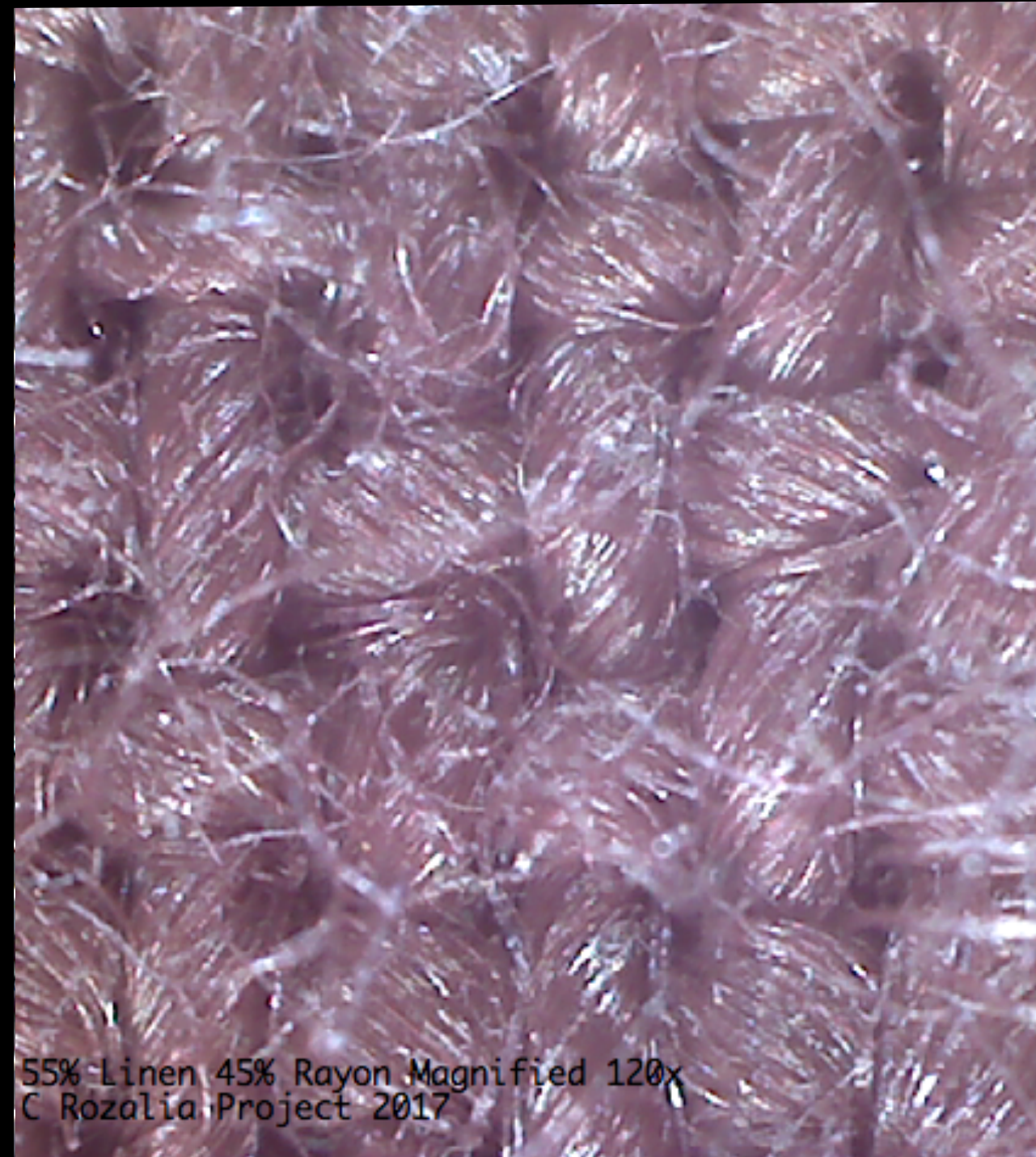
80% Polyester 15% Cotton Magnified 130x
Rozalia Project 2017



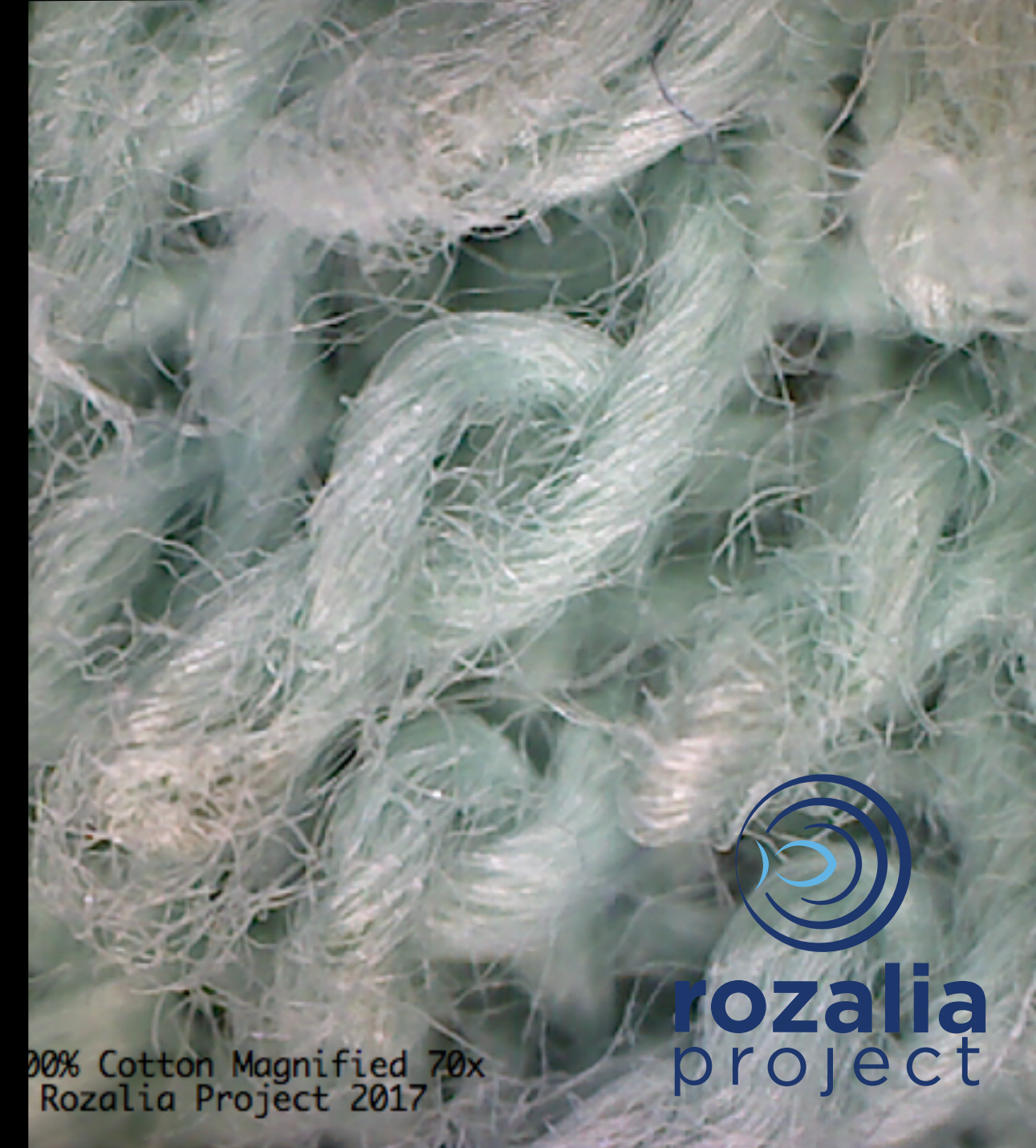
100% Neoprene Magnified 120x
C Rozalia Project 2017



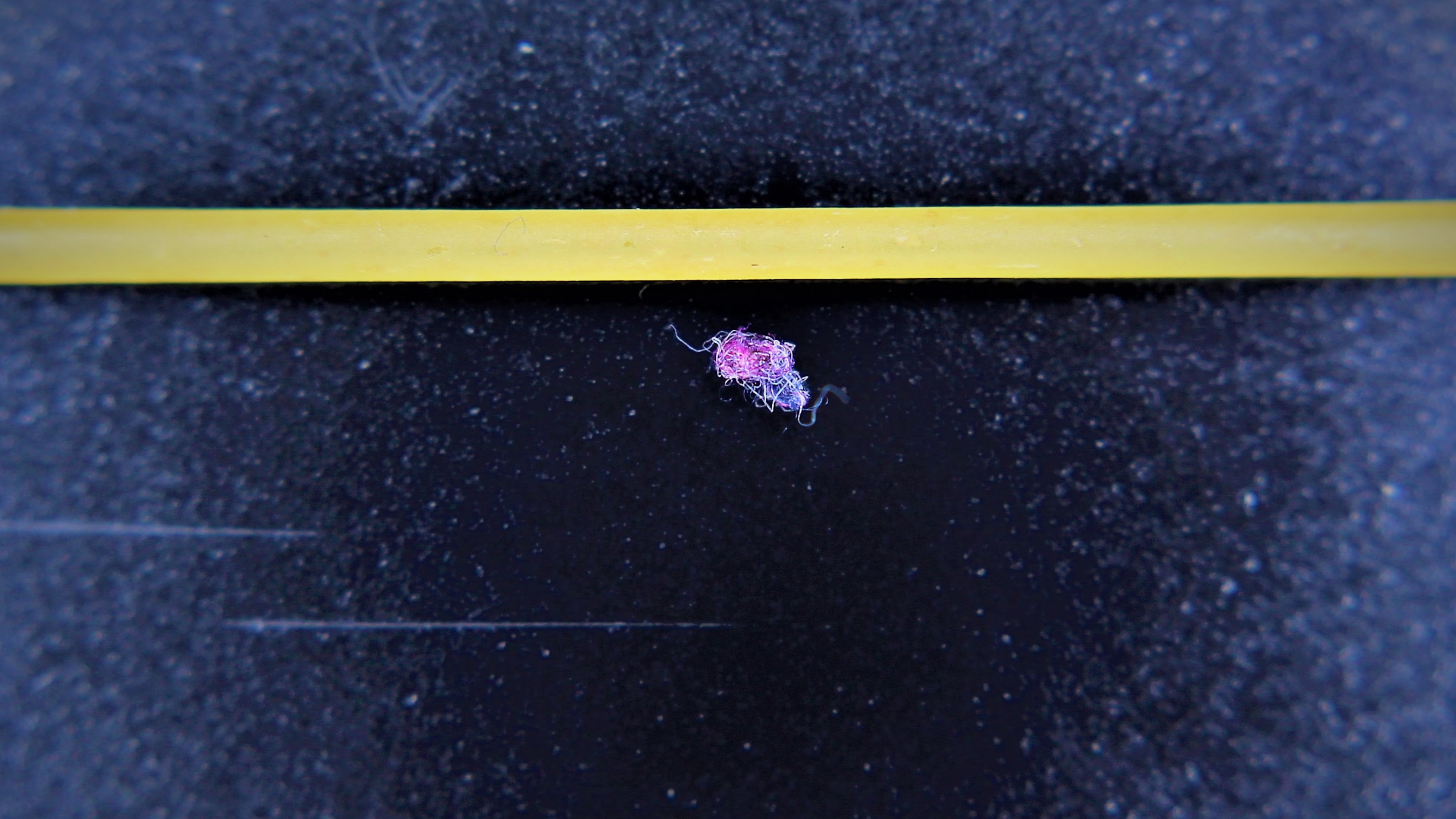
88% Nylon 12% Spandex Magnified 130x
Rozalia Project 2017



55% Linen 45% Rayon Magnified 120x
C Rozalia Project 2017



100% Cotton Magnified 70x
Rozalia Project 2017





Opportunities for innovation: A circular economy

Prevent leakage

Stop leakage

Close the loop

Resilient Clothing

Opportunities for innovation: A circular economy

Prevent leakage

Stop leakage

Close the loop

Resilient Clothing

Washing
Machine
Filters

Reduced
Dryer
Emissions

Consumer
Actions

WWTPs

Opportunities for innovation: A circular economy

Prevent leakage

Stop leakage

Close the loop

Resilient Clothing

Upcycling
Mixed
Fibers

Washing
Machine
Filters

Reduced
Dryer
Emissions

Consumer
Actions

WWTPs

SOLUTIONS: WASHER EMISSIONS

DO LESS LAUNDRY

USE COLD WATER

DO FULL LOADS

SOFTEN YOUR WATER

USE A FRONT LOADER

USE A CORA BALL

USE AN AFTER MARKET FILTER

ASK COMPANIES FOR INLINE FILTERS

ADD TO THE RESEARCH

-MATERIALS AND WASHING, SEPTIC TANKS & LEACH FIELDS+

SOLUTIONS: DRYER EMISSIONS

DO LESS LAUNDRY

AIR DRY WHEN POSSIBLE*

KEEP LINT TRAPS CLEAN

ADD TO THE RESEARCH

**-WHAT CAUSES MORE FIBER FRAGMENTATION
BASED ON: DRYER SETTINGS, FABRIC CONSTRUCTION
AND MATERIAL, LOAD DETAILS & DRYER INSTALLATION
CHARACTERISTICS; EMISSIONS FROM AIR DRYING &
VENTLESS DRYERS+**

SOLUTIONS: EMISSIONS FROM WEARING CLOTHES

ADD TO THE RESEARCH

-RESILIENT MATERIALS, RESILIENT CONSTRUCTION METHODS (WEAVES, ETC.), ACTIONS THAT CAUSE FIBER FRAGMENTATION, DEVELOP A METHOD TO TEST FRAGMENTATION QUOTIENT BASED ON WEARING CLOTHING++++

THANK YOU!

**ROZALIAPROJECT.ORG
CORNBALL.COM**

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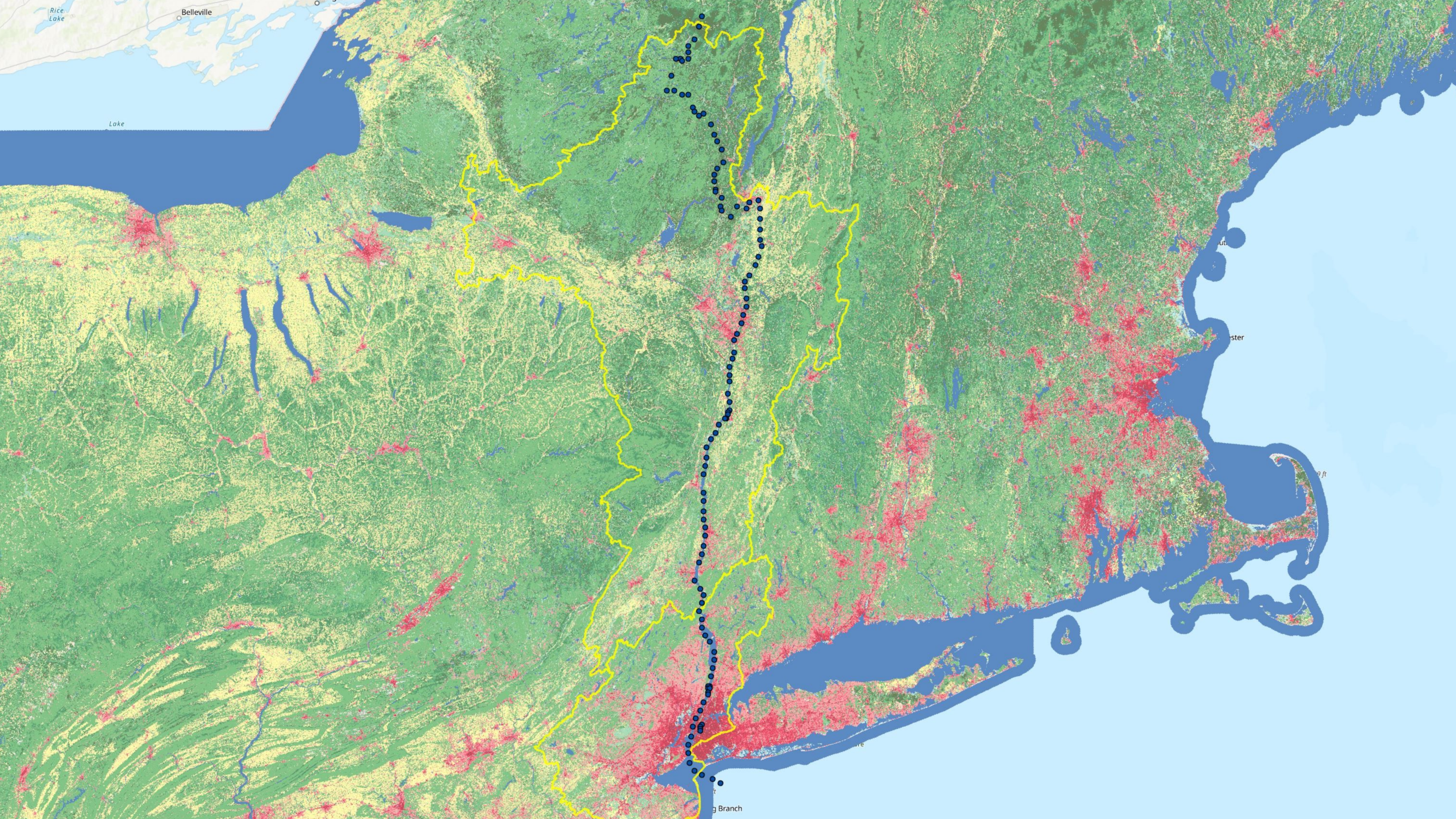




HUDSON
[RURAL]

YONKERS
[SUBURBAN]

EAST RIVER/BROOKLYN
[URBAN]



Rice Lake

Belleville

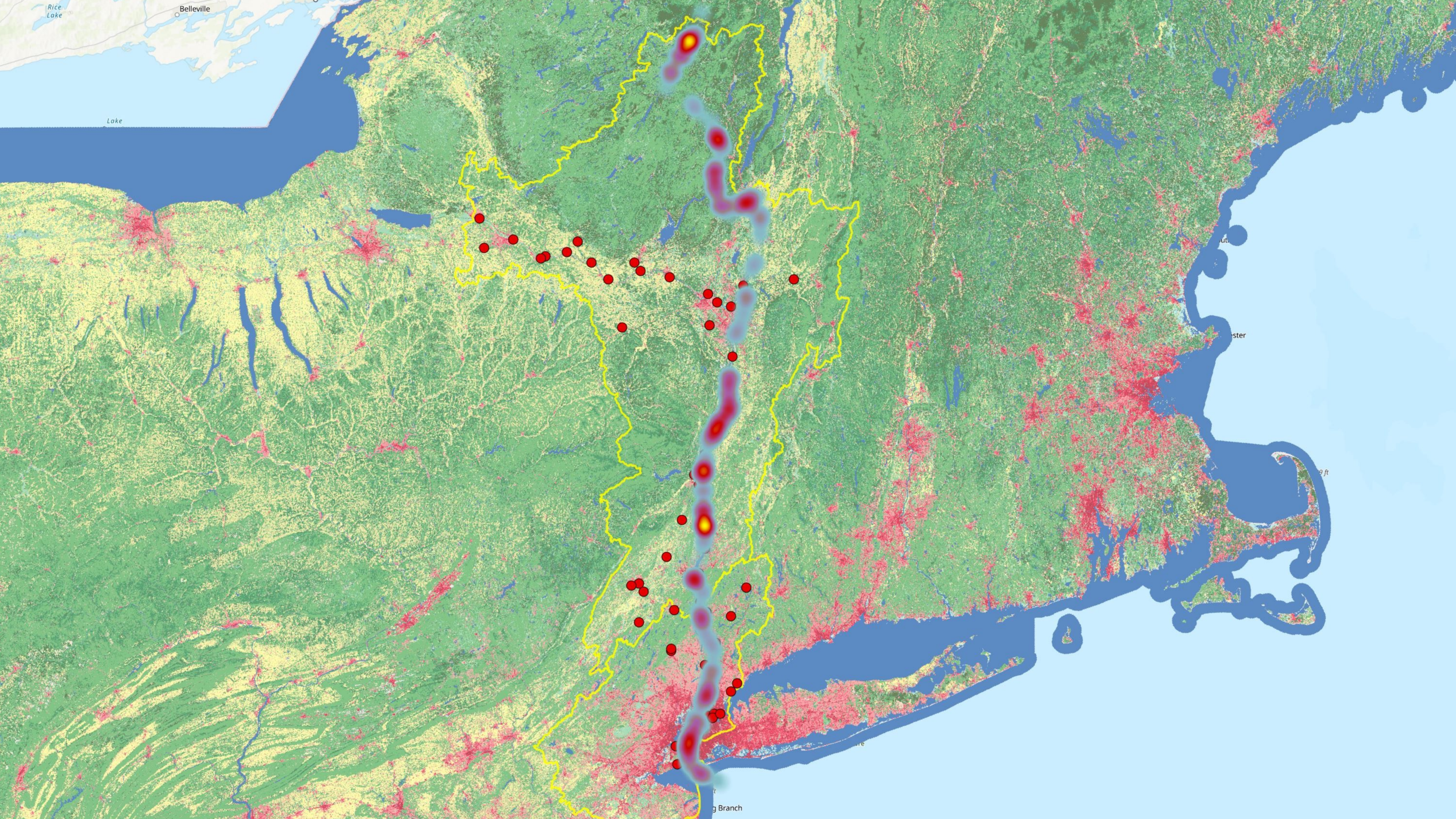
Lake

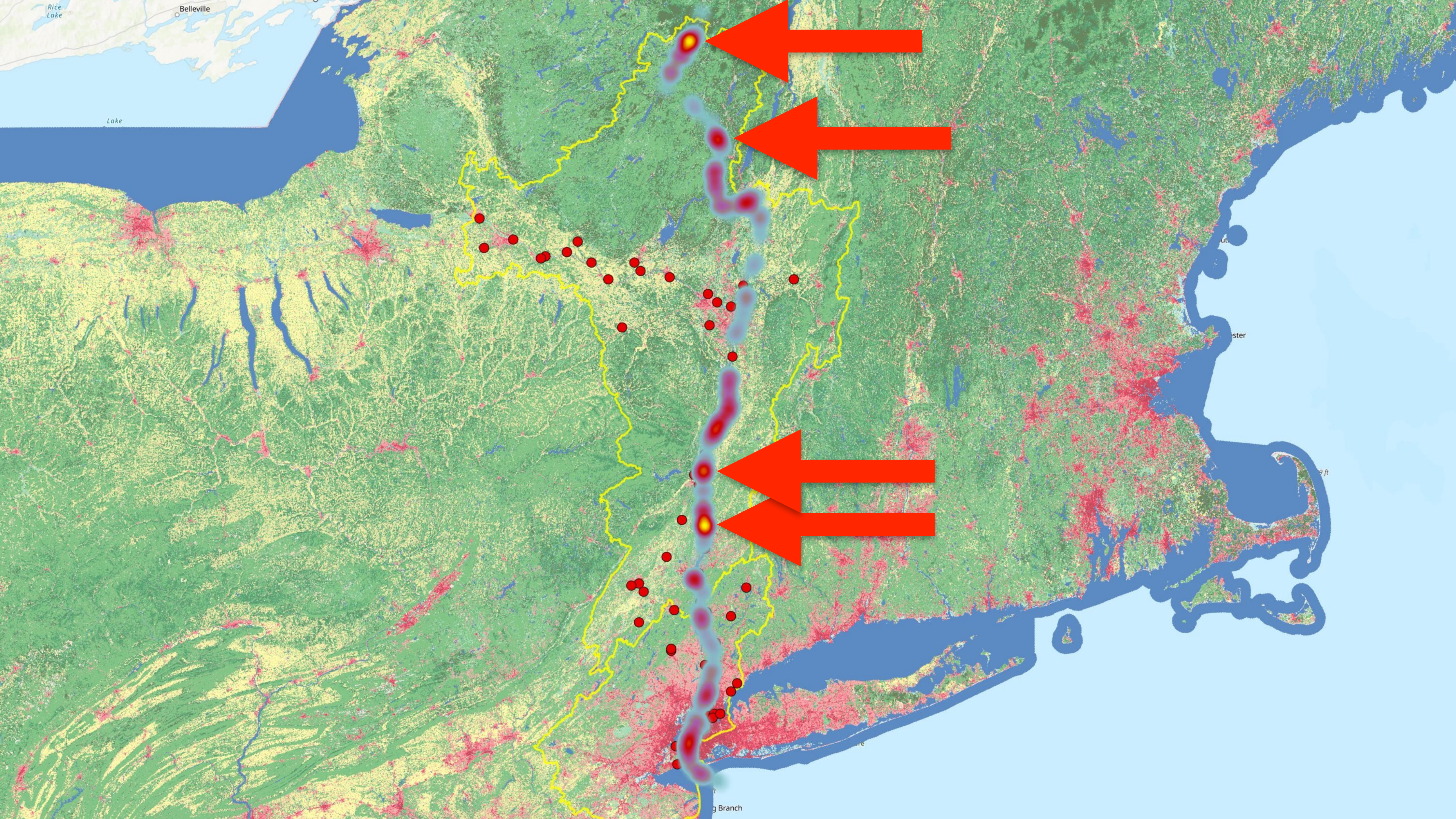
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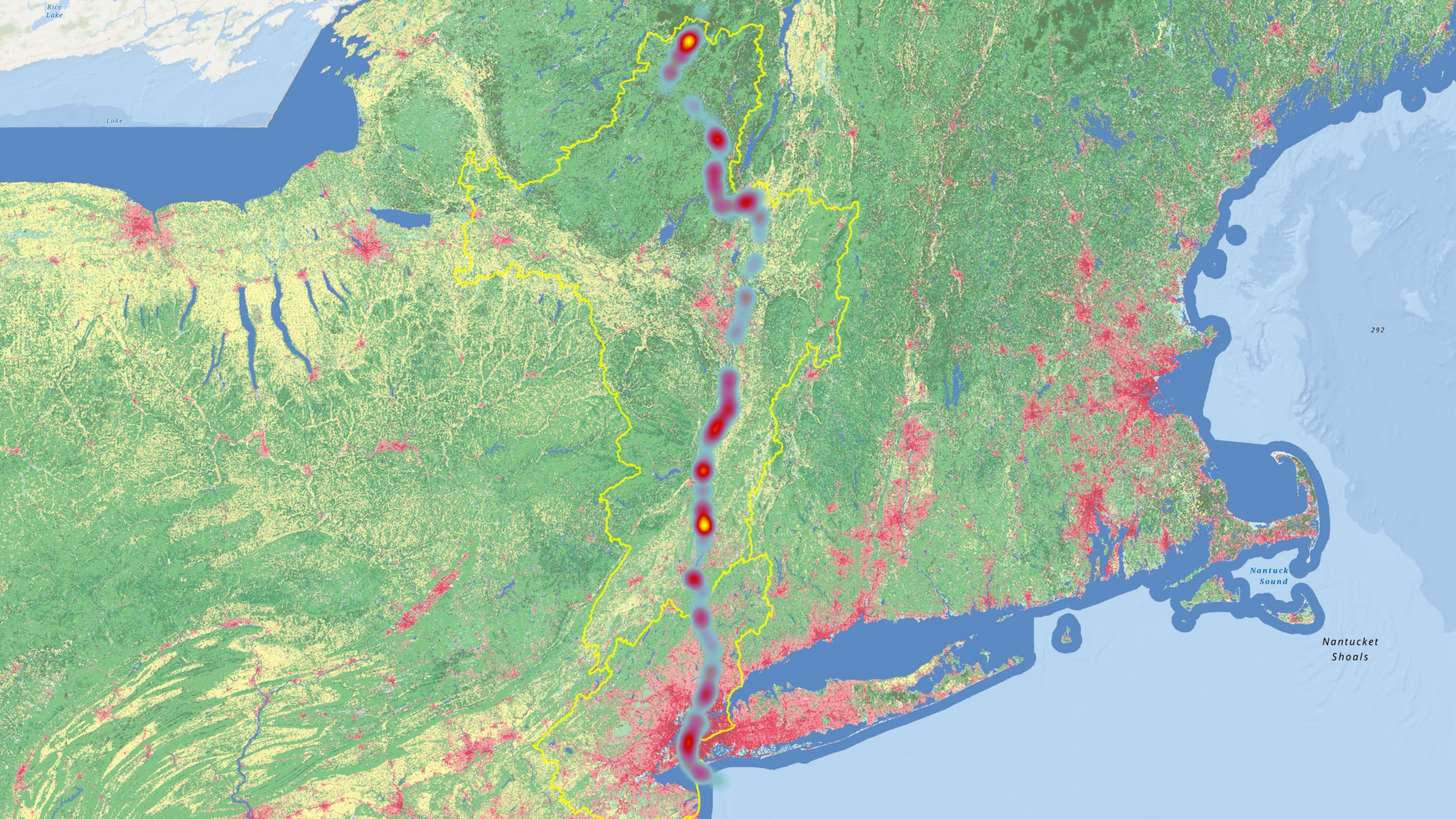
ster

9 ft

g Branch







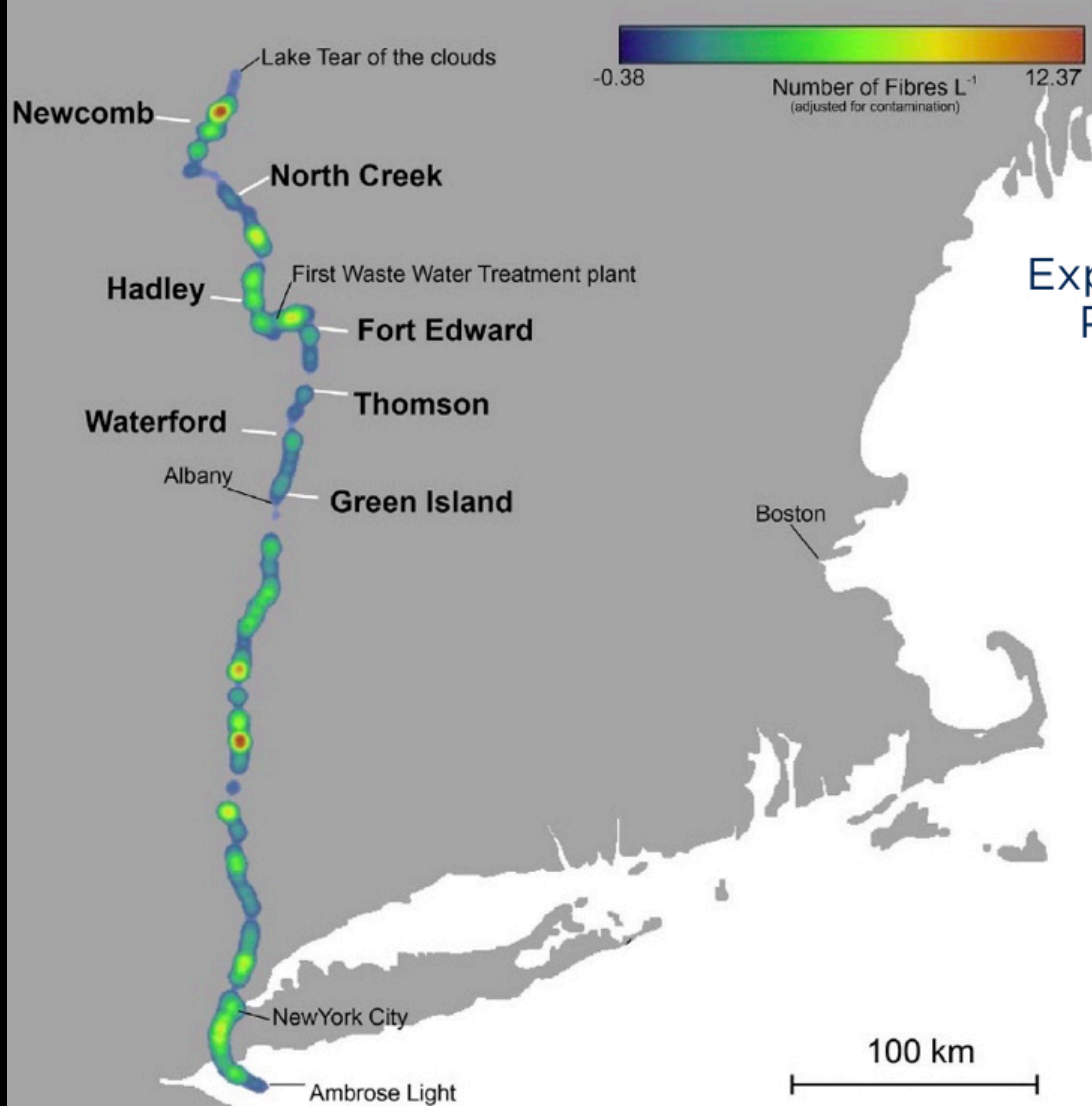
Rice
Lake

Lake

292

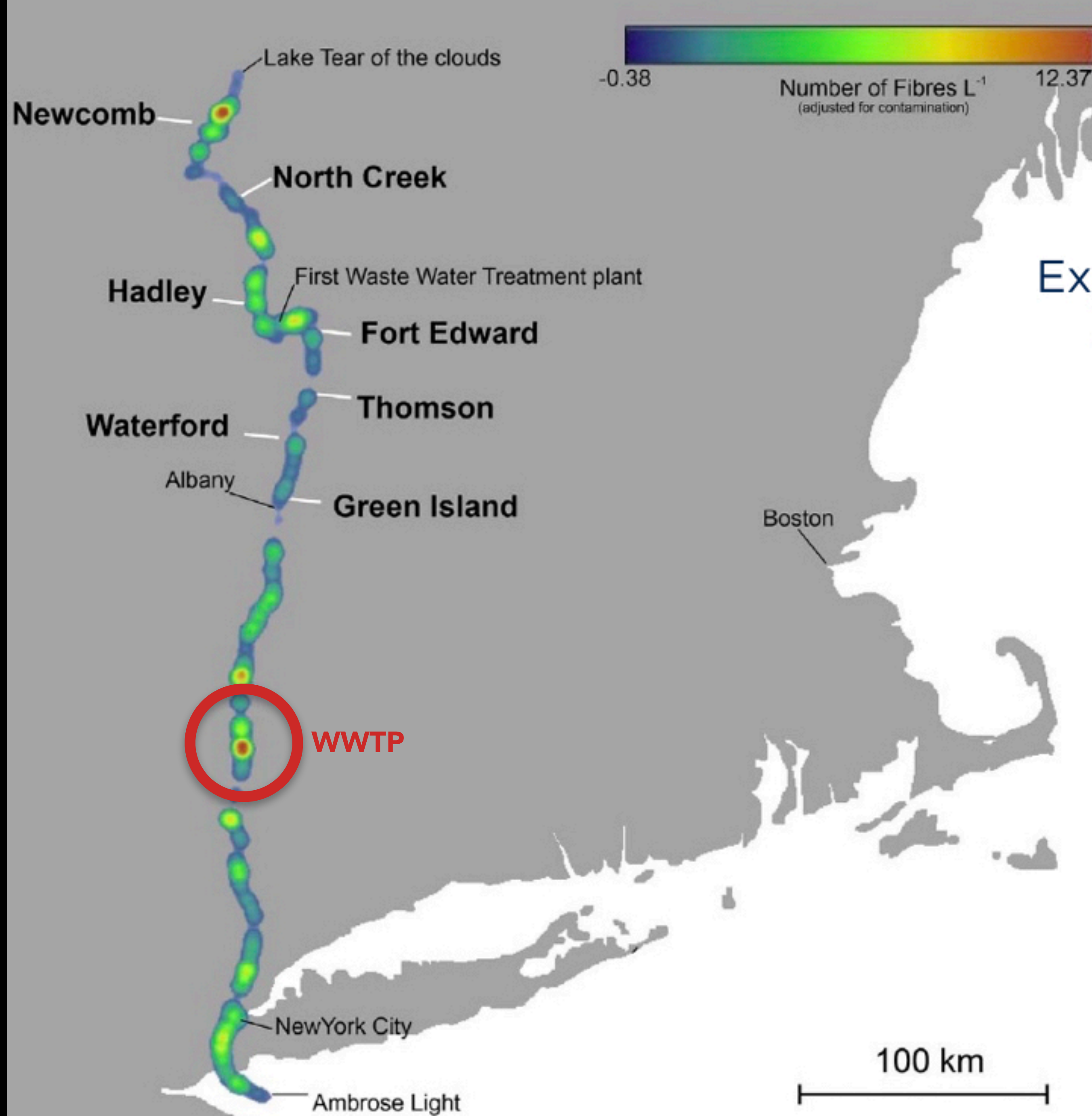
Nantucket
Sound

Nantucket
Shoals

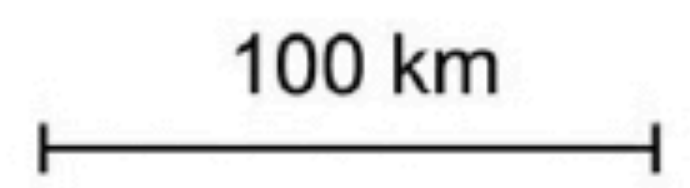


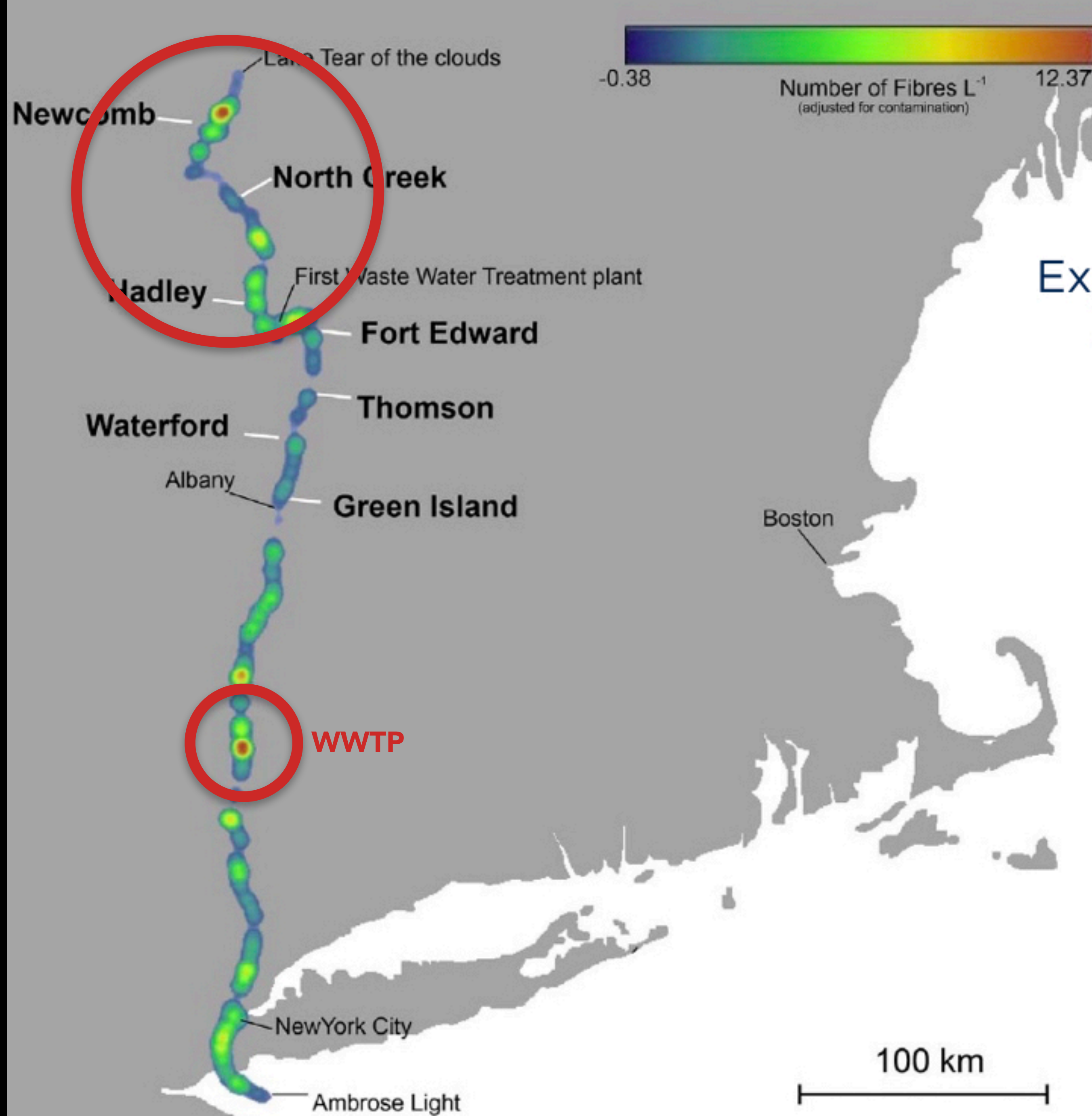
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Published July 2017





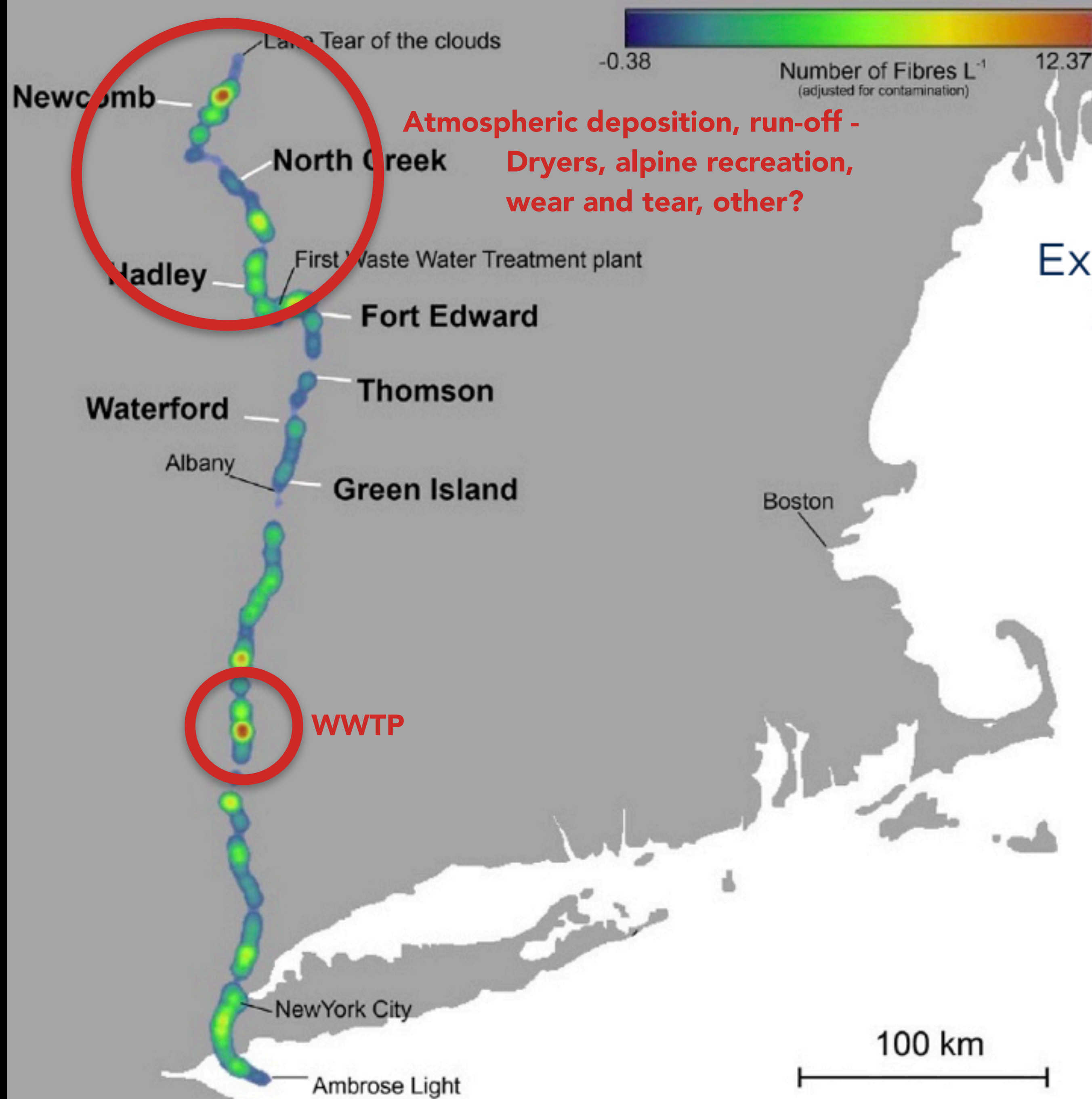
Expedition: June 2016
Published July 2017





Expedition: June 2016
Published July 2017





**Atmospheric deposition, run-off -
Dryers, alpine recreation,
wear and tear, other?**

Expedition: June 2016
Published July 2017



100 km