SFEI San Francisco Estuary Institute

RMP

RMP Microplastics Workgroup Meeting

30 April 2026

Zoom Stuff

1. This meeting is being recorded and AI transcribed
2. Update your name and add your affiliation
3. Raise your hand if you have a comment or question
4. Unmute yourself and turn on video when you are speaking
5. Use the chat function if you have a secondary comment, question, or technical issue

In person attendees

1. Mute your microphone and the volume on your laptop
2. Turn off your camera
3. Silence cell phone
4. Keep side conversations to a minimum, new SFEI mic system is very sensitive. Speak clearly and do no talk over each other
5. We assume consent from participants to photograph the event and attendees and use the photos for our website and newsletter unless you inform us otherwise

Guidelines for Inclusive Conversations

1. Try it on
2. Practice self focus
3. Understand the difference between intent and impact
4. Practice both / and
5. Refrain from blaming or shaming self and others
6. Move up / move back
7. Practice mindful listening
8. Right to pass
9. Avoid jargon
10. It’s okay to disagree

The San Francisco Bay is the ancestral homeland of many indigenous people, including the Ohlone, Patwin, Coast Miwok, and Bay Miwok.

S. Bezalel

Microplastics Workgroup Expert Advisors

Chelsea Rochman
University of Toronto

Barbara Beckinghmam
College of Charleston

Introductions

Meeting Agenda

Information: Microplastics Update	9:45
Discussion: Microplastics Strategy and Multi-Year Plan	10:15
Short Break	10:45
Information: Dryer Study	11:00
Discussion: Microplastics in Sport Fish	11:30
LUNCH	12:00

Meeting Agenda

Discussion: Microplastics Stormwater Pilot Study Update	1:00
Proposed MPWG Special Study for 2027	2:15
Short Break	2:45
Discussion of Proposed Studies for 2027 - General Q&A	3:00
Closed Session - Decision: Recommendations for 2027 Special Studies Funding	3:20
Report out on recommendations	4:00
ADJOURN	4:15

Goals for Meeting - TODAY

- Provide updates on recent and ongoing MPWG activities
- Discuss MPWG multi-year plan and potential future studies
- Feedback on data interpretation
- Recommendations from the MPWG to the TRC regarding special studies funding

Regional Monitoring Program for Water Quality

Collect data and communicate information about water quality in San Francisco Bay in support of management decisions

~ 68 entities in the Program

- Municipal wastewater
- Industrial wastewater
- Municipal stormwater
- Dredgers

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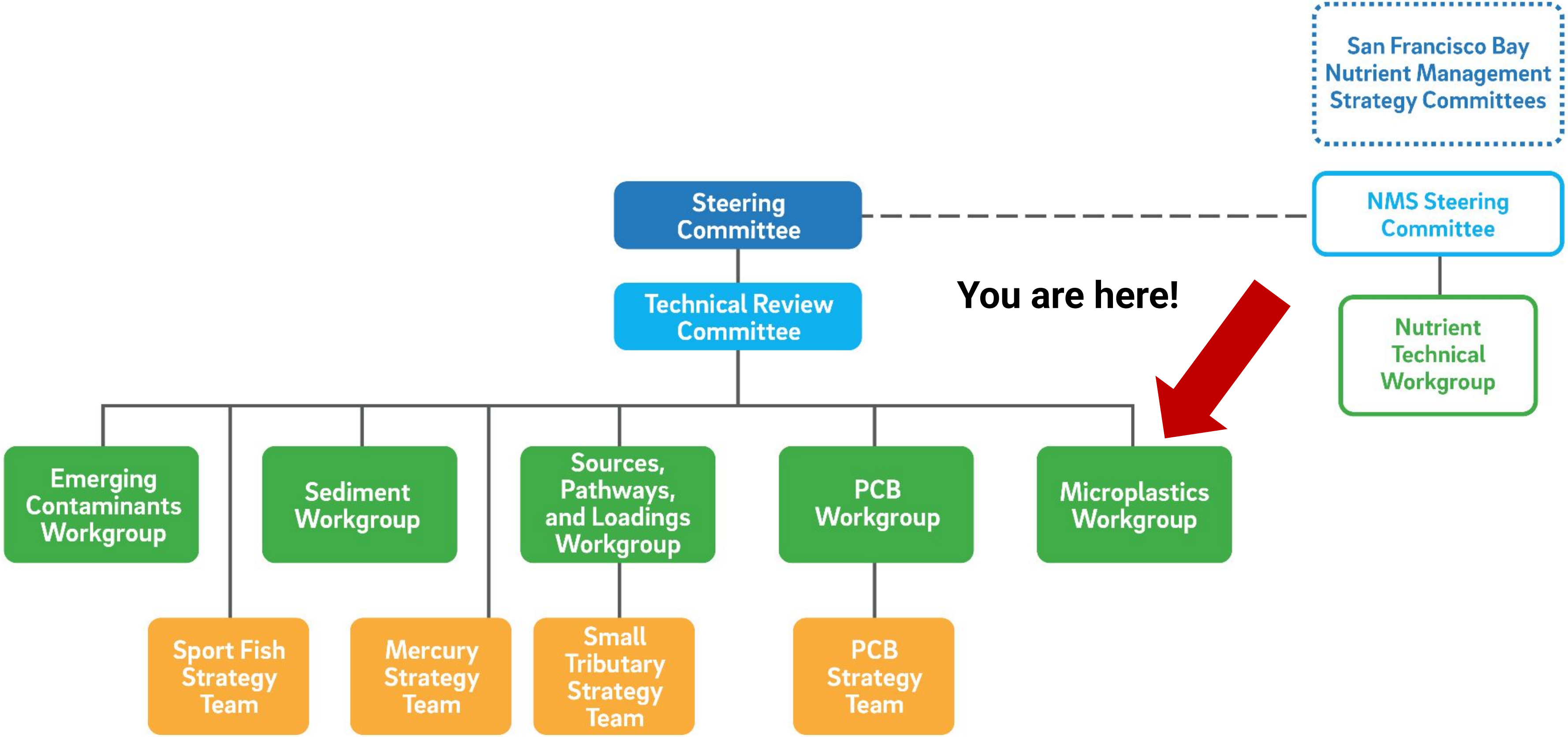
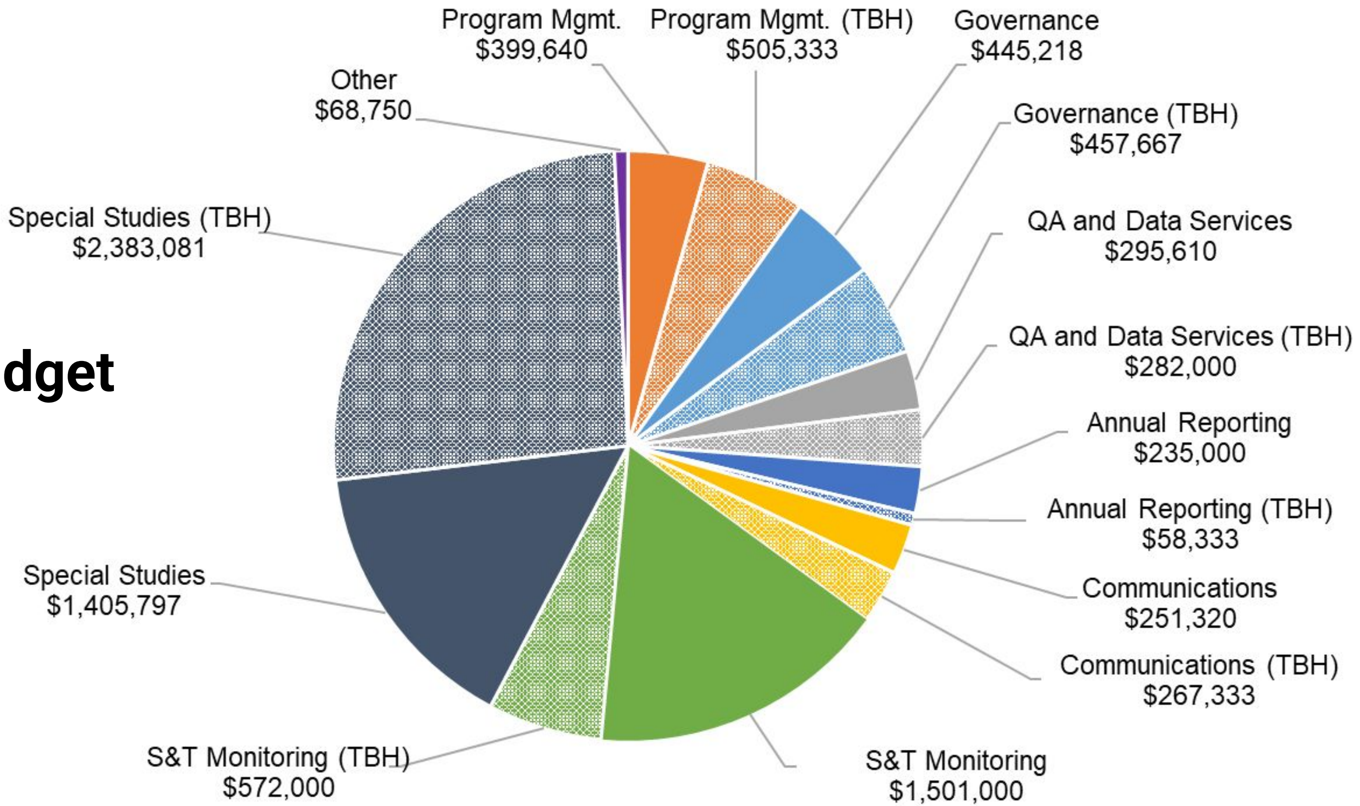
RMP Governance Structure



Regional Monitoring Program

2026 Budget
$9.2M



Microplastics Workgroup Planning

2027 Planning Budget - $154,650

RMP Committees recommended that workgroups plan multi-year proposals where possible

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Item 2: Microplastics Update

Diana Lin, PhD

Our Team

Diana Lin
Managing Senior Scientist

Kayli Paterson
Associate Environ. Scientist

Ezra Miller
Senior Scientist

Rebecca Sutton
Managing Senior Scientist

Kelly D. Moran
Senior Scientist

Alicia Gilbreath
Managing Senior Scientist

Lester McKee
Senior Environ. Scientist

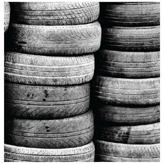
Maya Yu
Scientist In-Training

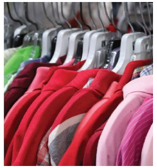
RMP Microplastics Strategy Development

SAN FRANCISCO BAY MICRO PLASTICS

2021 Synthesis of Sources and Pathways to Stormwater

Emphasize tires and fibers.
Hypothesized dryers is major source.





2025 Stormwater Pilot Study

2019 San Francisco Bay Microplastics Study

Bay Water, Sediment, Wastewater, and Urban Stormwater Runoff

2024 RMP MPWG Strategy Update

Priority Management Questions

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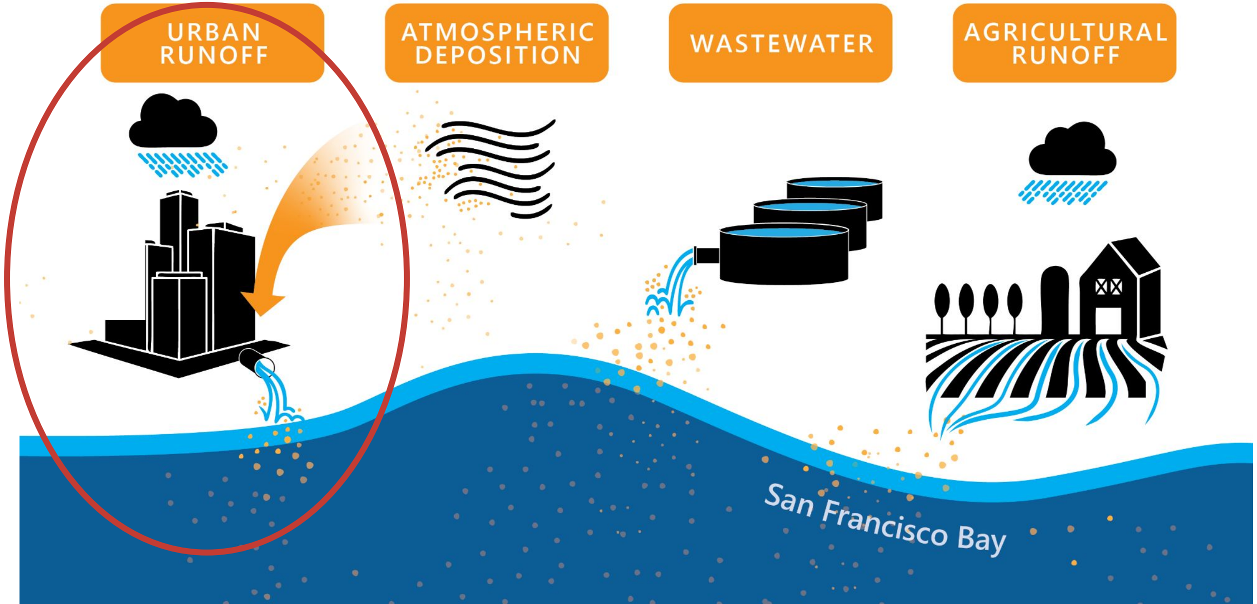
RMP Microplastics Strategy Development

- Stormwater identified as major pathway for microplastics
- Tire wear particles, fibers, and other small microplastics (<100 μm) is a major data gap to inform risk



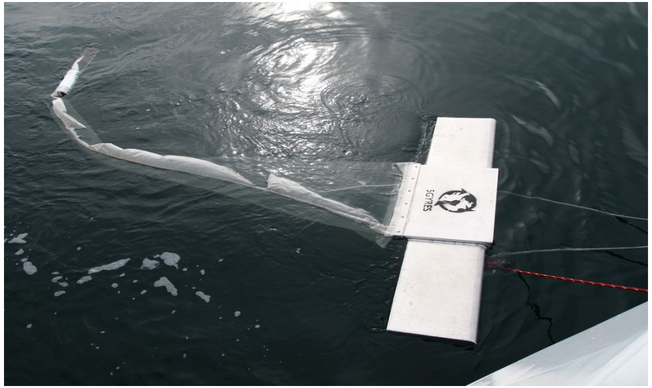
RMP Special Study Updates

Pilot Study to Evaluate Methods to Measure Small Microplastic Particles in Bay Water

Bay Water Study: Motivation

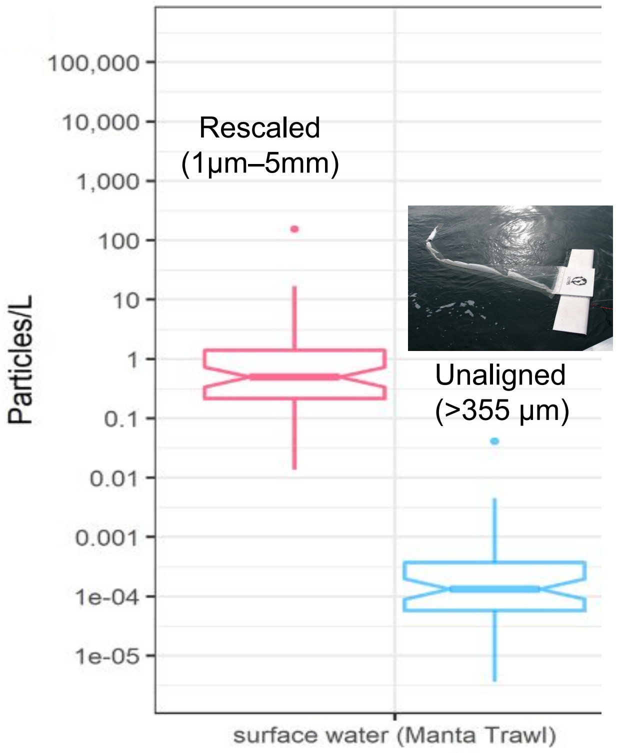
- Smaller microplastics in previous Bay water monitoring is a priority data gap to understand microplastics levels
- Smaller particles are also important for risk characterization

SAN FRANCISCO BAY MICRO PLASTICS



Manta Trawl captures particles >355 μm

Background



Coffin et al., 2022

RESEARCH Open Access

Risk characterization of microplastics in San Francisco Bay, California

Scott Coffin[1*], Stephen B. Weisberg[2], Chelsea Rochman[3], Merel Kooi[4] and Albert A. Koelmans[4]

- Coffin et al, 2022 estimated higher levels of microplastics in SF Bay with sized based re-scaling
- Introduces substantial uncertainty
- State Water Board water quality assessment indicates “beneficial uses may be potentially threatened”

Study Objectives

- Pilot sampling and analytical approaches for quantifying small microplastics (20–100 µm) in Bay water
- Inform future, more representative monitoring study that can update risk screening

Study Approach

- Leverage surface water sampling guidance developments for statewide monitoring and International Joint Commission efforts for Great Lakes
  - ISCO pump through 20 μm, 53 μm, and 125 μm sieve
- Sample Collection
  - Water at two open bay locations
  - Samples analyzed via Raman and LDIR

Leah Thornton Hampton

Raman analysis

LDIR analysis

Deliverables and Timeline

Bay Water Study

2026 May–August
Sample Collection

2026–2027
Laboratory
Analysis

2027 April
Presentation at
MPWG

2027 July–Sept.
Draft/Final
Report

Tire Rubber Marker Analysis for Tire Wear Particle Quantification

Motivation

- Improve methods to quantify tire wear particles in Bay Area samples

Approach

- Purchasing 30 tires: representative of most popular tires on the road and diversity of tires
- Analyze for 4 tire rubber markers using pyrolysis GC-MS
- Results used as reference database for current and future RMP tire studies

Elisabeth
Rødland

NIVA

Deliverables and Timeline

Tire Rubber Marker Analysis Study

2026 Summer
Tire purchase and sampling

2026 Fall
Laboratory Analysis

2027 April
Presentation at MPWG

2027 Summer
Final Report/Draft manuscript

Seeking Collaborators

- Do you have insights in tire market and composition and would like to review our study design?
- Want tire tread material for scientific study?

Email: diana@sfei.org

Updates for Today

- Item 4: Dryer Study
- Item 5: Microplastics in Sport Fish
- Item 6: MP Pilot Stage Study

Other Related Microplastics Updates

Recent Publications

ToMEx Update

The Toxicity of Microplastics Explorer (ToMEx) 2.0

Trends in Quality and Risk Assessment Applicability of Microplastic Ecotoxicity Studies

A Probabilistic Risk Framework for Microplastics Integrating Uncertainty Across Toxicological and Environmental Variability: Development and Application to Marine and Freshwater Ecosystems

Upcoming Publications

Load and Concentration Based Performance Outcomes for Emerging Organic Contaminants in Bioretention Stormwater Treatment Systems

Jennifer A. Dougherty[1], Kayli Paterson[1], Melissa Gonzalez[2,3], Edward P. Kolodziej[2,3,4], Diana Lin[1], Alicia Gilbreath[1], Elisabeth Rødland[5], Win Cowger[6], Hazel Vaquero[6], Andrea Amend[6], Rebecca Sutton[1,*]

[1]San Francisco Estuary Institute, Richmond, CA 94530, USA

[2]Center for Urban Waters, Tacoma, WA 98421, USA

[3]Interdisciplinary Arts and Sciences, University of Washington-Tacoma, Tacoma, WA 98421, USA

Accepted with revisions

*Corresponding author email: RebeccaS@sfei.org

ABSTRACT

The performance capabilities of bioretention systems for a range of stormwater constituents remain lightly characterized, particularly for emerging organic contaminants. To address this gap, we evaluated concentration- and load-based treatment outcomes at four urban bioretention systems for tire wear particles (TWPs) and 21 chemical contaminants, including 6PPD-quinone (6PPDQ), 1,3-diphenylguanidine (DPG), hexa(methoxymethyl)melamine (HMMM), benzothiazoles, benzotriazoles, pharmaceuticals and personal care products (PPCPs), and pesticides. Inlet concentrations of vehicle-derived contaminants were generally at least twice the values reported for regional stormwater, consistent with these systems draining primarily roadway and parking lot runoff. Concentration-based removal varied widely across compounds, storms, and sites and was moderately associated with predicted organic carbon-water partitioning. Median concentration-based removal efficiencies exceeded 76% for 9 of 19 contaminants, whereas the remaining compounds exhibited lower and more variable removal. Although bioretention reduced 6PPDQ concentrations by 95%, the median outlet concentration of 12 ng/L remained above the US EPA acute freshwater screening value. At one site with modeled flow data, load-based estimates provided complementary context for treatment performance by integrating measured concentrations with modeled event volumes, revealing

Microplastics Removal in Rain Gardens

Load and Concentration Based Performance Outcomes for Emerging Organic Contaminants in Bioretention Stormwater Treatment Systems

Statewide Plastics Monitoring Strategy - Goals

- Articulate and coordinate vision for a future statewide plastics monitoring program
- Implement monitoring that will inform
  - Understanding of exposure and risks from macro- and microplastics
  - Management actions
- Recommend phased approach for near-term and long-term implementation

CALIFORNIA OCEAN PROTECTION COUNCIL

Kyla Kelly
Water Quality
Program Manager

Tony Hale

Diana Lin

SFEI

Deliverables and Timeline

Statewide Plastics Strategy

Other Related Statewide Microplastics Strategy Work

- Southern Coastal Water Research Project (SCCWRP) coordinating publishing sampling guidance for water and stormwater for statewide monitoring strategy

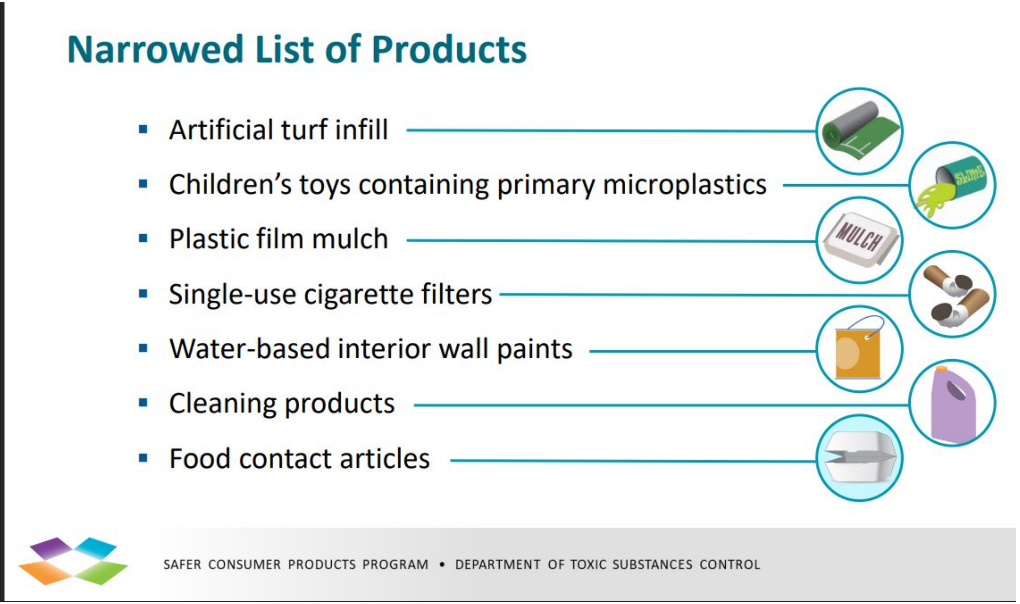
Chelsea Rochman leading
surface water studies
Draft manuscript

Andy Gray, UC Riverside
leading stormwater studies
Analysis in progress

- Bight Monitoring: 2023 sediment and shellfish monitoring
    - Anticipated reporting winter 2026

DTSC Safer Consumer Products Program

- 2025: Initiated rulemaking to add microplastics to its Candidate Chemicals List
  - Broad definition of microplastics to avoid regrettable substitutions
- Preliminary screening research on products that can release microplastics



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Item 3: Microplastics Strategy and Multi-Year Plan

Diana Lin, PhD

Priority Management Questions

1. What are levels of microplastics in the Bay? What are the risks of adverse impacts?
2. What are the sources, pathways, processes, and relative loadings leading to levels of microplastics in the Bay?
3. Are microplastics levels changing over time? What are potential drivers contributing to changes?
4. What are the anticipated effects of management actions?

MPWG Multi-year plan

Year	Special Studies
2027	Stormwater multi-year Study (2027-2029)
2028 - 2029	Water monitoring, current pilot follow-up Sediment monitoring, leverage S&T
2030	Wastewater monitoring Air monitoring Characterizing microplastic additives

Monitoring Strategy Discussion

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1. Are we missing any important topics?
2. Any updates on upcoming management decisions and priority management questions?
3. What topics are of highest priority?

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Item 4: Dryer Study

Kayli Paterson

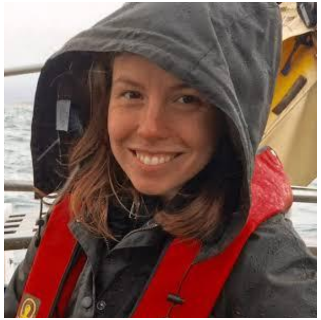
SFEI
SAN FRANCISCO ESTUARY INSTITUTE

Project Team

Diana Lin
SFEI

Kayli Paterson
SFEI

Monica Arienzo
DRI



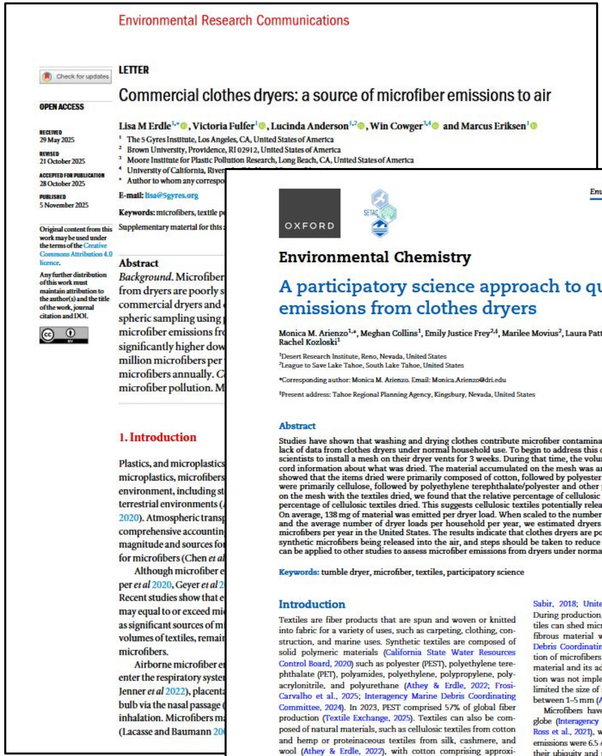
Lisa Erdle
5 GYRES

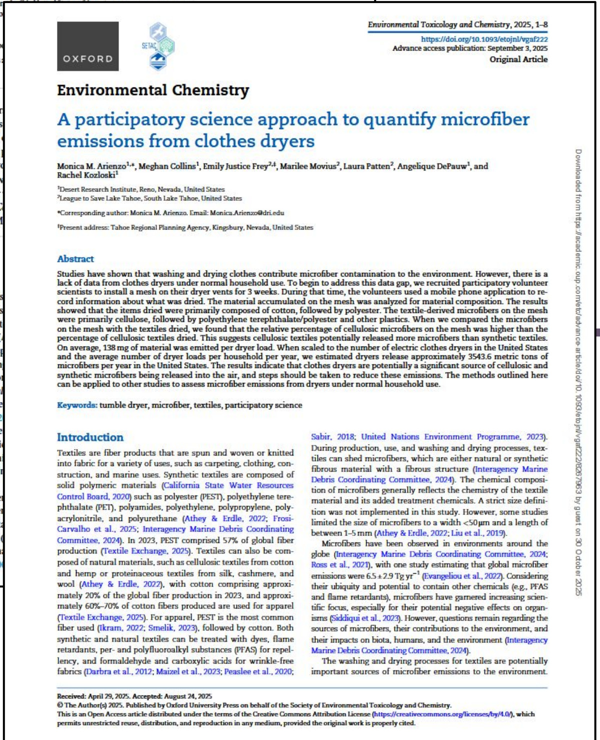
OCEAN PROTECTION COUNCIL

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NOAA
U.S. DEPARTMENT OF COMMERCE

Sea Grant

Publications





Commercial clothes dryers: a source of microfiber emissions to air

Environmental Research and Communications (2025)

Lisa M. Erdle, Victoria Fulfer, Lucinda Anderson, Win Cowger and Marcus Eriksen

A participatory science approach to quantify microfiber emissions from clothes dryers

Environmental Chemistry (2025)

Monica M. Arienzo, Meghan Collins, Emily Justice Frey, Marilee Movius, Laura Patten, Angelique DePauw, and Rachel Kozloski

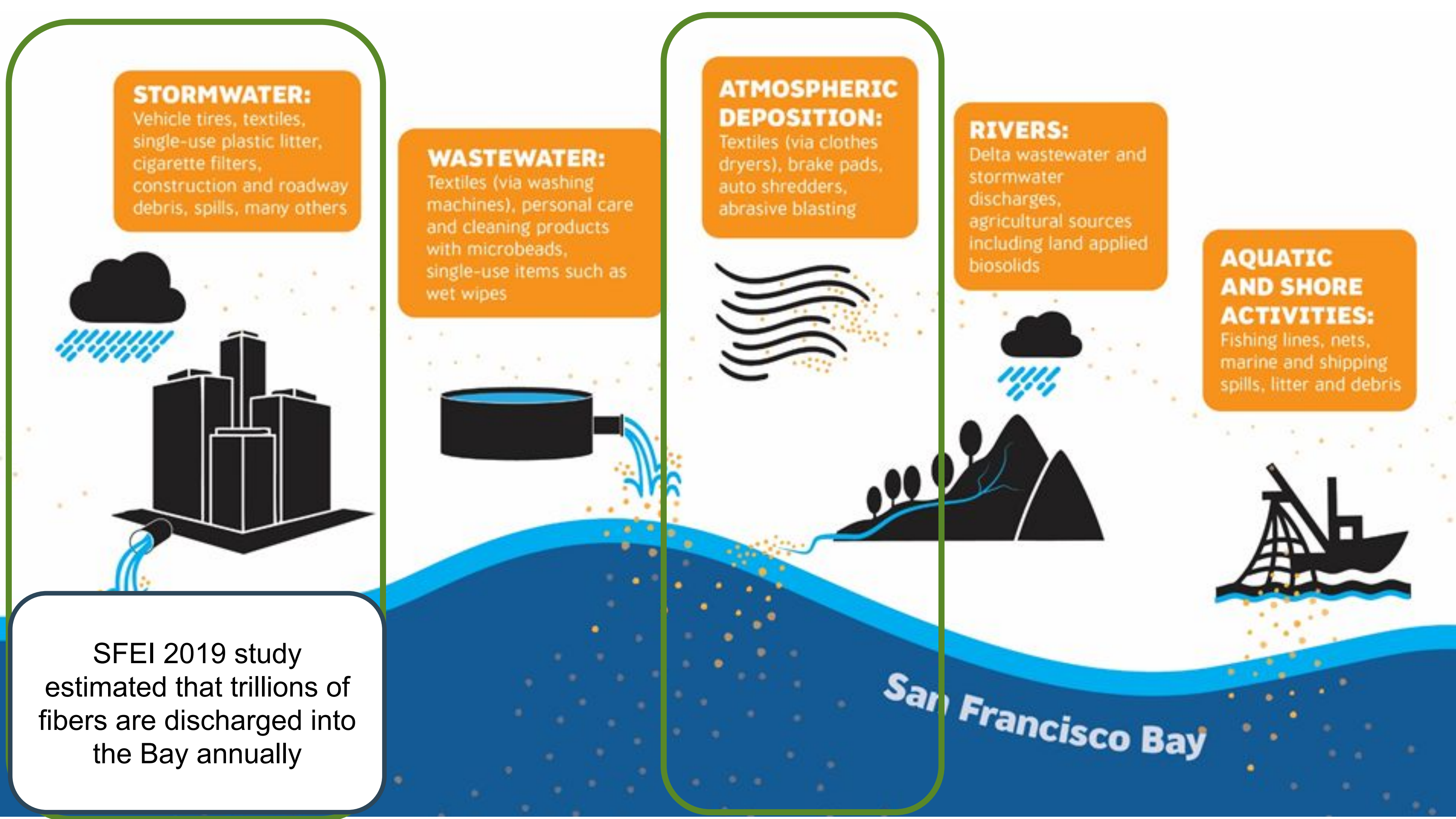
Dryers as a Source of Microplastics

- Emission directly outside - possibly to atmosphere
- Atmospheric fibers can travel long distances
  - Sources from outside the Bay Area
  - Source to other areas
- Growing human health concern from microplastic fiber exposure

Photo by Lorien Fono

Study Goals

- Are clothing dryers a significant source of microplastic pollution?
- Are commercially available secondary dryers filters effective? - 5Gyers Institute



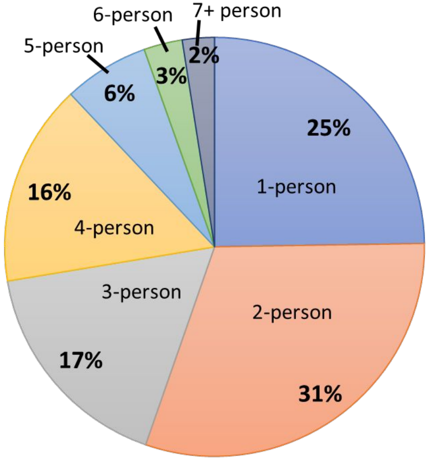
SFEI 2019 study estimated that trillions of fibers are discharged into the Bay annually

Study Demographics

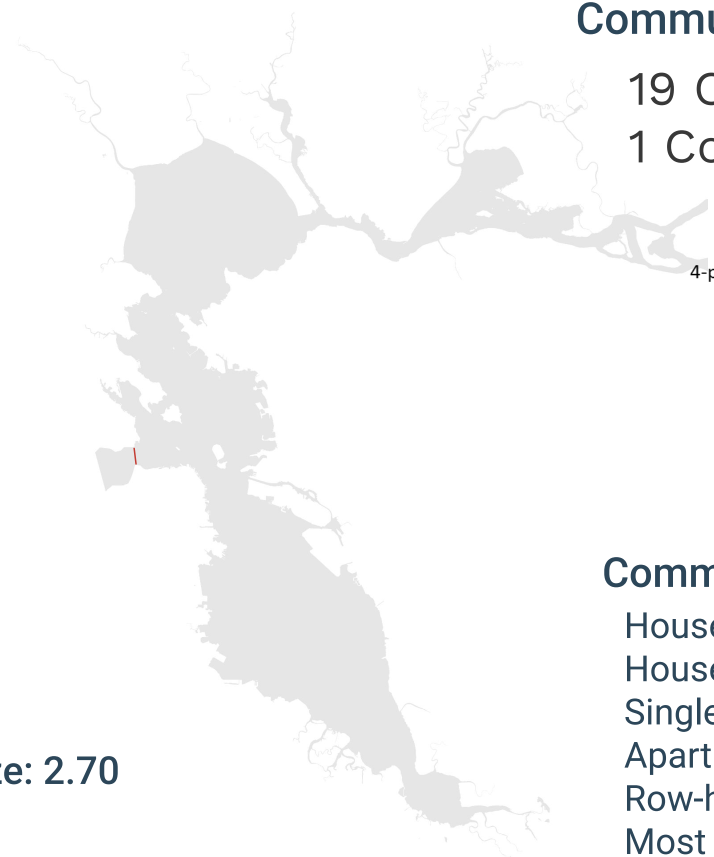
Total Bay Area Population

6.9 million people
(2020 U.S. Census)

Bay Area Household Sizes

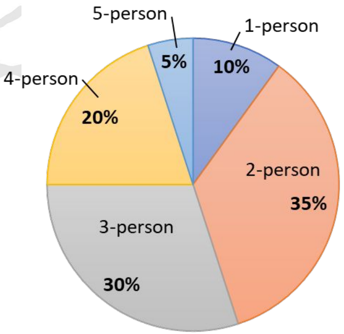


Average Bay Area Household Size: 2.70



Community Scientist Household Size

19 Community Scientist
1 Community Laundromat



Average Household Size: 2.75

Community Scientist Demographics

Households with Children: 7
Households with Pets: 8
Single family homes: 16
Apartments: 3
Row-house: 1
Most Bay Area counties represented

Sample Collection

Individual Households

- 19 volunteer households
- September 2024 - May 2025
- 3 laundry load collections per household

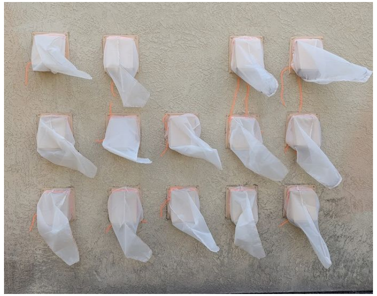
Community Laundromat

- April 2025 - single 12 hr collection
- California State University East Bay dormitory on campus

Photo by Kayli Paterson

Methods

Sample Collection



100µm Nylon Mesh

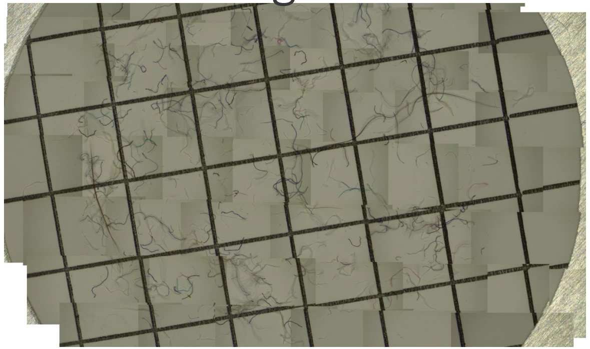
Sample Mass

Micro-Scale

Dilution/agitation/subsampling

1-2L DI dilution, 1% Micro90, 2x 50mL aliquots

Filtering



47mm, 0.45µm pore size

FTIR Analysis

Match Value >0.7

Dryer Use Surveys

- **2019 Canadian Natural Resources Survey of Household Energy Use**[1]
  - 67% of the 2.5 million respondents had an in-home dryer unit
- **2020 U.S. Energy Information Administration (EIA) Residential Energy Consumption Survey**[2]
  - 83% of the 123 million residential households surveyed had in-home dryers
- **SFEI outresearch survey**
  - 84% of 436 respondents had in-home dryers, of those 6% had ventless dryers
- **Community Scientist Participants**
  - 19 households

[1] *Natural Resources Canada (2019). Table 10.6a - Clothes dryer by household size.*
https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/showTable.cfm?type=SH&sector=AAA&juris=CA&year=2019&rn=76&page=1
[2] *U.S. Energy Information Administration (2020). Residential Energy Consumption Survey (RECS).*
https://www.eia.gov/consumption/residential/data/2020/

Project Outreach and Engagement

SFEI published articles, Public Surveys, SFEI Newsletter, Social Media, Radio and newspaper interviews

SFEI San Francisco Estuary Institute

WHAT WE DO PROJECTS & RESOURCES ABOUT DONATE

Are clothing dryers a major source of microplastics pollution in the San Francisco Bay? Study participants needed!

February 5, 2025

SFEI is studying dryer emissions to find out if clothing dryers are a significant source of microplastic pollution in the San Francisco Bay. The study will measure the dryer emissions from single-family homes, laundromats, apartment buildings, and other shared laundry facilities. The study will also evaluate the efficacy of commercially available secondary dryer filters (screens installed on a dryer's exhaust duct) in capturing microplastic fibers before they enter the environment. The dryer study will contribute to the Statewide Microplastics Strategy led by the California Ocean Protection Council (OPC) to investigate the sources and pathways of microplastics and develop action plans for combatting microplastic pollution.

In California's most comprehensive microplastics pollution study, SFEI found that almost half of the microplastics in urban stormwater runoff are fibers. Microplastic fibers are tiny thread-like pieces of plastic less than 5mm long (smaller than a grain of rice) that are shed from clothing, towels, and other everyday household products made from synthetic fabrics. During the drying process, fibers that aren't captured by the lint trap are vented outdoors, settle on nearby surfaces, and wash into stormwater collection systems or are carried directly to waterways by the wind. While air drying is common in most parts of the world, clothing dryers with outdoor ventilation are the standard in the United States. In the Western United States,

November 2025 Sea Grant Webinar

SETAC North America 46th Annual Meeting

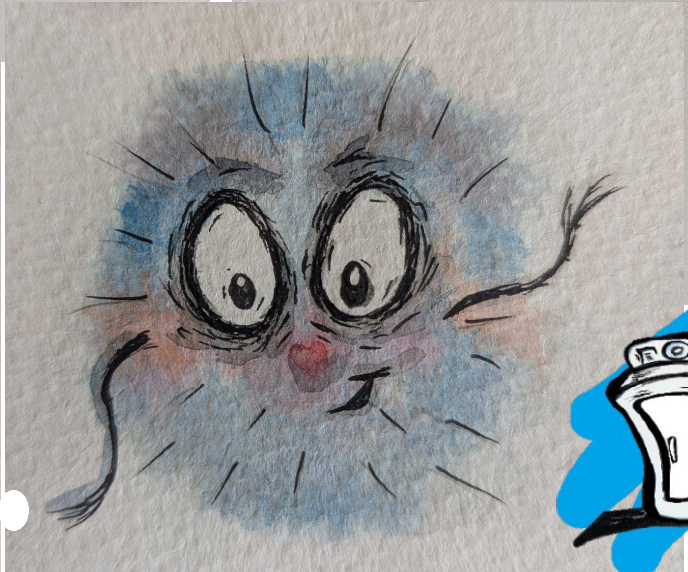
Deliverables

- Draft Manuscript: July 2026
- Final Manuscript: September 2026

Discussion

- Do you have any concerns about how we are extrapolating the data to a larger population?
- Are there any shortfalls in the study we should look to address?

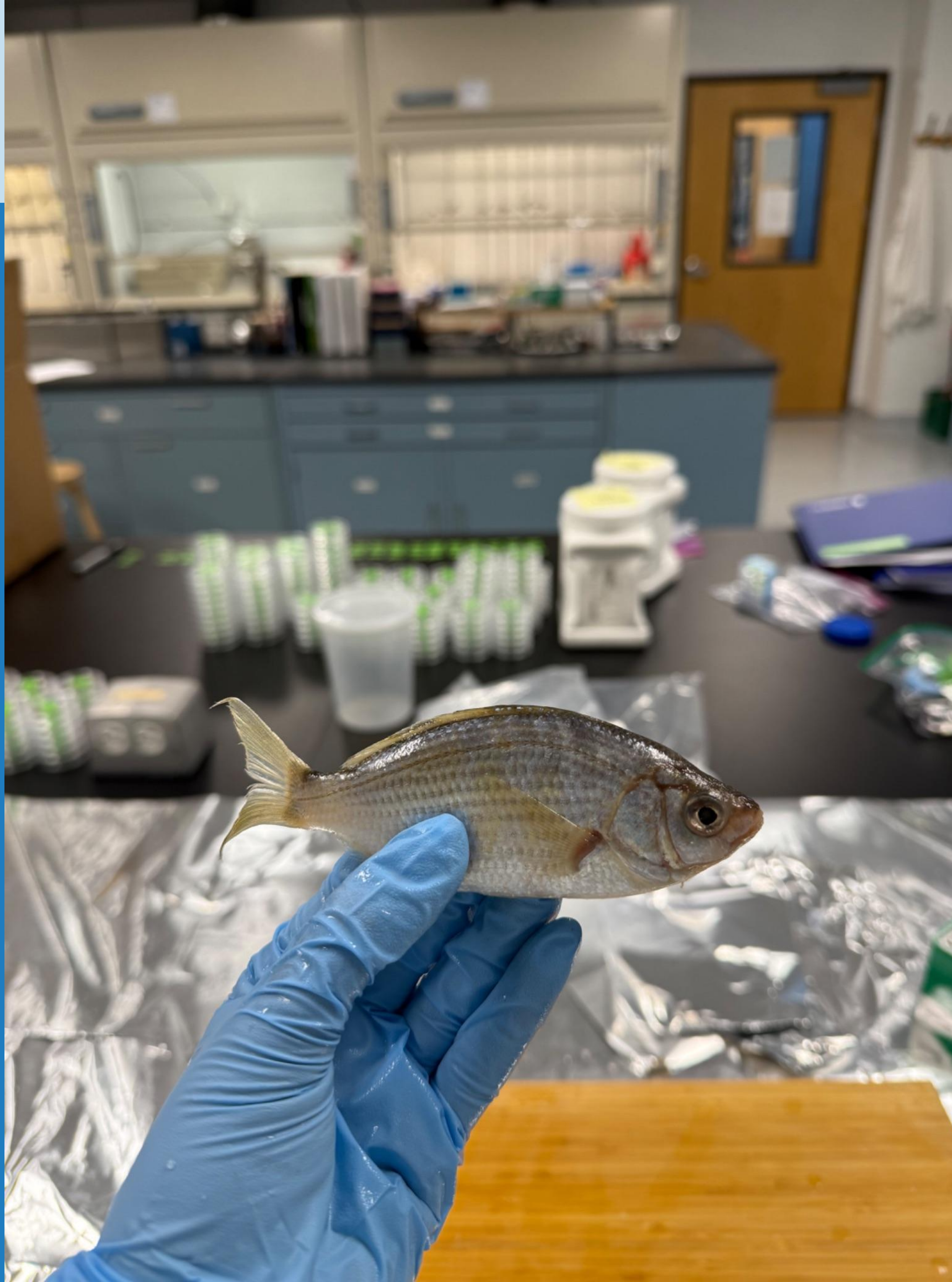
Questions?



Madeleine Milne & Chelsea Rochman
University of Toronto, Department of Ecology and Evolutionary Biology

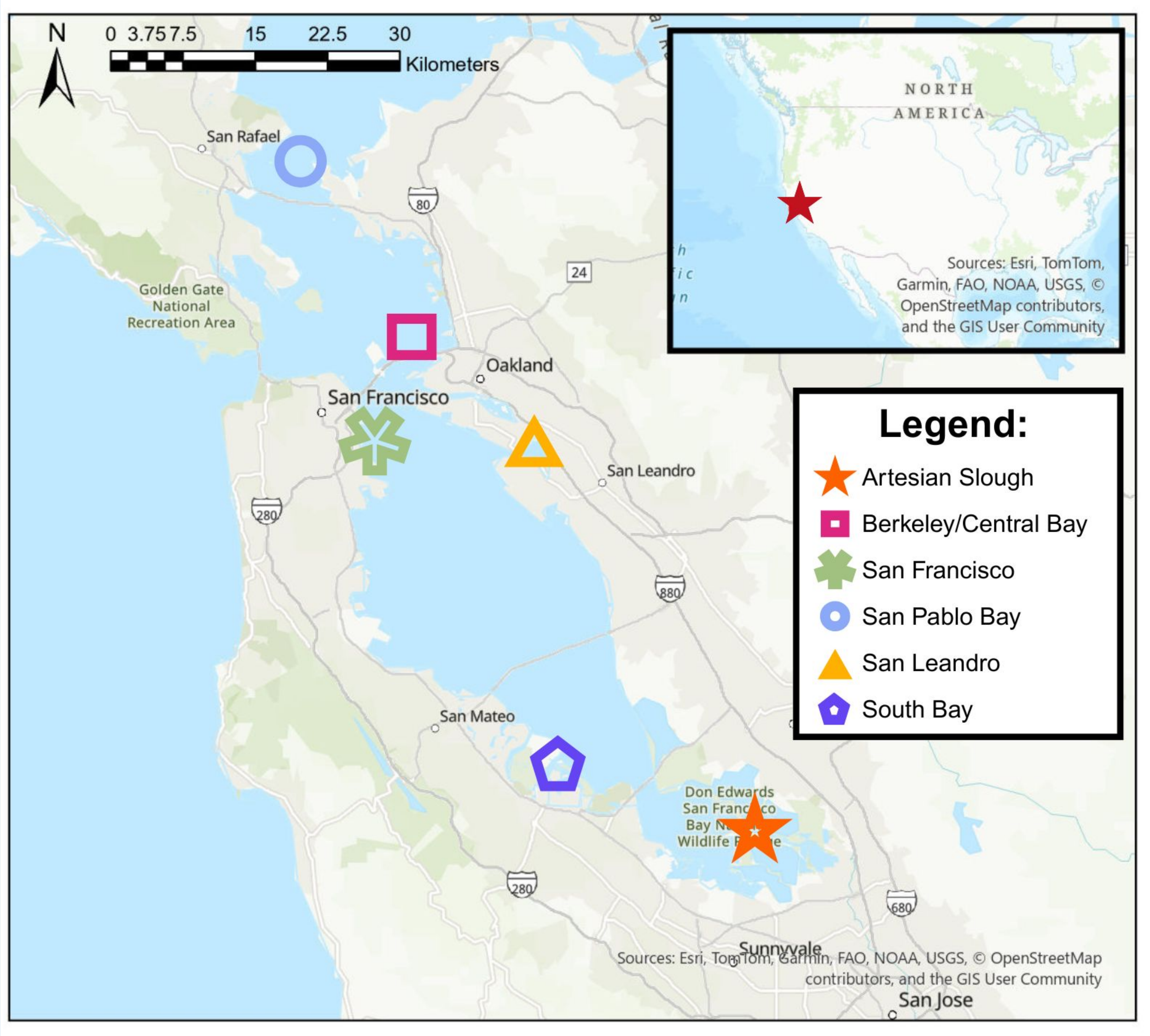
Microplastics Workgroup Meeting

Microplastics are prevalent in striped bass and shiner surfperch tissues across San Francisco Bay, California



Study Design

- 25 striped bass
  - 3 tissues analyzed individually: gut, muscle, and liver.
- 36 shiner surfperch
  - 3 tissues pooled: gut, muscle, and liver.
- Fish were collected from six sites in the Bay.



Methods

- Potassium hydroxide
  - Breaks down fish tissues leaving behind microplastics.
- Detergent soak
  - Removes any residual fatty materials.
- Microscopy
  - Identify suspected MPs.
- Raman spectroscopy
  - Chemically confirm the polymer/material.

QA/QC

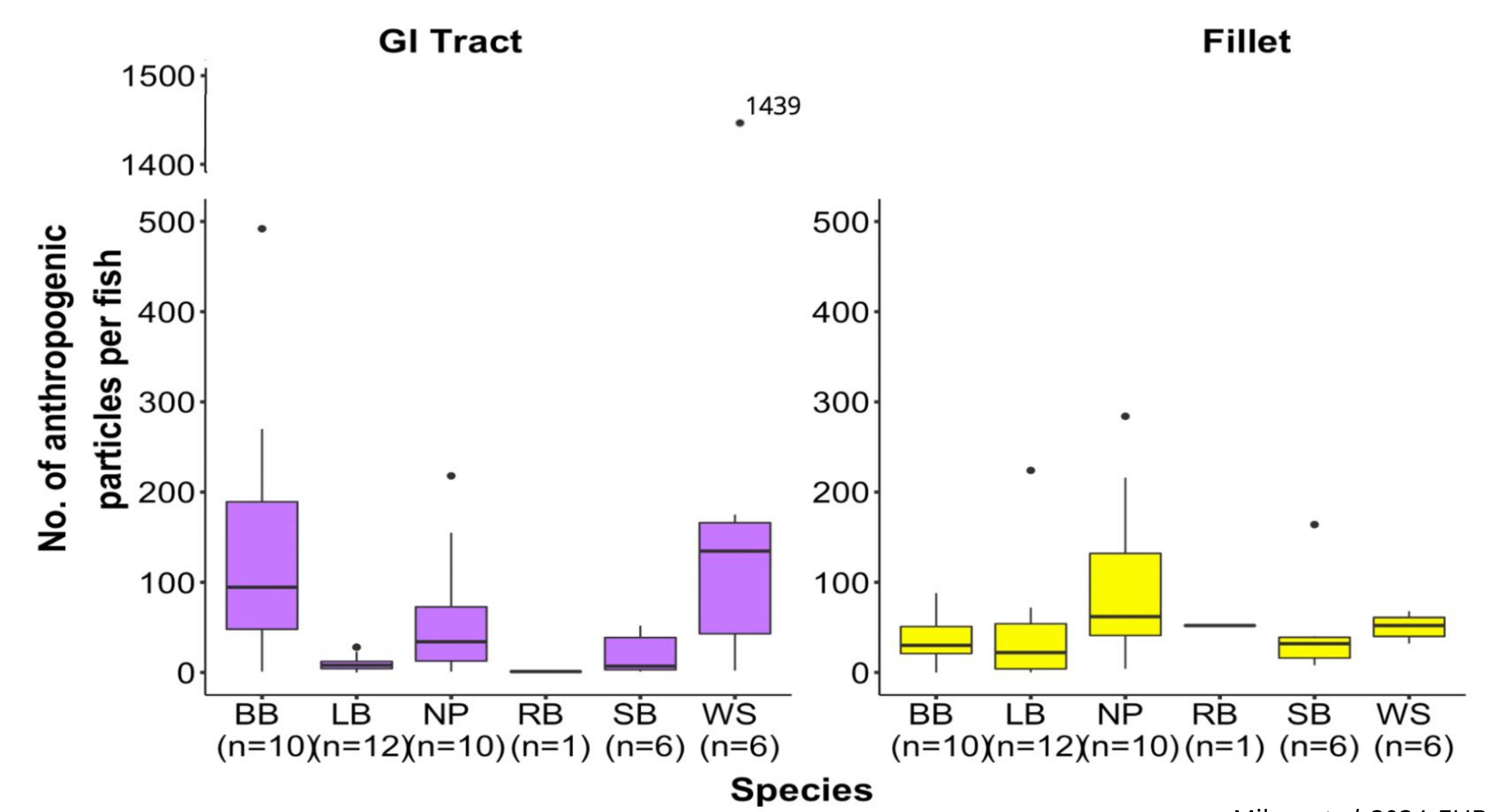
- Blank-correction
  - Account for contamination associated with laboratory processing.
- Spectroscopy correction
  - Excludes proportion of particles that were natural/unknown.
- Spike and recovery
  - Measure of particle loss from the processing steps.

Environmental Exposure

- Limited alignment with previous measures of MPs in the water, sediments, and fish in the Bay.
- Highest surface water concentrations of microplastics were reported in Central Bay by Zhu *et al.* (2021), and this is where we observed both our most and least contaminated shiner surfperch.
- For shiner surfperch, our lowest contamination sites are where the contamination in topsmelt and northern anchovy in Zhu *et al.* (2021) were highest.

Parallel Work

- Similar monitoring of fish in the Great Lakes.



Milne *et al.* 2024 *EHP*

Largemouth Bass

Smallmouth Bass

Northern Pike

Brown Bullhead

White Sucker

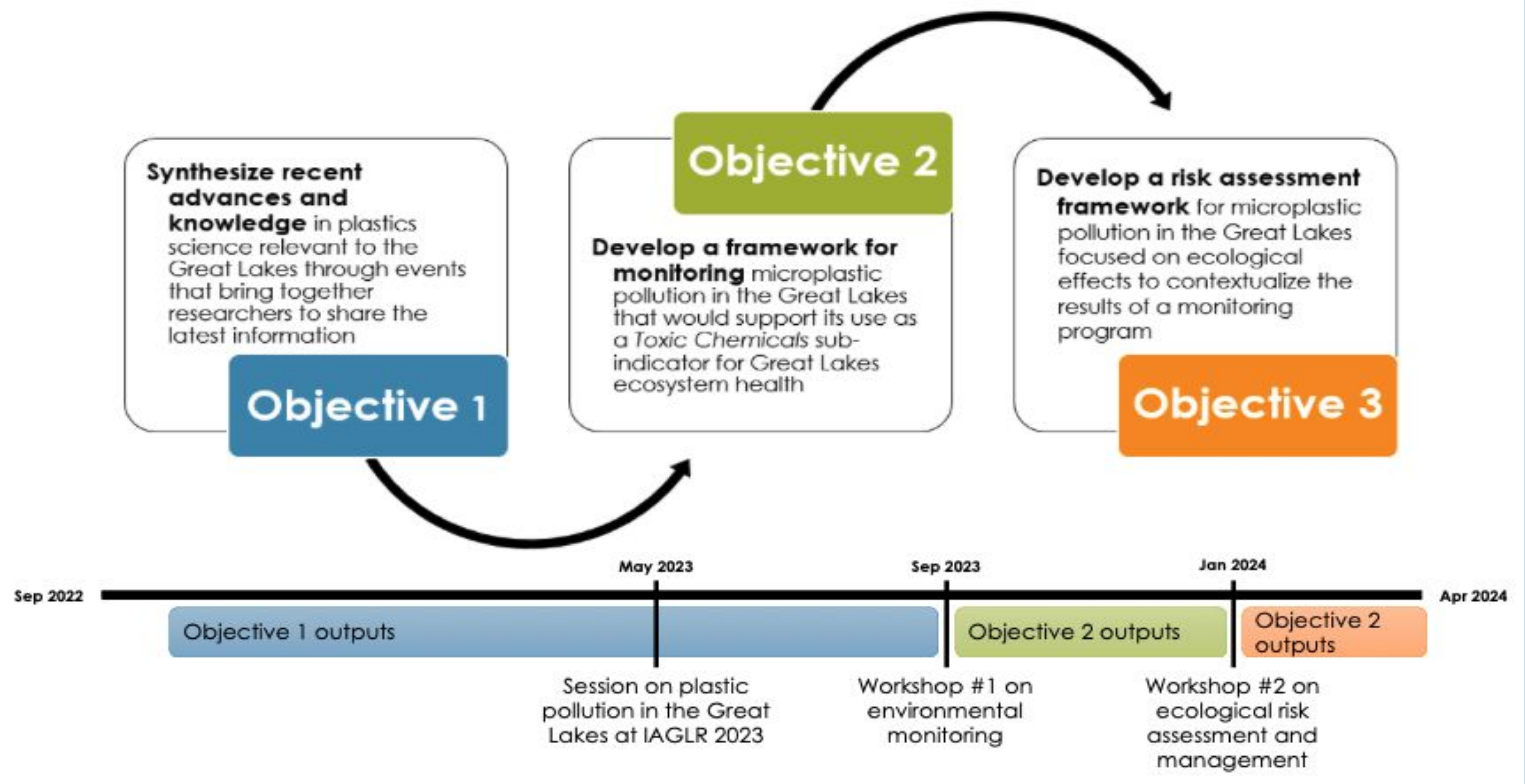
Rock Bass

MPs as a Chemical of Mutual Concern

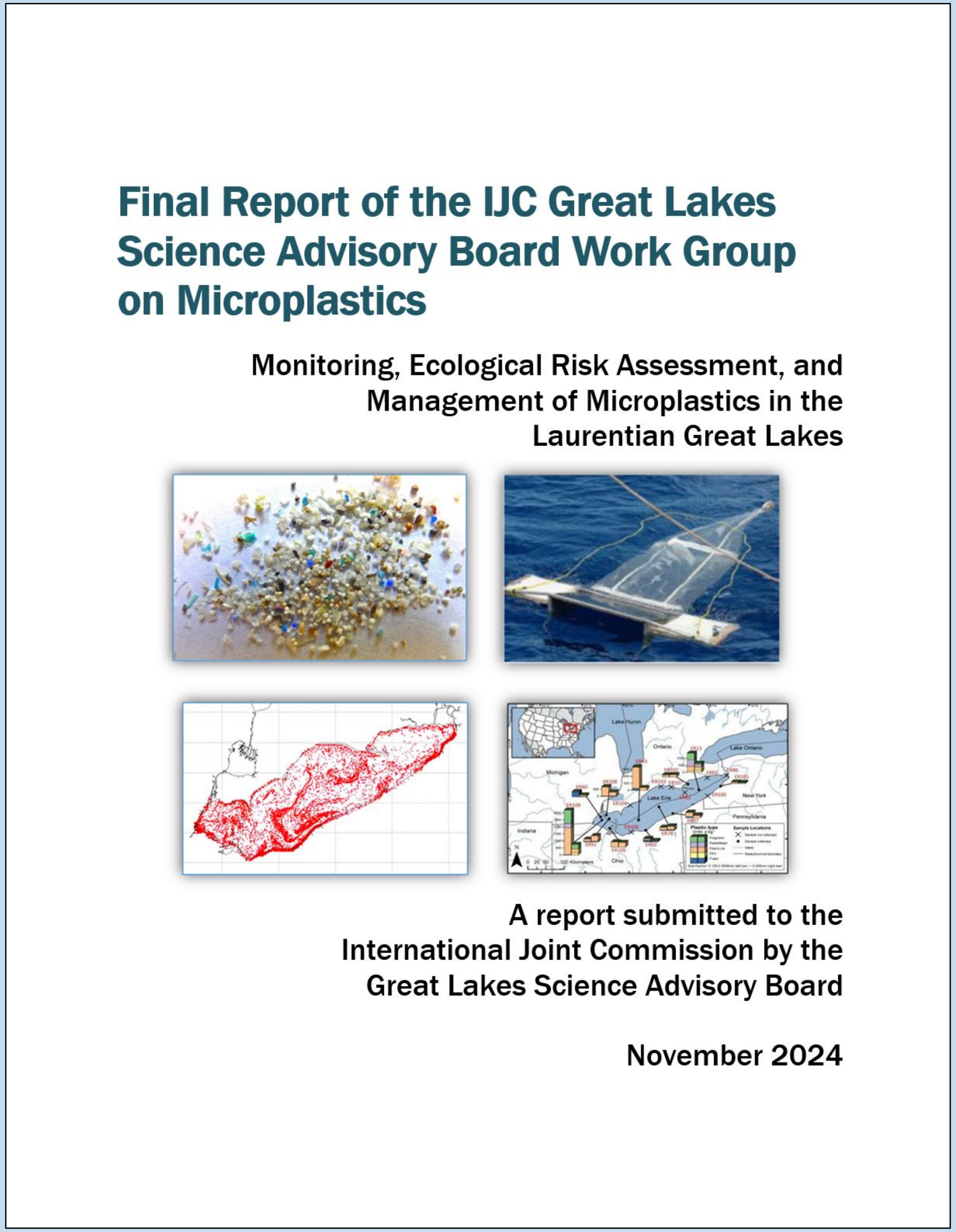
- ECCC report and an IJC work group with same goals as California, and to inform how microplastics fit under the Great Lakes Water Quality Agreement.

Based On California Work

- Products developed based on the methods and findings from California.



Our Products


Final Report of the IJC Great Lakes Science Advisory Board Work Group on Microplastics

Monitoring, Ecological Risk Assessment, and Management of Microplastics in the Laurentian Great Lakes

A report submitted to the International Joint Commission by the Great Lakes Science Advisory Board

November 2024

Report and tools available at:

bit.ly/SAB-Plastics

IJC Recommendations

- **Develop a regionally coordinated monitoring program**
- **Support continued research to refine monitoring and analytical capabilities, and ecological risk assessments**
- **Under the GLWQA, adopt microplastics as a Toxic Chemicals sub-indicator and as a Chemical of Mutual Concern**
- **Prevent the emissions of plastic and reduce plastic pollution in the Great Lakes**

Thank-you!

- Diana Lin
- Jay Davis
- Ezra Miller
- Martin Trinh

And for the support from:

- The Southern California Coastal Water Research Project.
- The Moss Landing Marine Laboratories.
- Brenda Li from the Rochman Lab.

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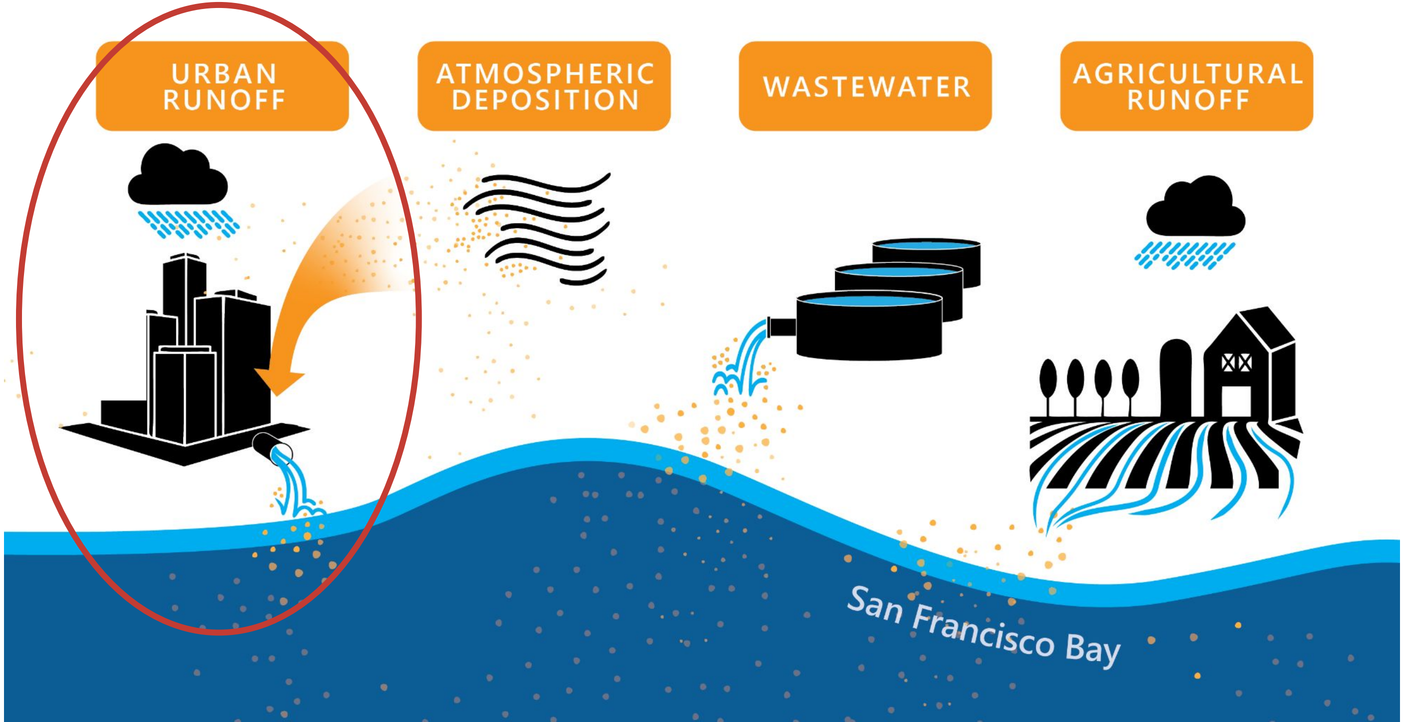
Item 6: Microplastics Stormwater Pilot Study Update

Diana Lin and Kayli Paterson

Motivation

- Stormwater monitoring is a priority for RMP and statewide microplastics monitoring strategies

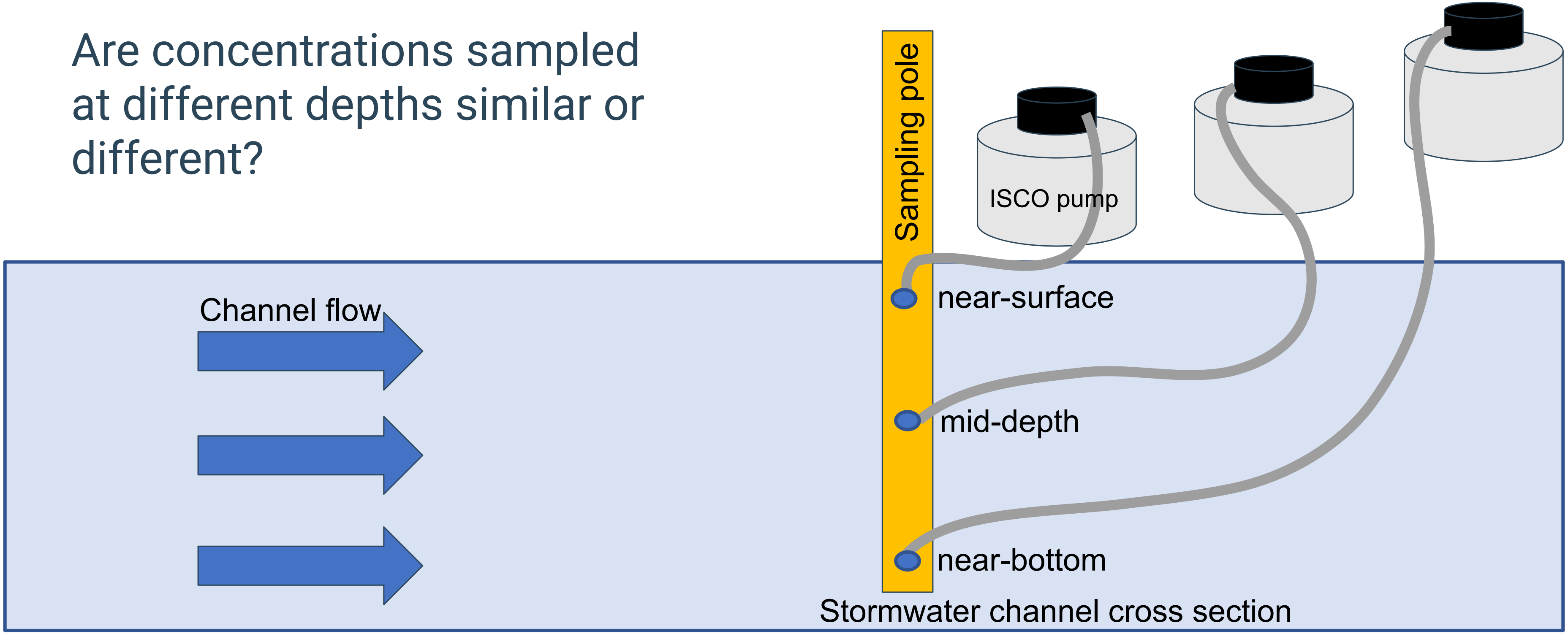


Motivation

- Leverage RMP stormwater monitoring efforts
- Study Questions:
  - Can we sample at a single depth during storm flows (versus depth integrated sampling)?
  - Are stormwater channels well-mixed during storm flows?

Study Design

Are concentrations sampled at different depths similar or different?



Sampling Sites

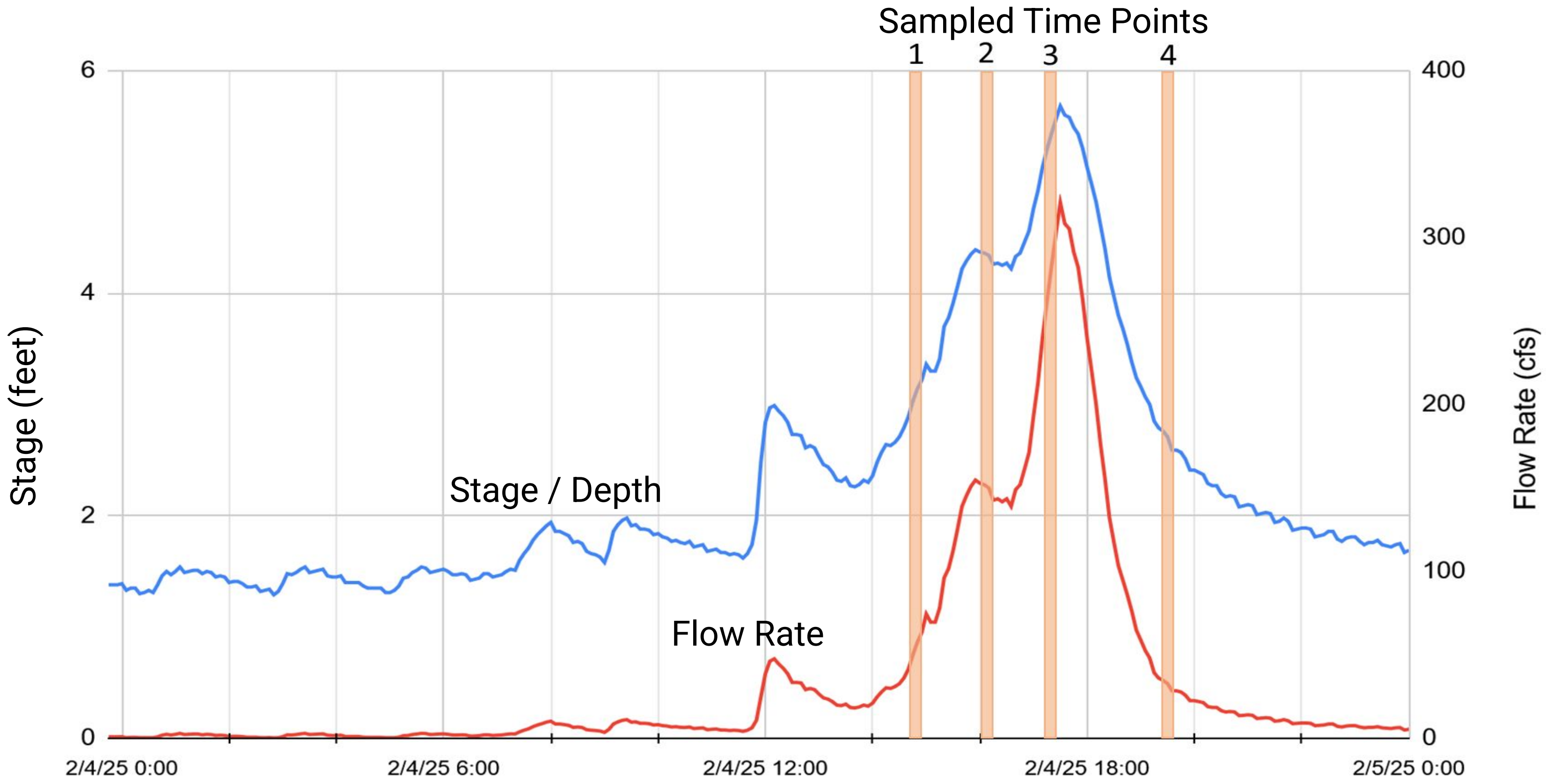
Sunnyvale East Channel
- Watershed area: 14.8 km^2
- Residential (50%), transport-related (27%), commercial (13%)


Photo by Alicia Gilbreath

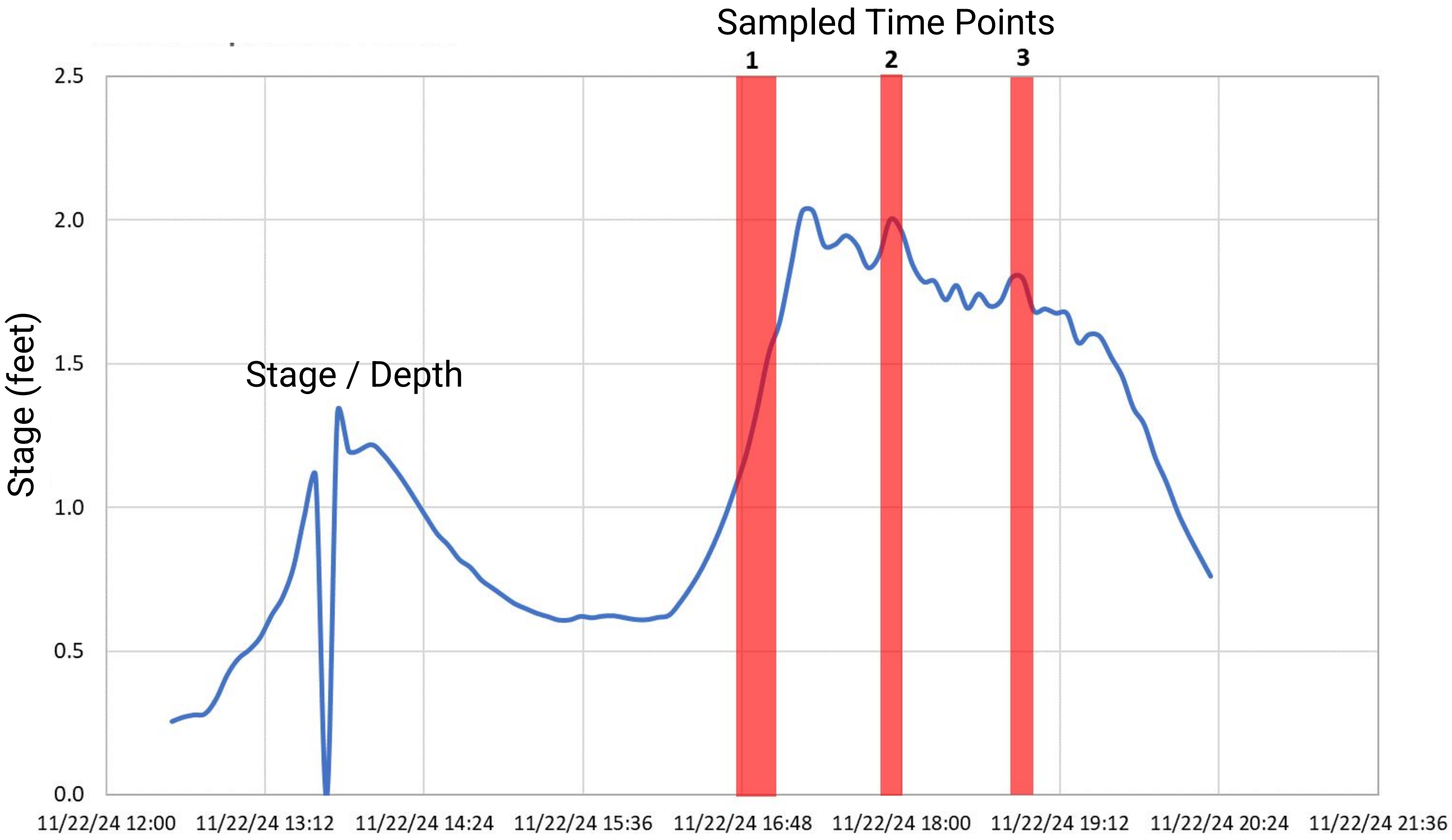
Zone 4 Line A, Hayward
- Watershed area: 4.2 km^2
- Residential (38%), industrial (23%), transport-related (18%), commercial (18%)


Photo by Kayli Paterson

Hydrograph at Sunnyvale East Channel



Hydrograph at Hayward



Sampling Design

Martin Trinh

SFEI

Turbidity & suspended solids conc. (SSC)

Win Cowger

MOORE INSTITUTE for Plastic Pollution Research

Microplastics via FTIR

Barbara Beckingham

COLLEGE OF CHARLESTON

Stephanie Whitmire

CLEMSON

Tire wear particle (TWP) counts via LDIR

Elisabeth Rødland

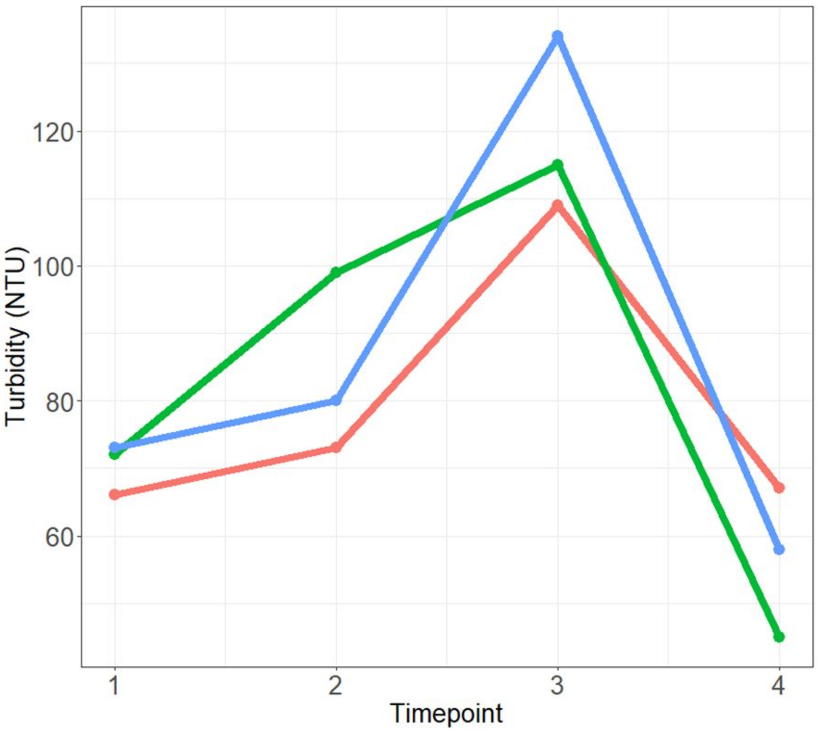
NIVA

TWP Mass via pyr-GC/MS

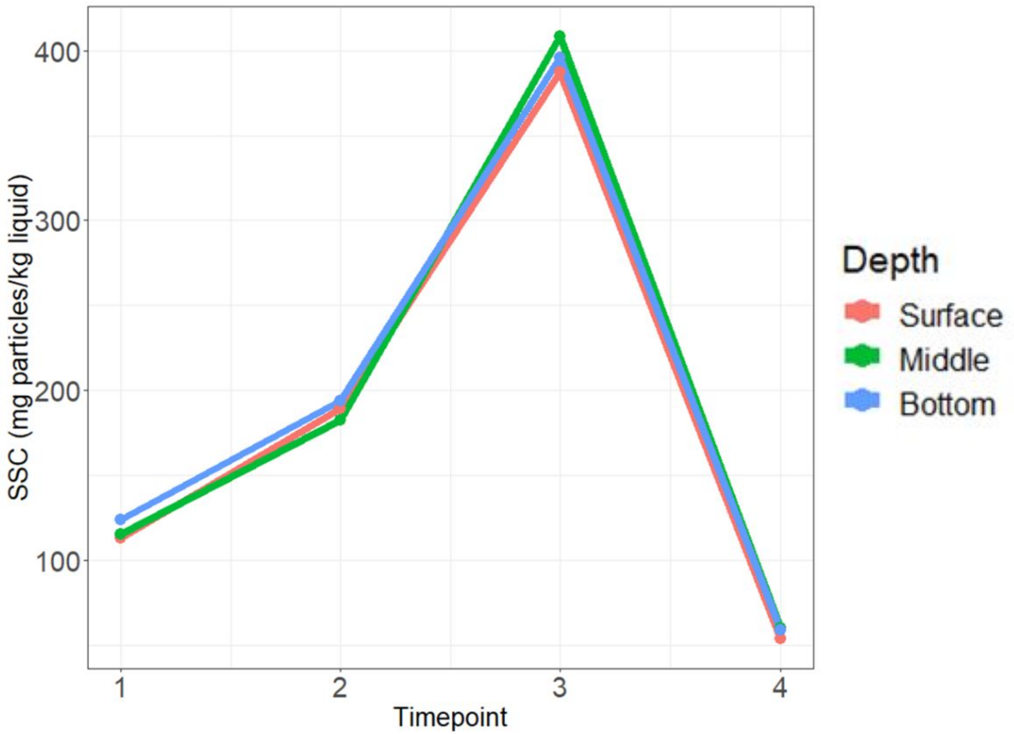
Suspended Solids Concentration (SSC) and Turbidity

Measurements support well-mixed profile

Sunnyvale: Turbidity

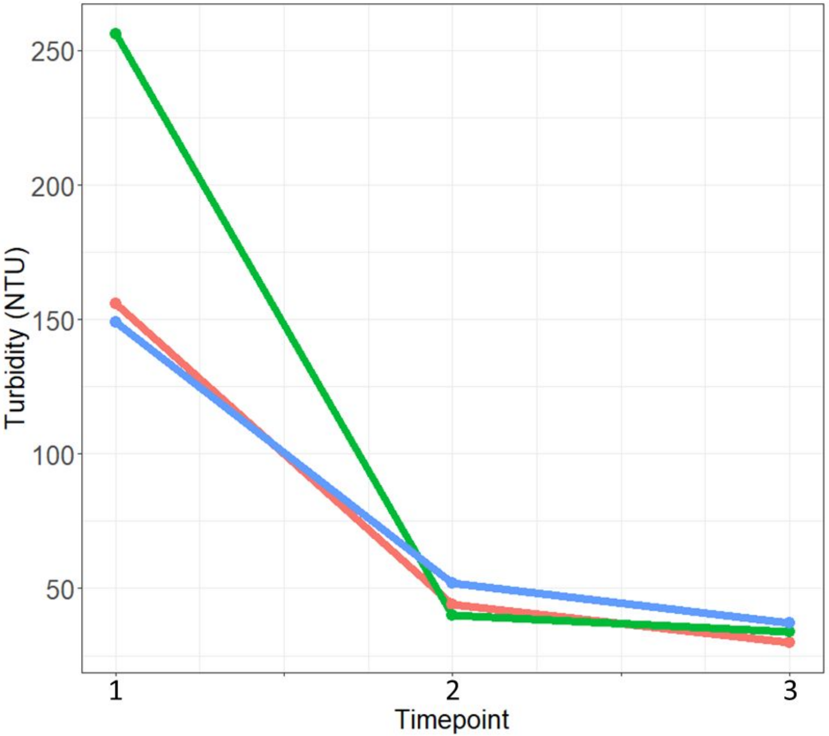


SSC

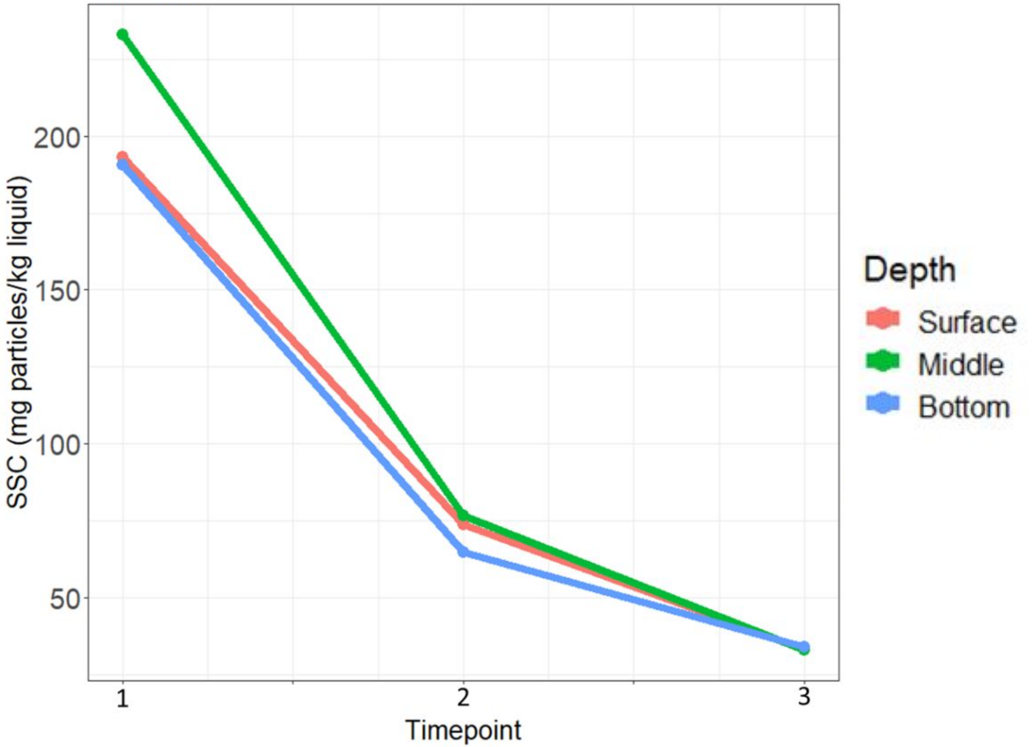


Measurements support well-mixed profile

Hayward: Turbidity



SSC



Microplastics (MP)

Win
Cowger

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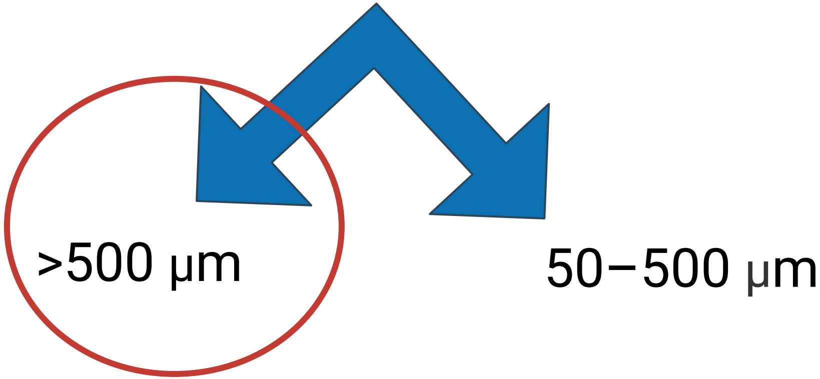
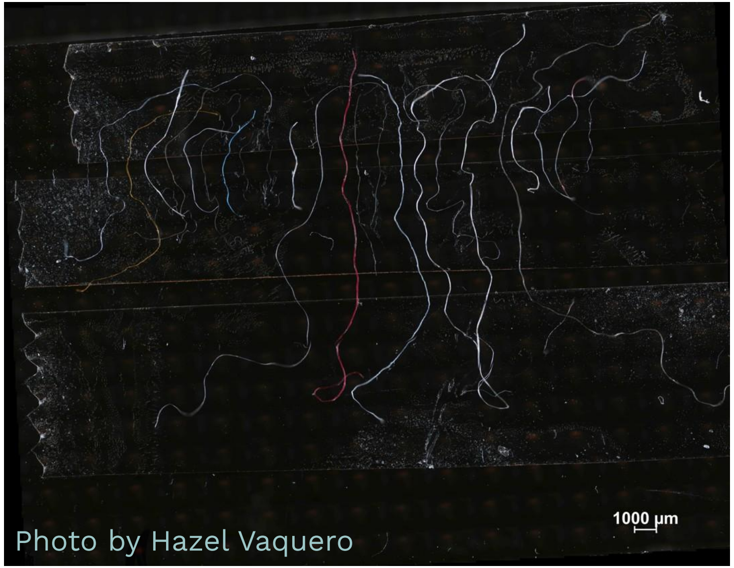
Microplastic Analysis

- Field: 10-L sieved sample
  - Particles on the 125µm and 53µm collected
  - Combined for analysis
- Lab:
  - Samples sieved at 500µm and 20µm before processing and separated into two processing streams

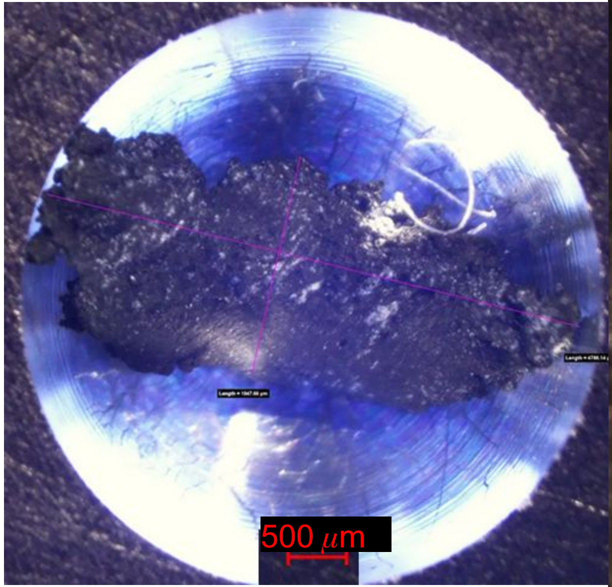


Microplastic Analysis (>500 μm)

- Manual microscopy particle counts and images for all particles
- FTIR identification for all particles (match quality >0.6)
- Tire rubber identified
- Fibers quantified
- Reported concentrations = 0−2 MP/L
  - 0–21 microplastics per sample

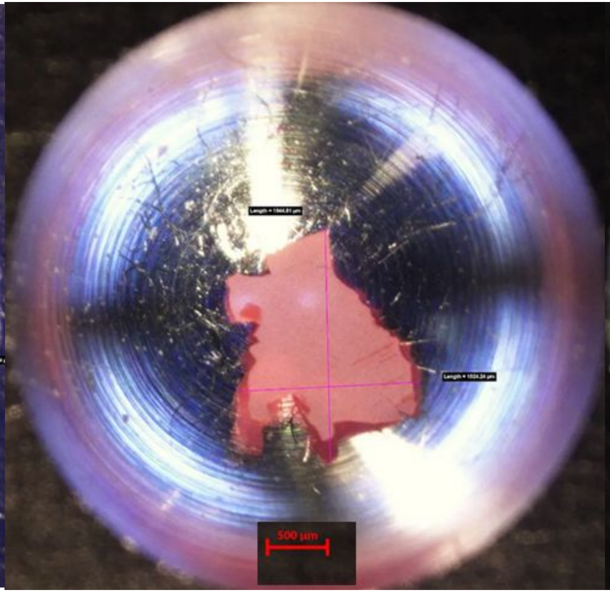


Microscopy provides clues to potential sources



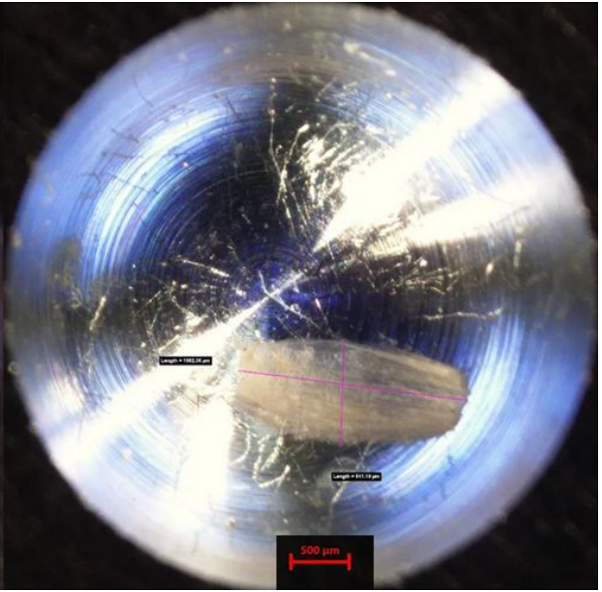
Black rubbery fragment

Tire wear particle??



Large red foam-like fragment

Paint or insulation??



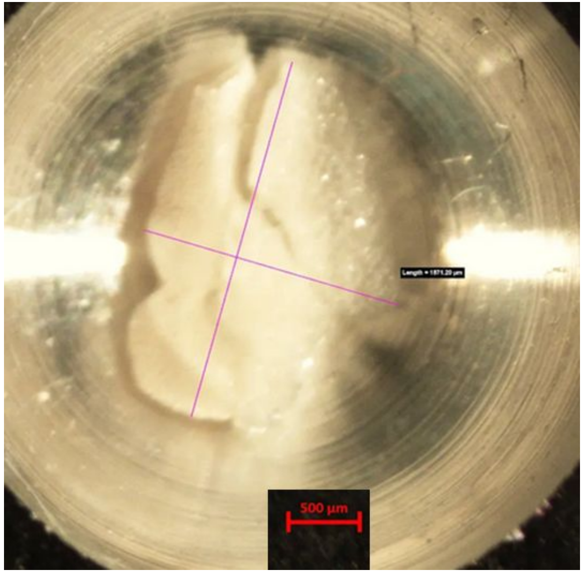
White fiber bundle

Cigarette butt filter??

Microscopy provides clues to potential sources

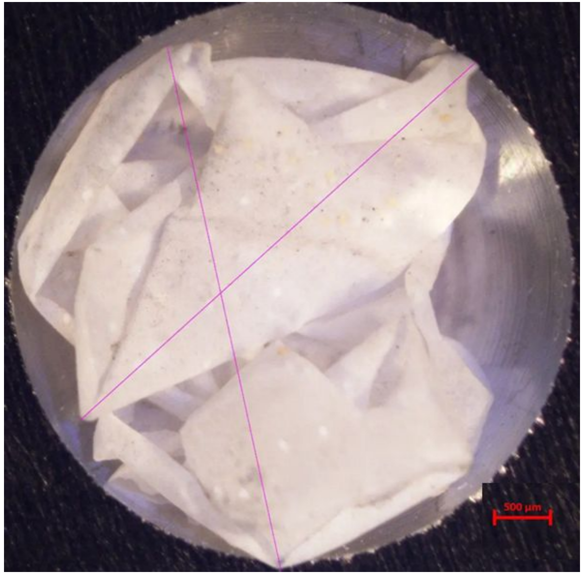
Large sphere-like fragment

???



White and clear airy fragment

Packing peanut??

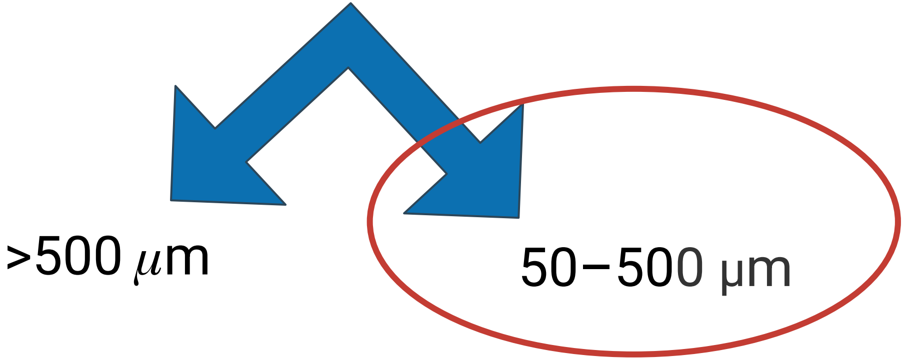


Large white flexible fragment

Plastic bag??

Microplastic Analysis

- Field: 10-L sieved sample
  - Particles on the 125µm and 53µm collected.
  - Combined for analysis
- Lab:
  - Samples sieved at 500µm and 20µm before processing and separated into two processing streams

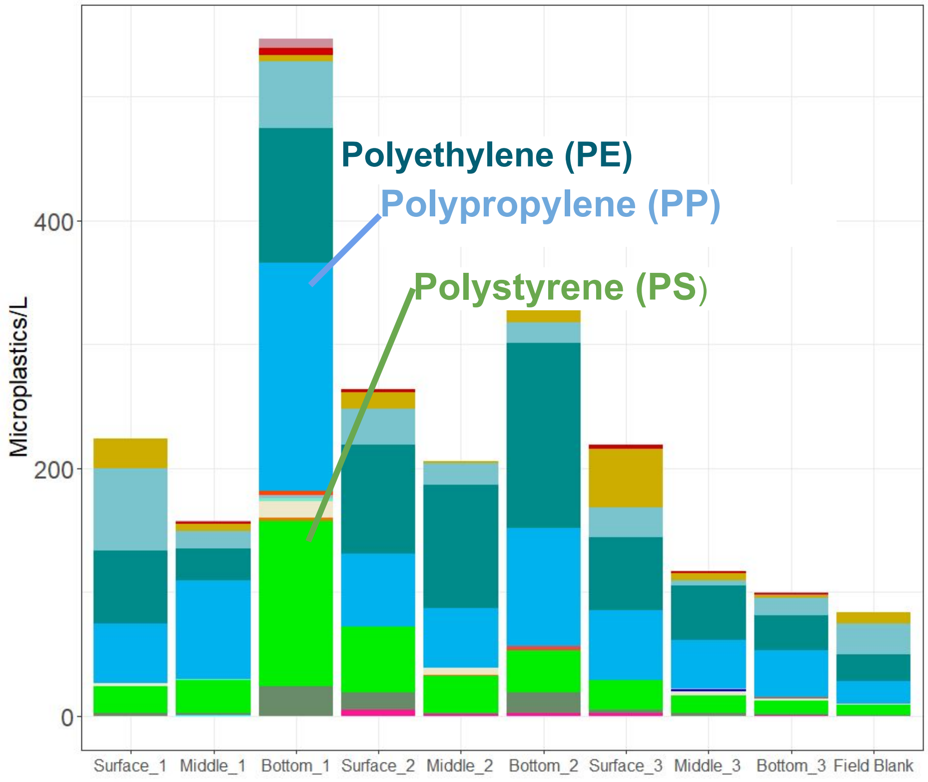


Microplastic Analysis (<500 μm)

- 3 aliquots of ~0.6–15mL
- Analyzed via automated software with FTIR analysis (match quality >0.6)
- Tire rubber not quantified due to low spectra match
- Fibers not counted due to challenges with software particle identification
- Reported concentration 90–500 microplastics/L
    - 10X previous results

Measurements support similarity at different depths

Hayward



- Concentrations with an order of magnitude (90–500 MP/L)
- Microplastics composed primarily of 3 polymers:
  - Polypropylene = 30%
  - Polyethylene = 28%
  - Polystyrenes = 22%

Microplastic Analysis

- Results deemed qualitative
  - Significant under-count of fibers and tire particles
  - Low recovery of small particles
  - Significant potential field blank contamination
- AND gathered important information
  - Source identification
  - High levels of microplastics in this pathway

Tire Wear Particle (TWP) Counts

Barbara Beckingham

COLLEGE OF CHARLESTON

Stephanie Whitmire

CLEMSON

Tire Wear Particle (TWP) Count Analysis

- Field: 1-L bulk sample
- Lab:
  - Particles sieved 20 μm
  - Particles identified and counted with LDIR software
    - Match quality >0.7

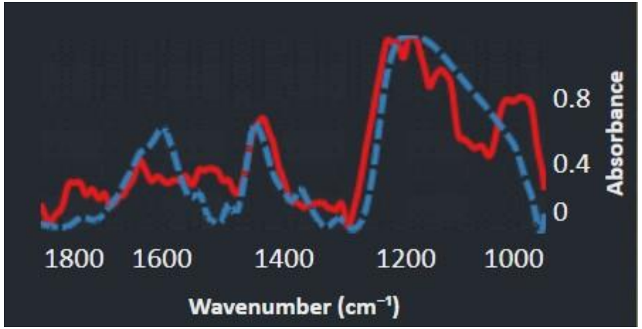

Photo by Kelly Moran

Variations in Rubber Match Quality

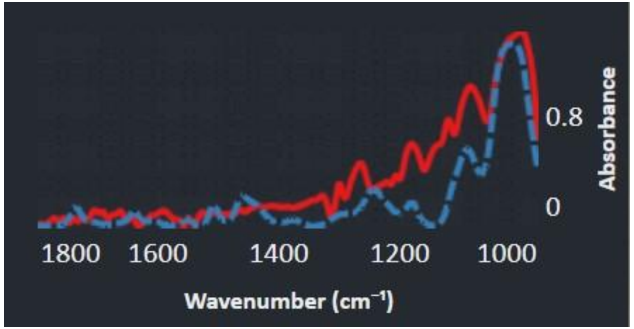
- >0.7 Match Critera: Average concentration = 500,000 TWP/L
- If >0.8 Match Critiera: Results drop by order of magnitude (50,000 TWP/L)
- Reference tire material give a different spectra matches and match quality scores

Reference tire material from tire industry (particle spectra v. library rubber spectra)

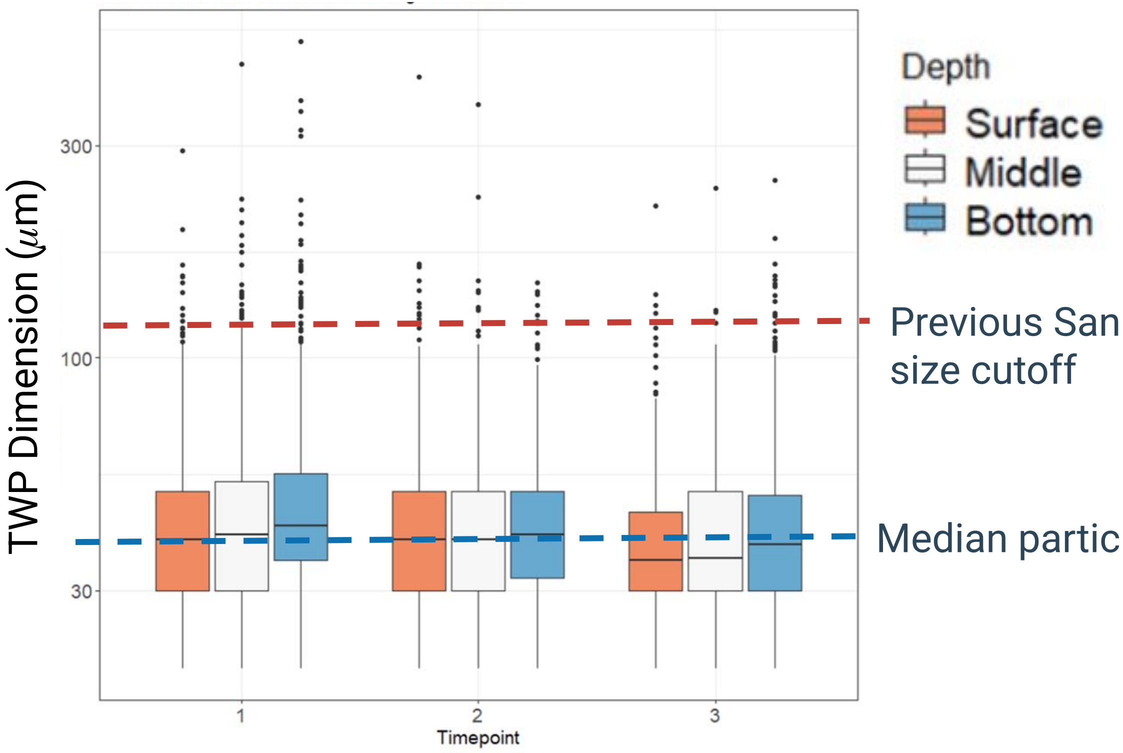
Spectra match quality = 0.774



Spectra match quality = 0.693



Particle Size Distribution



Previous San Francisco Bay study size cutoff

Median particle size 40 μm

Tire Wear Particle (TWP) Mass

Elisabeth Rødland

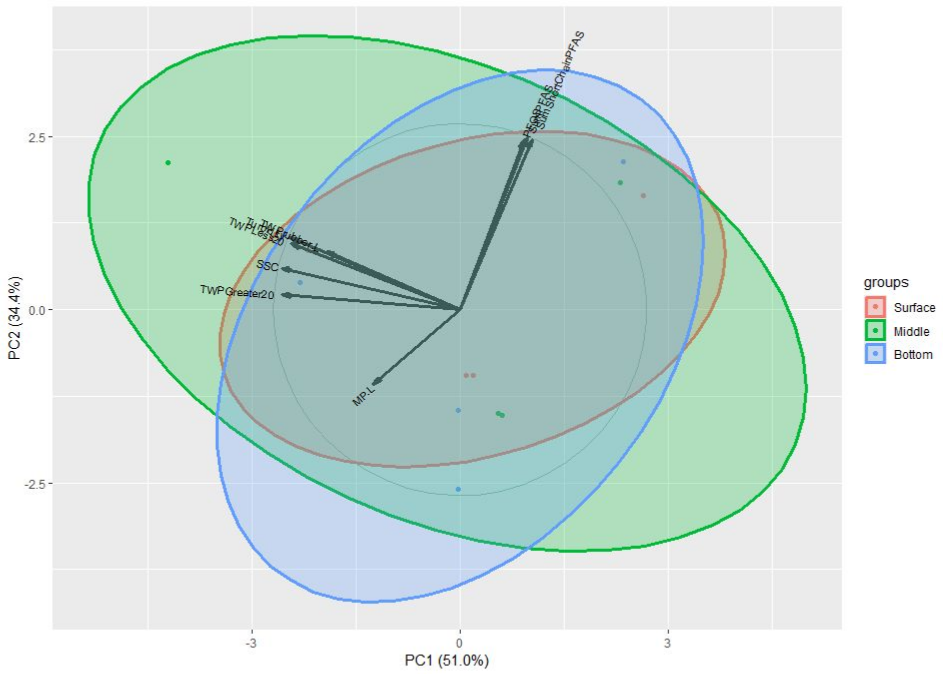
NIVA

Tire Particle Mass Analysis

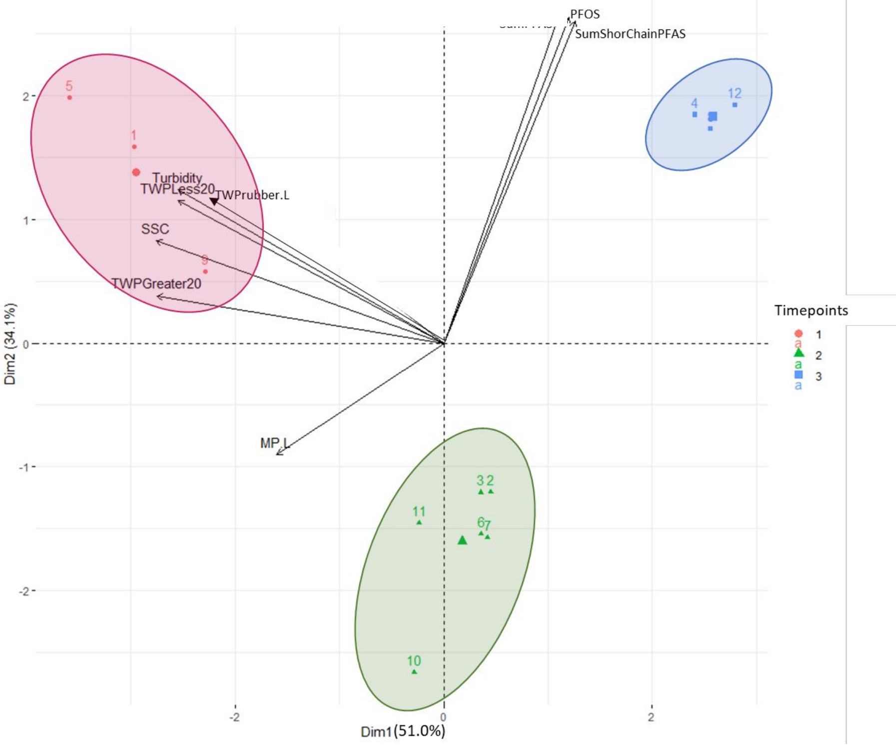
- Field: 1-L bulk samples
- SFEI sample preparation:
  - 50-100 mL laboratory duplicates
  - SFEI sieved sample to split <20 µm and >20 µm size fractions
- NIVA analyzed all field samples via pyrolysis-GCMS
  - Tire rubber chemical markers quantified
  - Tire particle mass estimated using NIVA tire database

Principal Component Analysis - Hayward

PCA: Depth



PCA: Time Point



Key Takeaways

Motivation

- Leverage RMP stormwater monitoring efforts
- Study Questions:
  - Can we sample at single depth during storm flows (versus depth integrated sampling)?
  - Is stormwater channel well-mixed during storm flows?

Yes

Lessons Learned

- First known quantification of TWP in stormwater runoff using LDIR
  - TWP levels are greater than our previous results
  - LDIR provides good rubber matches for small particles compared to other methods
  - TWP outnumber other types of microplastics
  - Recommend further screening of additional watersheds

Lessons Learned

- TWP mass concentrations in the mg/L
    - Estimates will be improved by ongoing Tire Rubber Study
- SFEI first to measure and estimate TWP mass in stormwater runoff in U.S.

Lessons Learned

- Other types of microplastic concentrations significantly greater than previously reported levels
- PP, PE, and PS represent the vast majority of microplastics identified

Deliverables

- Draft Report: July 2026
- Final Report: August 2026

Photo by Sierra Garcia

Photo by Sierra Garcia

Discussion

- Is this sufficient information to support single-depth sampling for TWP and microplastics in stormwater?
- What level of accuracy is needed to inform management questions?
- Are there other interpretation considerations?

Photo by Shira Bezalel

Item 7: MPWG Special Study

Diana Lin, PhD and Kayli Paterson

Evaluation of Tire Wear Particles in Urban Stormwater Runoff, and Method Evaluation for Other Types of Microplastics

(multi-year proposal)

Motivation

- Inform RMP microplastics stormwater monitoring approach
  - What are the sources, pathways, processes, and relative loadings leading to levels of microplastics in the Bay?
- Inform Statewide Microplastics Monitoring Strategy

Approach

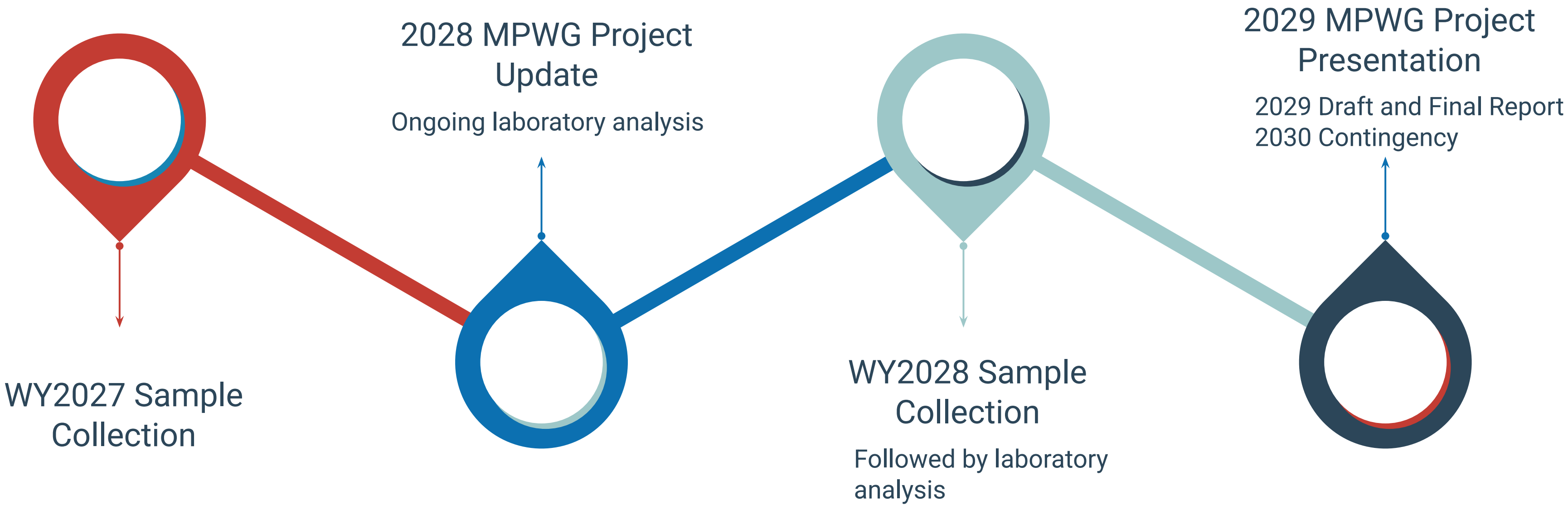
- 5 Sites x 2 Storm Events samples over 2 wet seasons
  - Leverage other stormwater sampling activities (ECWG and SPLWG)
  - Single depth sampling
  - Repeat at Hayward and Sunnyvale
  - Field blank and field duplicates collected at all sampling events
- TWP LDIR (particle counts)
- TWP pyrolysis GC-MS (mass)
  - Update analysis with ongoing Tire Rubber Marker study results

Approach

- Pilot LDIR for other microplastics, including fibers, at subset of storms
  - 3 storms
    - Include field blanks and field duplicates at each event
  - 10-L sieved samples
  - Matrix spike evaluations and extra lab blanks to evaluate uncertainty

Timeline and Deliverables

Evaluation of Tire Wear Particles in Urban Stormwater Runoff, and Method Evaluation for Other Types of Microplastics



Budget & Deliverables

Expense	Est. Hours	Cost
Project Management (Year 1, 2,3)	110	$26,400
Study Design and Prep (Y1)	110	$22,000
Stormwater sample collection (Y1, 2)	220	$39,600
Sample Processing (Y1, 2)	75	$12,000
Data management (Y2, 3)	40	$8,400
Analysis and Reporting (Y3)	240	$48,000
Final Report (Y3)	70	$14,000
TWP and Microplastic Particle Analysis College of Charleston		$33,500
TWP Mass Analysis Norwegian Institute of Water Research		$11,100
Equipment and Supplies, Travel, Shipping	--	$6,500
GRAND TOTAL		**$221,500**

over 3 years

RMP

Questions and Discussion