

Microplastics Workgroup Meeting

A photograph of the Golden Gate Bridge in San Francisco, California. The bridge is a suspension bridge with two large towers and numerous cables. The bridge is painted a distinctive orange-red color. The sky is overcast and grey, and the water in the foreground is choppy and greyish-green. The bridge spans across the water, with hills visible in the background.

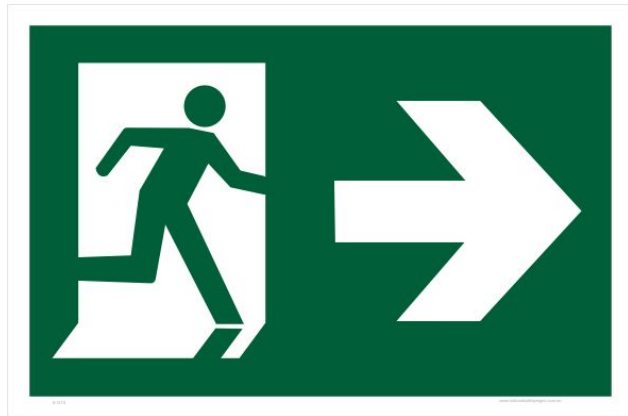
Amy Kleckner, RMP Manager
April 30, 2024 – Hybrid

SFEI Housekeeping Reminders

Gender diversity is welcomed here. All are encouraged to use the restroom that best fits their identity.

A white icon of a toilet on a blue background, representing a restroom.

Out the doors and to the right



Password:
sfsfsfsf

Please silence cell phones & laptops



Zoom tips

1. Update your name and add your affiliation
2. Raise your hand if you have a comment or question
3. Unmute yourself and turn on video when you are speaking
4. Use the chat function if you have a comment, question, or technical issue

In person attendees

1. Mute your microphone and the volume on your laptop.
2. Turn off your camera.



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



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



MPWG Expert Advisors



Chelsea Rochman
University of Toronto



Barbara Beckingham
College of Charleston



INTRODUCTIONS



Meeting Agenda: DAY ONE

1. Introduction and Goals for Meeting	8:30
2. Information: Quantifying Tire Wear Particles	8:45
3. Information: Microplastics Studies Updates	9:15
4. Information: Developing a Statewide Plastics Monitoring Strategy	9:40
BREAK	10:00
5. Information: Fate and Effects of Microplastics in Fish	10:10
6. Discussion: Multi Year Planning	10:40

Meeting Agenda: DAY ONE cont.

7. Summary of Proposed MPWG Studies for 2025	11:00
LUNCH	11:45
8. Discussion of Recommended Studies for 2025	12:30
9. Closed Session - Decision Recommendation for 2025 Special Study Funding	1:45
10. Report Out on Recommendations	2:30
ADJOURN	

Regional Monitoring Program

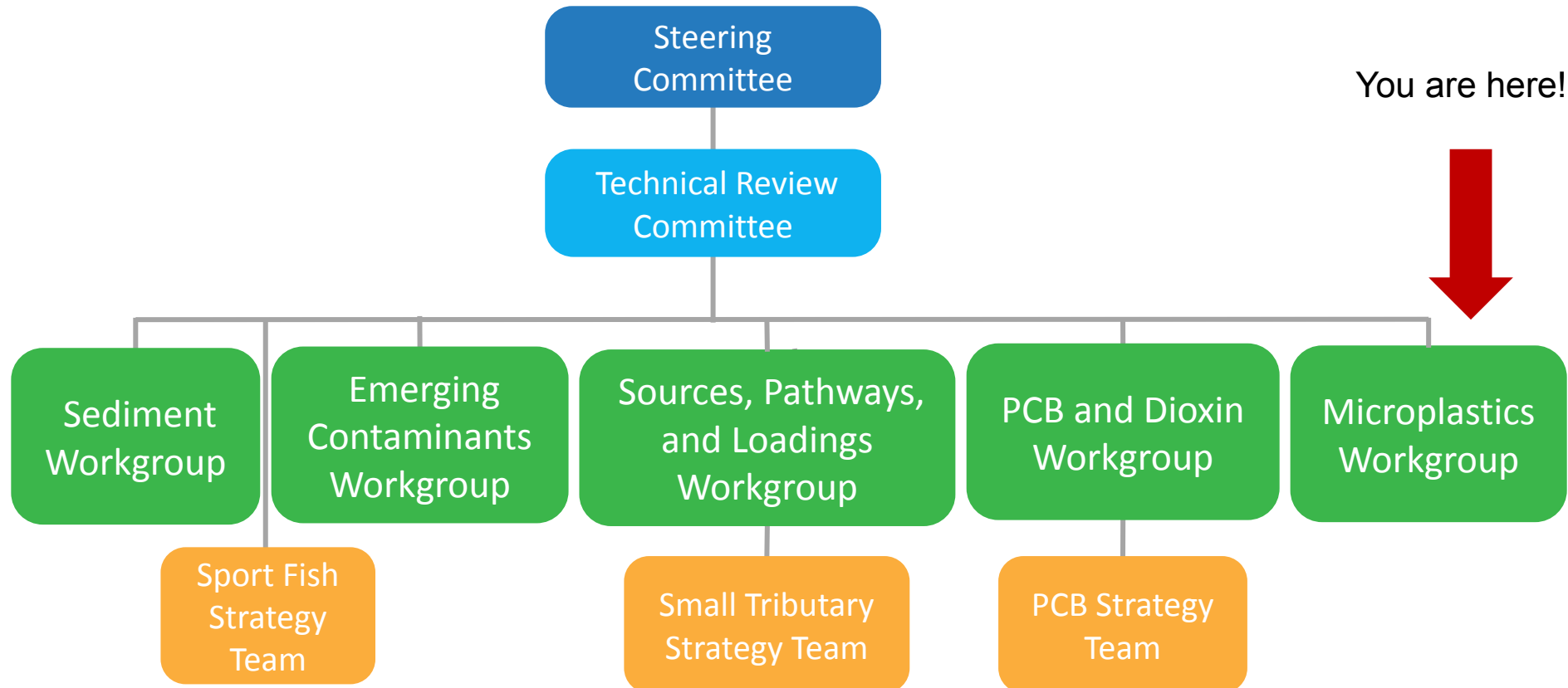
Collect data and communicate information about water quality in San Francisco Bay in support of management decisions

~ 68 entities in the Program

- Municipal wastewater
- Industrial wastewater
- Municipal stormwater
- Dredgers

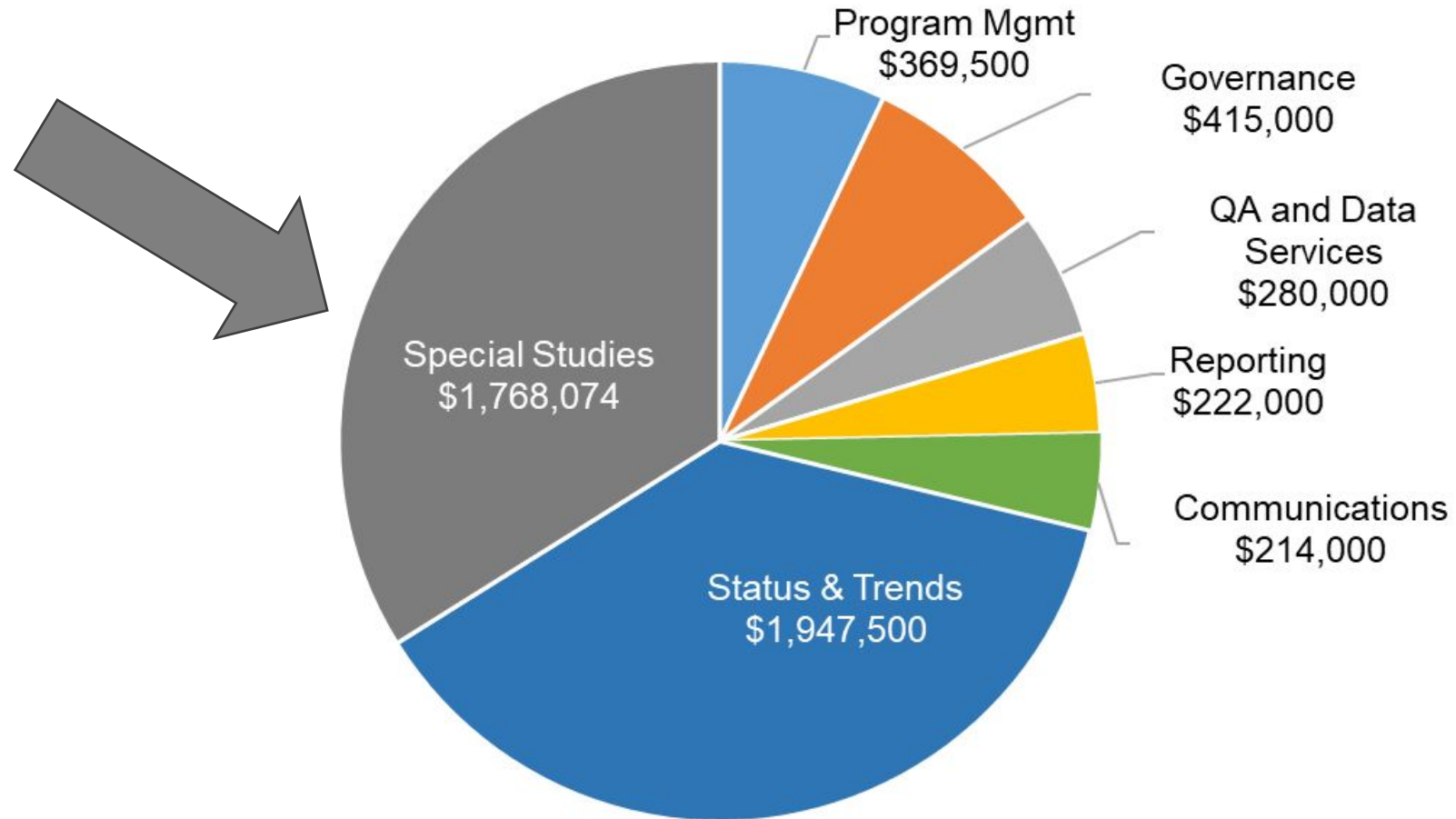


RMP Program Structure



Regional Monitoring Program

RMP Budgeted Expenses: 2024



Special Studies Budget for 2025

Tier 1 & Tier 2 study proposals

Predicted RMP Special Studies Budget for 2025 = \$1.54M

But wait there's more!

USEPA San Francisco Bay Program Office

- Expected \$54M per year (!) for San Francisco Bay



**Subtidal eelgrass
and oyster reef
restoration**

**Wetlands Regional
Monitoring
Program**

**Beneficial Reuse of
Dredged Material
Support**

**In-Bay Monitoring of
Pollutants, including
trash, and algal species
under the Regional
Monitoring Program**

**EPA Region 9
San Francisco Bay Program Office
FY24 Draft Annual Priority List**

**Large scale shoreline
resilience, multi-benefit
projects including
horizontal levees and
wastewater
treatment/reuse**

**Nutrient
Management
Strategy**

**Special
studies/projects for
addressing PFAS in
SF Bay**

**Large scale tidal
wetlands restoration**

**Special
studies/projects for
addressing PCBs
under TMDL
implementation plan**

**Large scale
implementation of
urban green
stormwater
infrastructure**

**BRRIT
(Bay Restoration
Regulatory
Integration Team)**

Getting the RMP Bucket Ready

- SC guidance to workgroups and staff: aim for 50% funding increase in 2025, 100% increase starting in 2026
- Important to include EJ and climate adaptation
- Great time for bigger ideas



2025 MPWG Updates

A photograph of the Golden Gate Bridge in San Francisco, California. The bridge is shown from a low angle, looking up at the massive red-orange steel towers and the suspension cables. The bridge is under construction, with visible scaffolding and construction equipment on the upper levels. The sky is overcast and grey, and the water in the foreground is choppy and greyish-green. The bridge spans across the water, with another tower visible in the distance on the left side.

Diana Lin
MPWG Meeting
April 30, 2024 – Hybrid

Microplastics Update

RMP

1. MPWG Strategy Revision
2. Stormwater monitoring pilot year 1

Other SFEI

3. Evaluating the Efficacy of Rain Gardens
4. Dryer Study
5. Trash Capture Device

State Agencies

6. Statewide Plastics Monitoring Strategy
7. SWB CEC Strategic Plan
8. DTSC Safer Consumer Products Program

Other Collaborators

10. Field Sampling Evaluation
11. ToMEx 2.0 Update



1. MPWG Strategy Revision - Finalized

Microplastics Monitoring and Science Strategy for San Francisco Bay 2024 Revision

Prepared by:

Kayli Paterson, Ezra Miller, Diana Lin
San Francisco Estuary Institute

CONTRIBUTION NO. 1144 / April 2024

- Updated Management Questions
 - MQ1: What are the levels of MP? What are the risks of adverse impacts?
 - MQ2: What are the sources, pathways, processes, and relative loadings?
- MYP and Priority Data Gaps
 - Water and sediment monitoring that fills small particle data gap
 - Stormwater monitoring

2. Stormwater Monitoring Year 1



Image credit: Kelly Moran and Shira Bezael

3. Evaluating Efficacy of Microplastics Removal in Rain Gardens

- ~\$200K (EPA Region 9 Water Quality Improvement Fund)

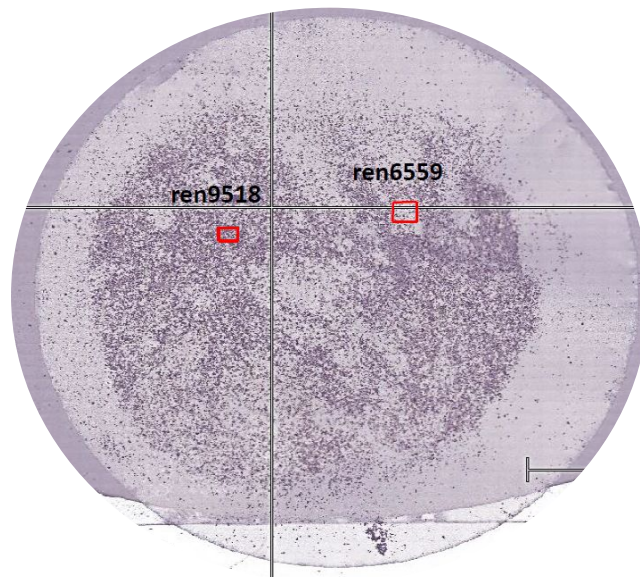


Image credit: Shira Bezael

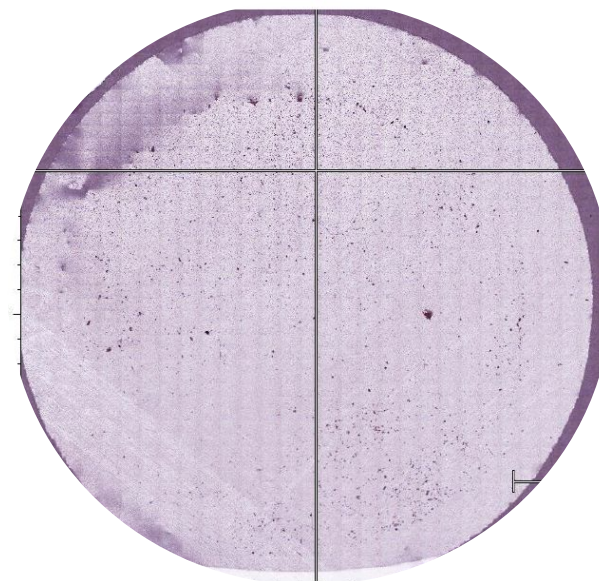
2. Insights and Lessons Learned



Inlet 53 μm Sieve



Inlet



Outlet

4. Dryer Study



Image credit: Lorien Fono

- ~\$400K (OPC, Sea Grant, NOAA)
- Are clothes dryers a significant source of microplastic pollution?
- Reporting late 2025
- Looking for ~10 participants
 - Contact diana@sfei.org

5. Trash Capture Device

- ~\$200K (NOAA)
- Evaluate whether trash capture devices generate, capture, or allow microplastics in urban stormwater runoff to pass through?
- Collaboration with City of Santa Barbara, Moore Institute of Plastic Pollution Research, WSP
- Recently launched
- 3-year study



Microplastics Updates from State Agencies

6. Statewide Plastics Monitoring Strategy

- ~\$200K (OPC)
- Currently reviewing management questions that will guide and scope and direction
- Strategy report draft for review early 2025



Tony Hale
SFEI, Program Director



Kaitlyn Kalua
OPC, Deputy Director



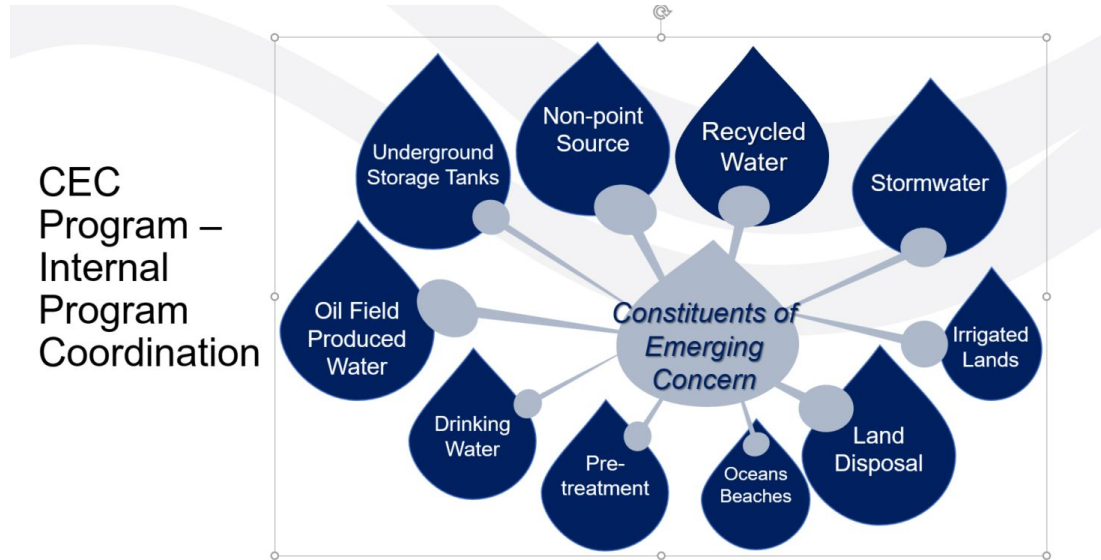
Christine Sur
OPC, Program Manager



CALIFORNIA
**OCEAN
PROTECTION
COUNCIL**

7. State Water Board CEC Program

- Technical resource to guide decision-making and address issues with CECs
- CECs Program Strategic Plan to be released soon



Erica Kalve, P.G.

8. Department of Toxic Substance Control

Safer Consumer Products (SCP) Process



1
Candidate
Chemical List

Create and maintain a menu of chemicals that we can choose from



2
Priority
Products

Prioritize Product-Chemical combinations that may cause harm + Rulemaking



3
Alternatives
Analysis

Manufacturer evaluation of alternatives



4
Regulatory
Response

Wide range of possible actions

Compliance
and
Enforcement

Microplastics Updates from
Southern California Coastal Water Research Project

10. Field Sampling Guidance to support standardization and comparability

- Goal to evaluate methods, and support efforts to standardize field sampling methods
- Reporting in the form of Standard Operating Procedure (SOP) that provide sampling guidance for each matrix



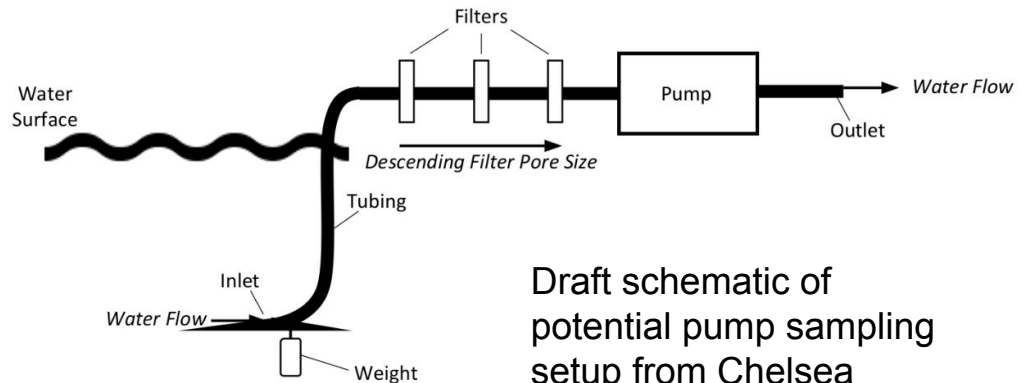
10. Ambient Water study design and reporting led by Chelsea Rochman



- Various pump sampling approaches to be tested by many project partners in various water bodies in fall 2024

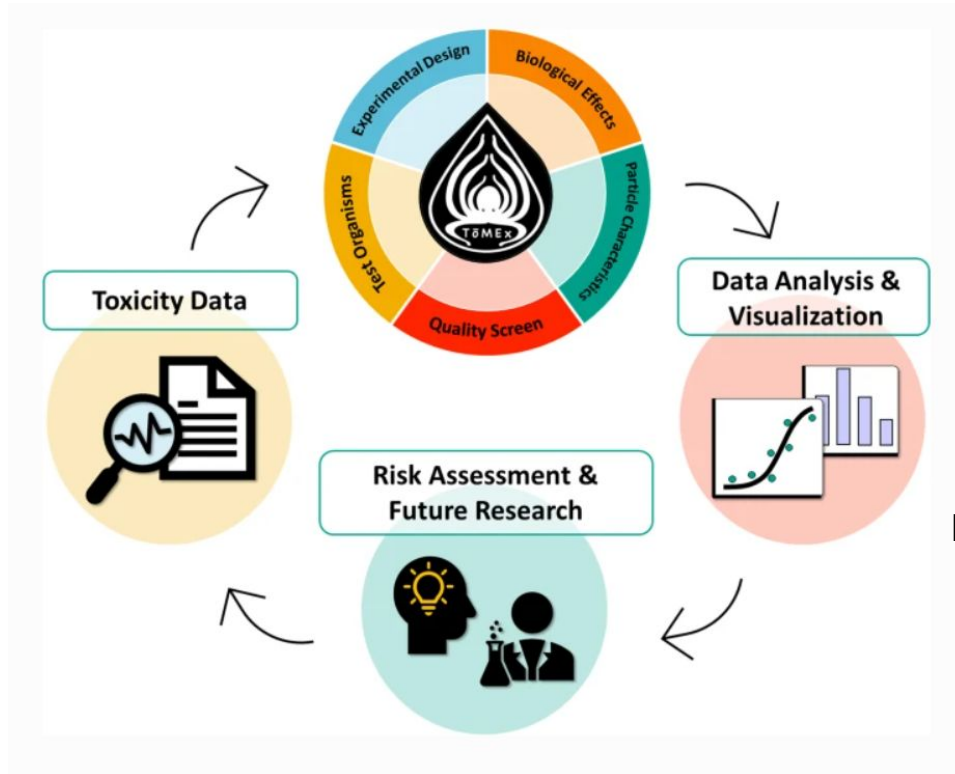


Professor Chelsea Rochman
University of Toronto



Draft schematic of
potential pump sampling
setup from Chelsea
Rochman

11. Toxicity of Microplastics Explorer Update



Leah Thornton Hampton
SCCWRP
Senior Scientist



Ezra Miller
SFEI
Environmental Scientist

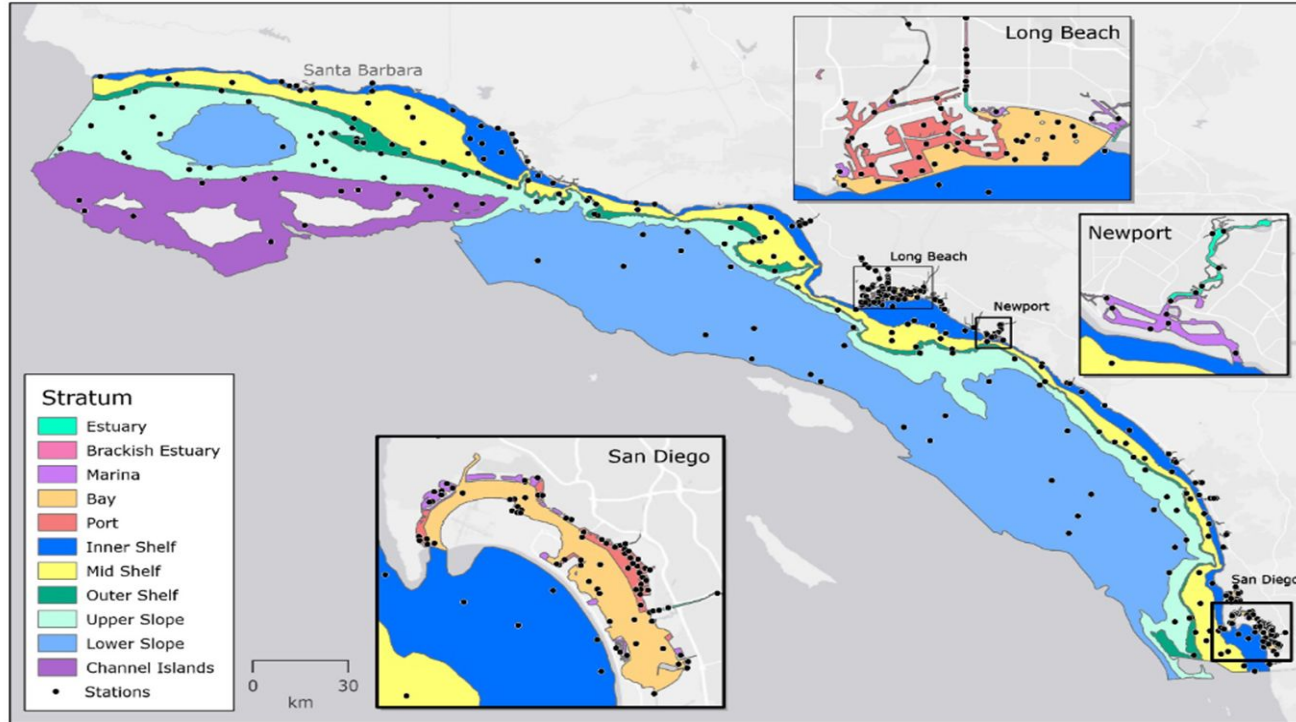
Questions?



Microplastics Update

Element	Study	Funder	Questions Addressed	2020	2021	2022	2023	2024	2025	2026
Strategy	<u>Microplastic</u> Strategy	RMP Patagonia/OPC	1,2,3,4	20 (30)	10	37	13 (50)	16 (100)	17 (50)	17
	Tires Strategy (ECWG)	RMP	1,2			25.5	10*	10*	10*	10*
Bay Monitoring	Bivalves	RMP	1,3							
	Fish	RMP	1,3							
	Sediment	RMP/OPC U. Rovira I Virgili	1,3		3.5		(15)			40
	Water	RMP/OPC	1,3						65	
	Wastewater	SCCWRP/OPC	1,2,3		(26)					
Characterizing sources, pathways, loadings, processes	<u>Stormwater</u>	RMP OPC	1,2,3					68	51	(40)
	<u>Stormwater</u> Conceptual Model	RMP OPC	1,2,4	30 (30)	30 (90)					
	Evaluating efficacy of rain gardens	SFEP/EPA	2,4			(62)	(62)	(62)		
	Investigating clothing dryers as a source	Sea Grant/OPC	2,4					(170)	(230)	
	Air monitoring	RMP OPC/Sea Grant/NOAA	1,2							(40)
	Assessing Information on Ecological Impacts	RMP NSF/CCCSD	1	(50)	18 (7.5+50)					
	Characterize <u>microplastic</u> additives	RMP ECWG	1,4						120*	
	Tire market synthesis to inform science (pro bono)	UC Berkeley	1,2,4			(20)				
RMP-funded Special Studies Subtotal – MPWG				50	61.5	62.5	13	84	133	57
High Priority Special Studies for Future RMP Funding									116	40
RMP-funded Special Studies Subtotal – Other Workgroups							10	10	130	10
MMP & Supplemental Environmental Projects Subtotal										
Pro-Bono & Externally-funded Special Studies Subtotal				110	173.5	82	127	332	280	80
OVERALL TOTAL				160	235	144.5	140	416	413	137

9. Bight Monitoring of Microplastics in Sediment and Bivalves



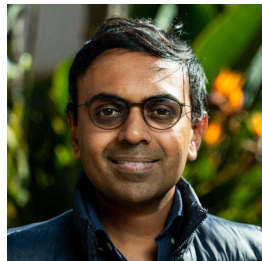
11. Stormwater study design and reporting led by Andy Gray



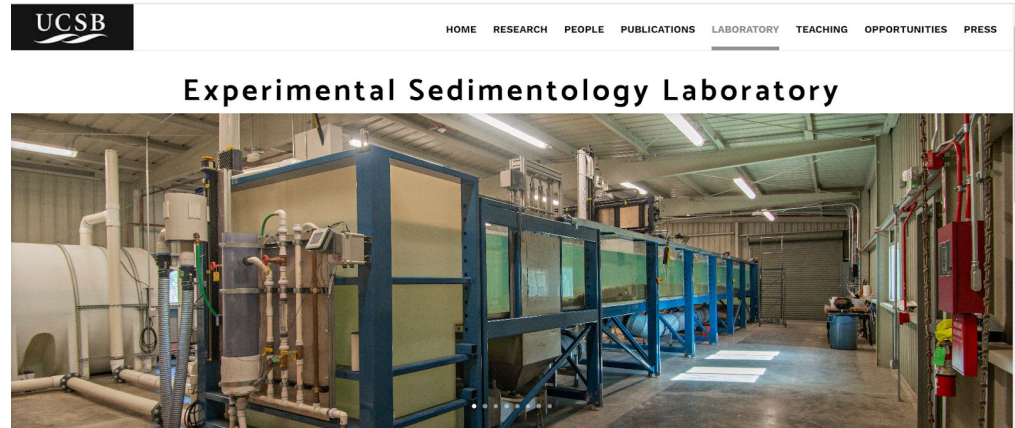
- Sampling methods will be evaluated in controlled flume in sedimentology laboratory (UC Santa Barbara, starting summer 2024)
- Methods include: surface bucket dip, isokinetic net, peristaltic pump
- Flume dosed with microplastic spheres (TBD 100, 500, 2000 um) and fibers of various polymer densities
- Simulate washload transport conditions



Prof. Andy Gray
UC Riverside



Prof. Vamsi Ganti
UC Santa Barbara



12. SCCWRP - Monitoring Rain Gardens to inform Best Management Practices



Approach – Field Monitoring

- Conduct wet weather monitoring
 - ≤ 6 bioretention/biofiltration type BMPs
 - Total 18 sampling events
 - Measure MP loads in & out of BMPs
- Conduct dry weather monitoring (start and end of project)
 - Measure MP occurrence in filter media
- Evaluate relevant design and maintenance elements
- Leverage SMC Regional BMP Monitoring Network



Elizabeth
Fassman-Beck



Objectives

- ▶ Conduct a coordinated, multi-agency investigation to characterize MP in wet weather urban runoff and explore whether existing filtration BMPs can/do effectively contribute to MP mitigation.
- ▶ Outcomes include:
 - Quantify the retention of microplastics in filtration BMPs, and influences on MP loading and BMP performance
 - Identifying design guidance or operational conditions to support microplastics' retention that is complementary to existing best practice for filtration-type BMPs.
 - Train next-generation engineers



Approach – Field Monitoring

- ▶ Conduct wet weather monitoring
 - ≤ 6 bioretention/biofiltration type BMPs
 - Total 18 sampling events
 - Measure MP loads in & out of BMPs
- ▶ Conduct dry weather monitoring (start and end of project)
 - Measure MP occurrence in filter media
- ▶ Evaluate relevant design and maintenance elements
- ▶ Leverage SMC Regional BMP Monitoring Network

2. Evaluating Efficacy of Microplastics Removal in Rain Gardens



8. Department of Toxics Substance Control

2024-2026 Priority Product Work Plan – Under Consideration *Product Categories Currently Under Evaluation*



**Beauty, Personal Care,
and Hygiene Products**



**Building Products & Materials
Used in Construction and
Renovation**



**Products that Contain or
Generate Microplastics**



Cleaning Products



Children's Products



Paints



8. Department of Toxics Substance Control

Alternatives Analysis
(Industry Step)

3 Alternatives
Selection

The AA process seeks to avoid regrettable substitutions

Answers key questions:

- Is it necessary?
- Is there a safer alternative?
- What are the tradeoffs?

Requires:

- Ecological impacts
- Life cycle impacts
- Economic analysis
- Performance evaluation
- Public comment



A photograph of the Golden Gate Bridge in San Francisco, California. The bridge is shown from a low angle, looking up at the massive red-orange steel towers and the suspension cables. The bridge spans across a body of water, with hills visible in the background under a cloudy sky. The bridge appears to be under construction or maintenance, with some scaffolding visible on the right tower.

Item 06: MPWG Multi-Year Plan

Diana Lin
MPWG Meeting
April 30, 2024 – Hybrid

MPWG Multi-Year Plan

Element	Study	Funder	Questions Addressed	2020	2021	2022	2023	2024	2025	2026
Strategy	Microplastic Strategy	RMP Patagonia/OPC	1,2,3,4	20 (30)	10	37	13 (50)	16 (100)	20 (50)	20
	Tires Strategy (ECWG)	RMP	1,2			25.5	10*	10*	10*	10*
Bay Monitoring	Bivalves	RMP	1,3							
	Fish	SEP/EPA	1,3						130	
	Sediment	RMP/OPC U. Rovira I Virgili	1,3		3.5		(15)			100
	Water	RMP/OPC	1,3						224.3	
Characterizing sources, pathways, loadings, processes	Wastewater	SCCWRP/OPC	1,2,3		(26)					
	Stormwater	RMP OPC	1,2,3					78	100.5	(80)
	Stormwater Conceptual Model	RMP OPC	1,2,4	30 (30)	30 (90)					
	Evaluating efficacy of rain gardens	SFEP/EPA	2,4			(62)	(62)	(62)		
	Investigating clothing dryers as a source	Sea Grant/OPC	2,4					(170)	(230)	
	Air monitoring	RMP OPC/Sea Grant/NOAA	1,2							(80)
	Assessing Information on Ecological Impacts	RMP NSF/CCCSD	1	(50)	18 (7.5+50)					
	Characterize microplastic additives	RMP ECWG	1,4							
	Tire market synthesis to inform science (pro bono)	UC Berkeley	1,2,4				(20)			
	RMP-funded Special Studies Subtotal – MPWG				50	61.5	62.5	13	94	344.8
High Priority Special Studies for Future RMP Funding									324.8	80
RMP-funded Special Studies Subtotal – Other Workgroups							10	10	10	10
MMP & Supplemental Environmental Projects Subtotal										
Pro-Bono & Externally-funded Special Studies Subtotal				110	173.5	82	127	332	410	80
OVERALL TOTAL				160	235	144.5	140	426	754.8	200

Discussion: Priorities for Future Monitoring



- Should there be future funding opportunities, what are priorities for next year and beyond?
- RMP can provide leadership in identifying priority data gaps to inform management



Suggested Multi-Year Plan Monitoring Priorities

	Completed or On-going	Current Proposal	Future
Bay Monitoring	<ul style="list-style-type: none"> • Water (2017-2018) • Sediment (2014, 2015, 2018) • Bivalves (2018) • Prey Fish (2017) 	<ul style="list-style-type: none"> • Water (Tier 1) • Sport fish (Tier 2) 	<ul style="list-style-type: none"> • Sediment (archived 2023, S&T 2028) • Water (S&T 2027)
Characterizing Sources, Pathways, Loadings, Processes	<ul style="list-style-type: none"> • Wastewater (2017) • Stormwater (WY2017, WY2018) • Investigating dryers (on-going) 	<ul style="list-style-type: none"> • Stormwater (Tier 1) 	<ul style="list-style-type: none"> • Urban stormwater (annual) • Air • Microplastics additives

Any Priorities Missing?

2025 MPWG Proposals

A photograph of the Golden Gate Bridge in San Francisco, California. The bridge is a suspension bridge with two large towers and numerous cables. The bridge is painted a distinctive orange-red color. The water in the foreground is choppy and greyish-green. The sky is overcast and grey. The bridge spans across the water, with hills visible in the background.

Diana Lin

MPWG Meeting

April 30, 2024 – Hybrid

		2025 MPWG Proposals	Budget
Tier 1	}	Microplastics in Urban Stormwater Runoff Pilot Year 2	\$100,500
		Size Distribution of Microplastic Particles in San Francisco Bay	\$224,300
		Total	\$324,800
Tier 2		Microplastics in San Francisco Bay Sport Fish	\$130,000

Joint ECWG proposals (informational only)

- Tire Rubber Marker Analysis: \$105,000
- Tire Wear Emissions and Washoff Estimates Journal Paper: \$15,000



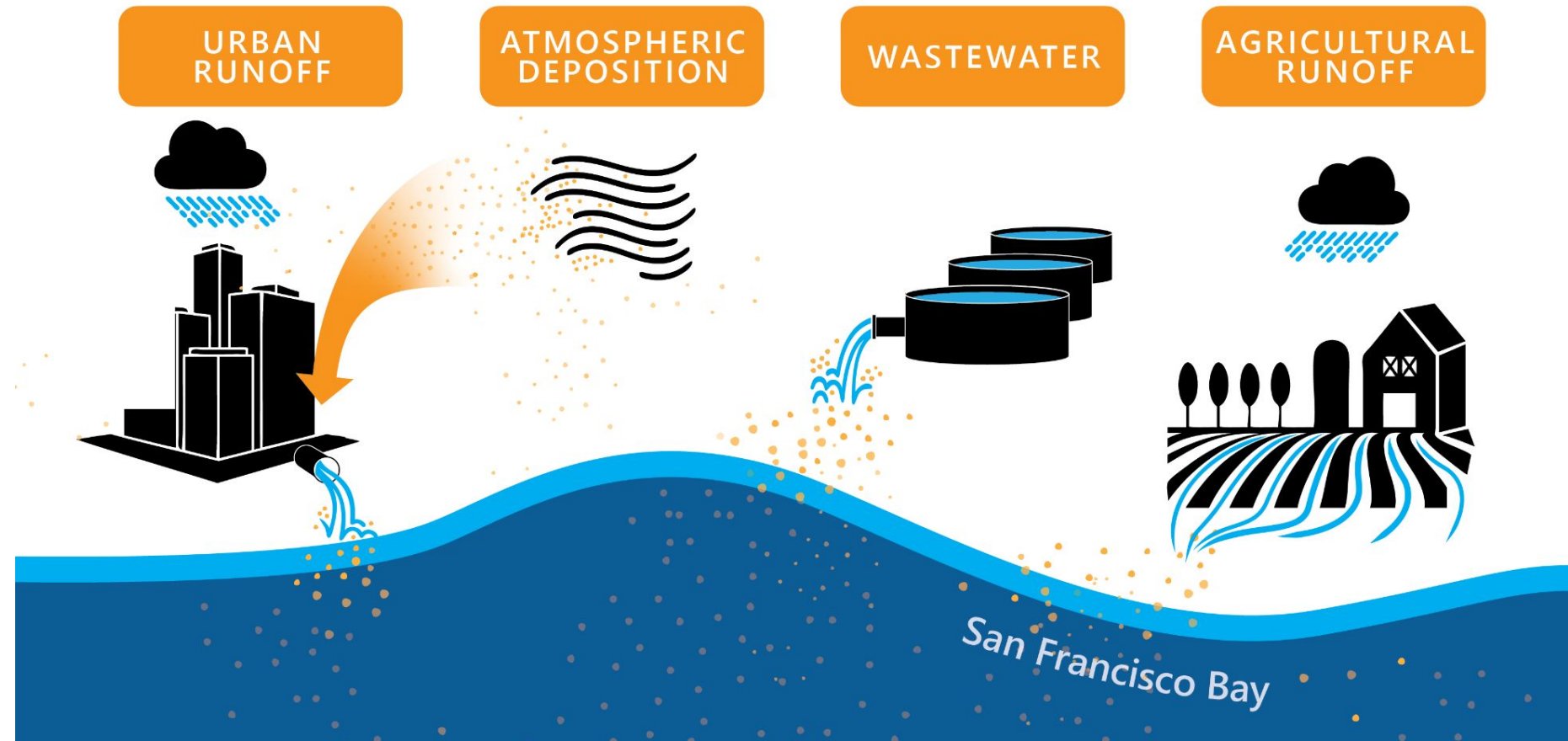
Microplastics in Urban Stormwater Runoff Pilot Year 2

Diana Lin, Alicia Gilbreath, Lester McKee, Rebecca Sutton



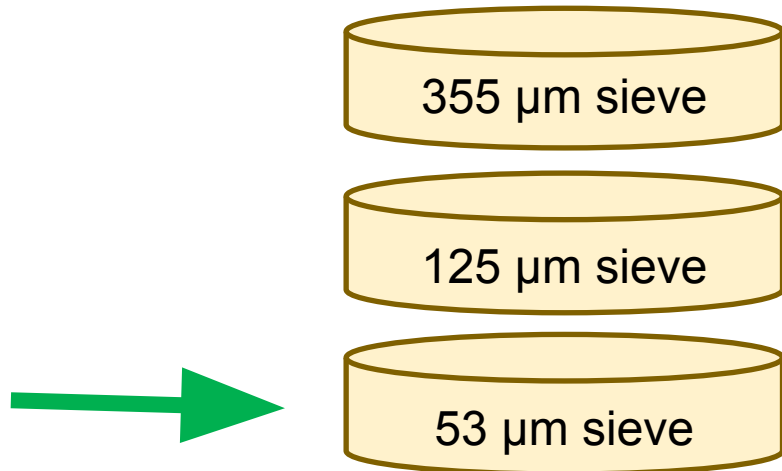
Motivation

- Stormwater monitoring is a priority data gap
- Need cost-effective approaches by leveraging other RMP stormwater monitoring efforts



Study Objectives

- Evaluate whether single-depth sampling is adequate compared to depth-integrated sampling in pilot study
 - Opens opportunity to leverage other monitoring methods
- Measure smaller microplastics and tire wear particles (previously under-counted)

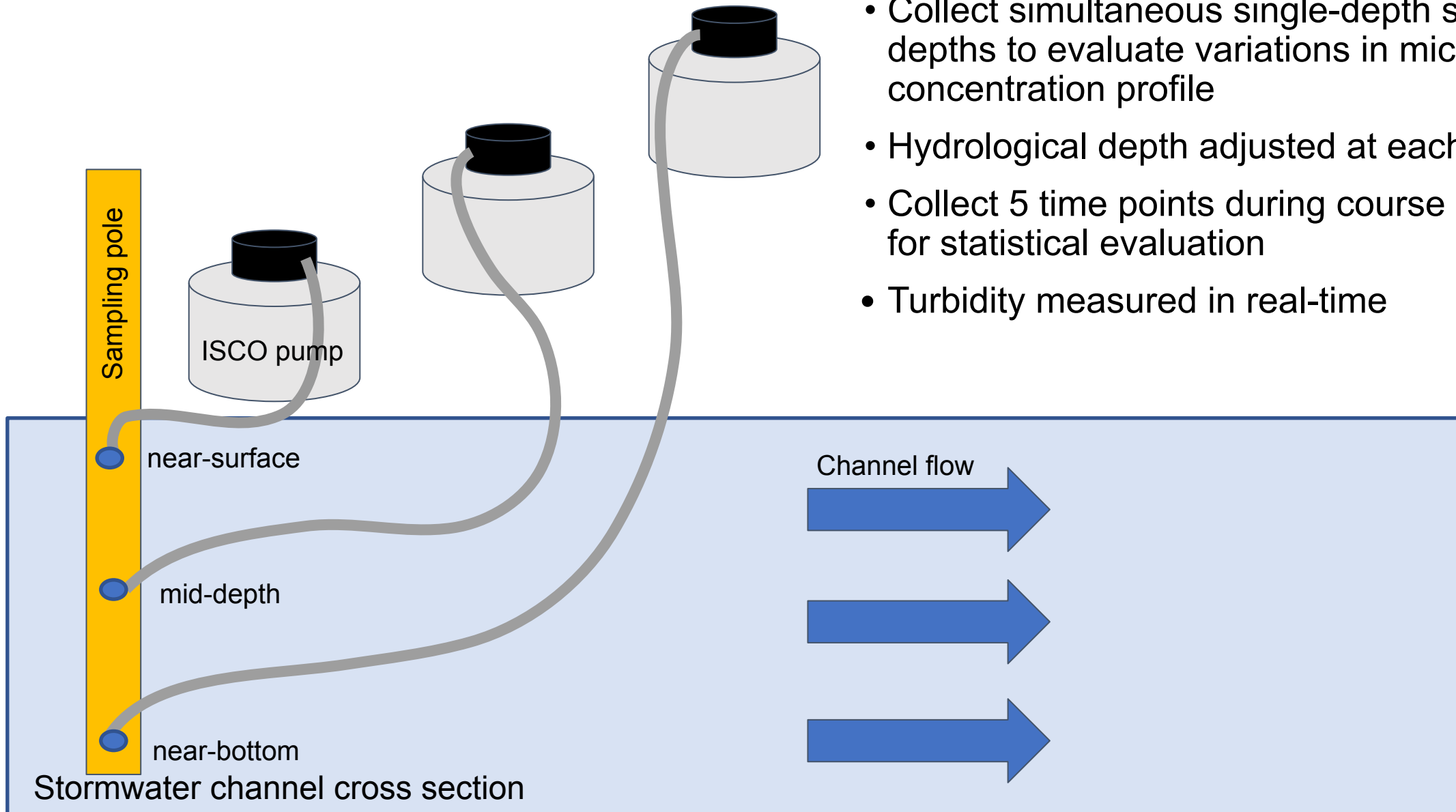


Approach

- Small pilot: sample at 2 sites, one storm event each
- Choose sites likely to be well-mixed based on RMP experience with suspended sediment
 - Are there important differences between microplastics and suspended sediment transport for the most abundant types of microplastics?

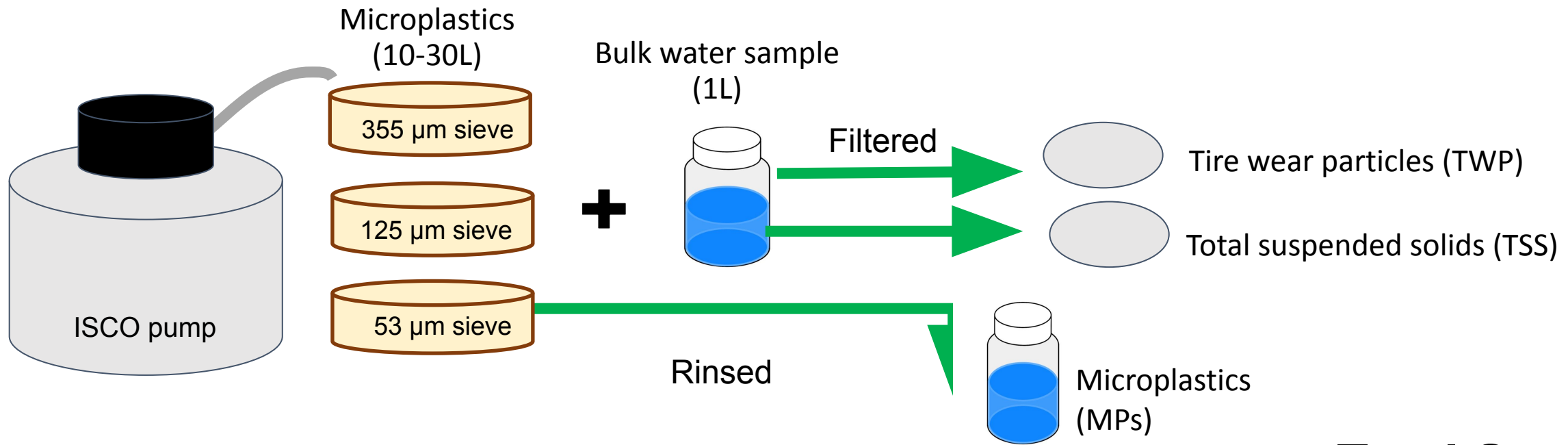


Approach - Sample Collection



- Collect simultaneous single-depth samples at 3 depths to evaluate variations in microplastics concentration profile
- Hydrological depth adjusted at each time point
- Collect 5 time points during course of storm flows for statistical evaluation
- Turbidity measured in real-time

Approach – Processing and Analysis



✘ 3 depths ✘ 5 sampling points ✘ 2 sites

=

Total Samples:
30 TSS
30 MPs
30 TWPs

Data Analysis

- Statistically evaluate whether single-depth measurements sufficiently representative of water column during storm flows
 - total suspended solids
 - microplastics
 - tire wear particles
- Inform RMP MPWG Strategy for stormwater monitoring
- Inform Statewide Plastics Monitoring Strategy and Plan and SCCWRP stormwater sampling guidance

Deliverables

- Draft and final technical report in February 2026

Budget

Expense	Estimated Cost
<i>Labor</i>	
Study design	12,300
Sample Collection	35,500
Data management	8,300
Analysis and Reporting	30,800
<i>Subcontracts</i>	
Microplastics laboratory analysis via FTIR/Raman spectroscopy (Moore Institute of Plastic Pollution Research or equivalent laboratory)	70,400
Tire wear particle analysis via pyrolysis GC-MS	16,000
<i>Direct Costs</i>	
Supplies	10,000
Travel and shipping	2,000
<i>Grand Total</i>	182,400
<i>Subtract Year 1 funded amount</i>	-78,100
<i>Year 2 Funding Request</i>	<u>100,500</u>

Add on proposal:

- **LDIR analytical method to quantify tire wear particles**
- **Barbara Beckingham (College of Charleston)**
- **Stefanie Whitmire (Clemson University)**
- **Budget: \$7,800**

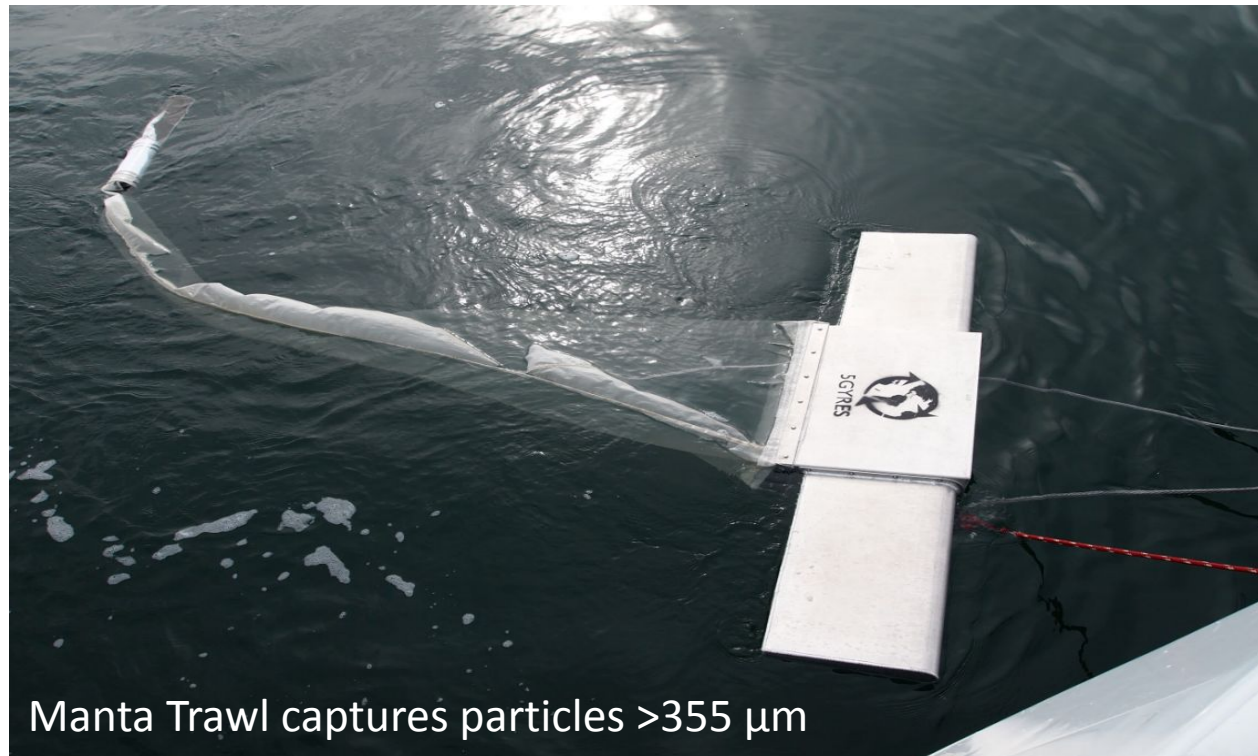
Size Distribution of Microplastic Particles in San Francisco Bay

Diana Lin, Ezra Miller, Kayli Paterson



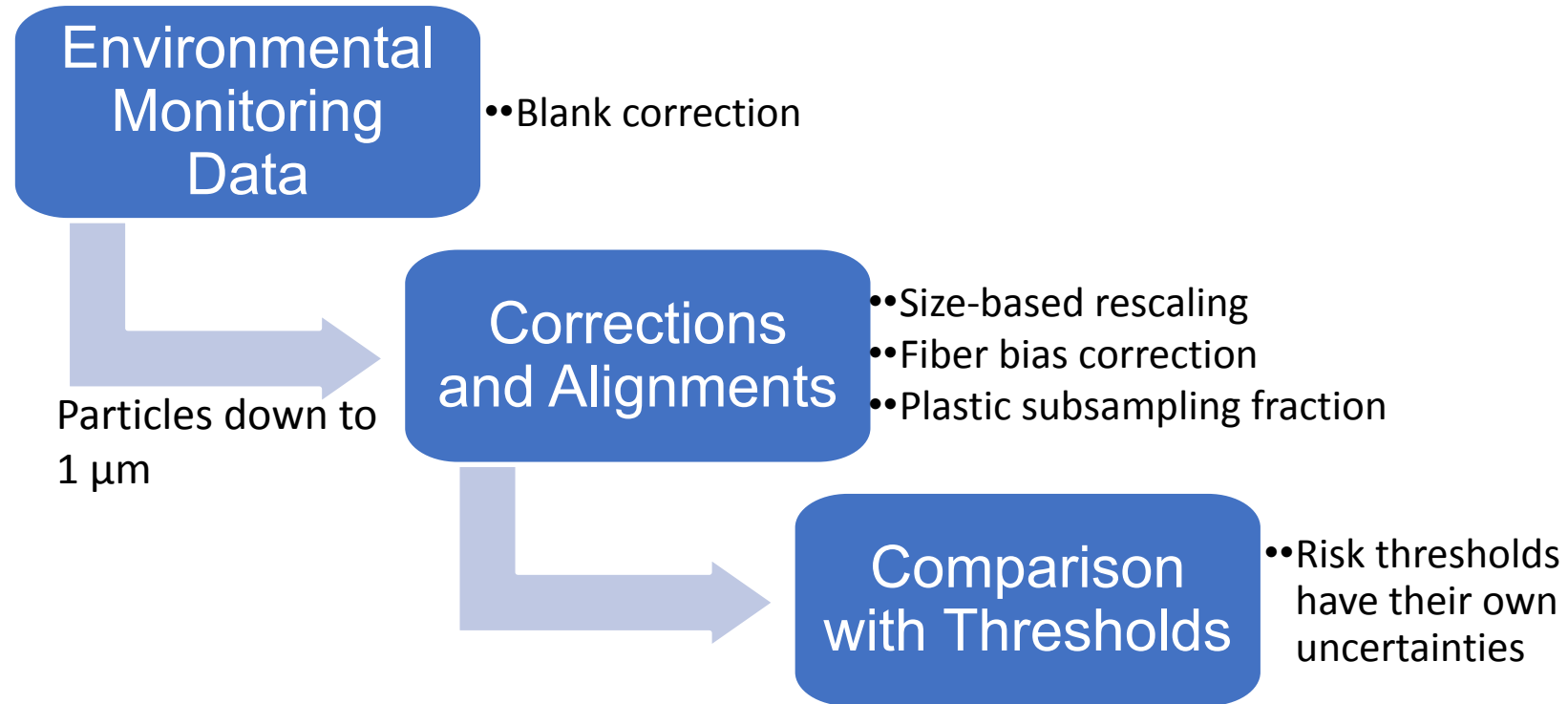
Motivation

- Smaller microplastics in previous ambient water monitoring is a priority data gap to understand microplastics levels

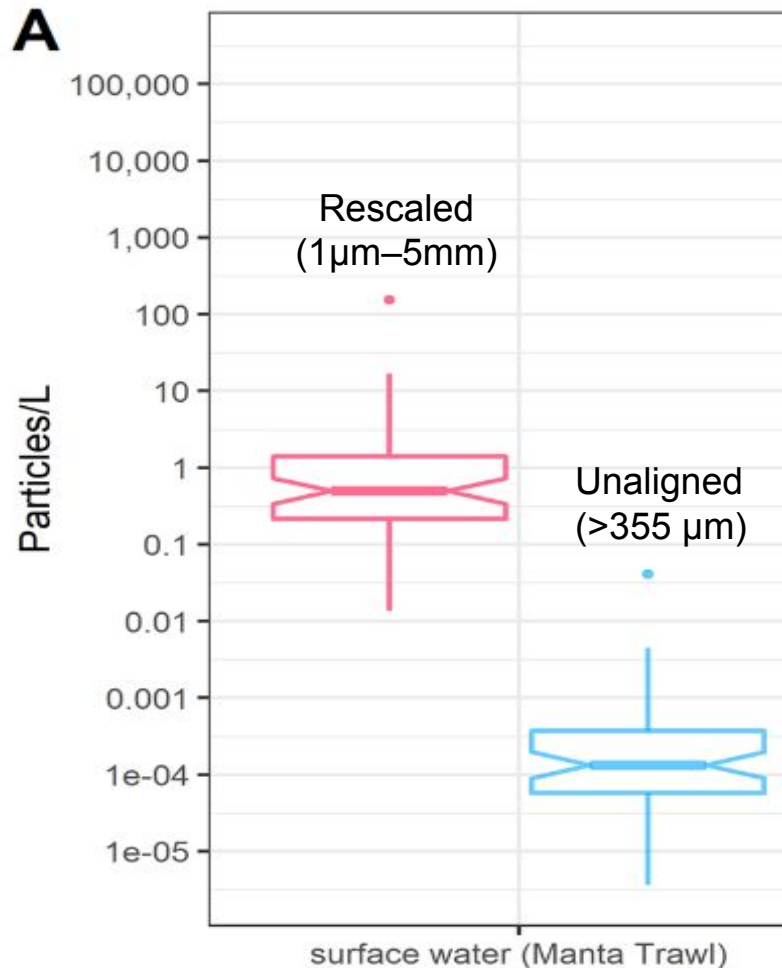


Background

- Smaller particles are also important for risk characterization



Background

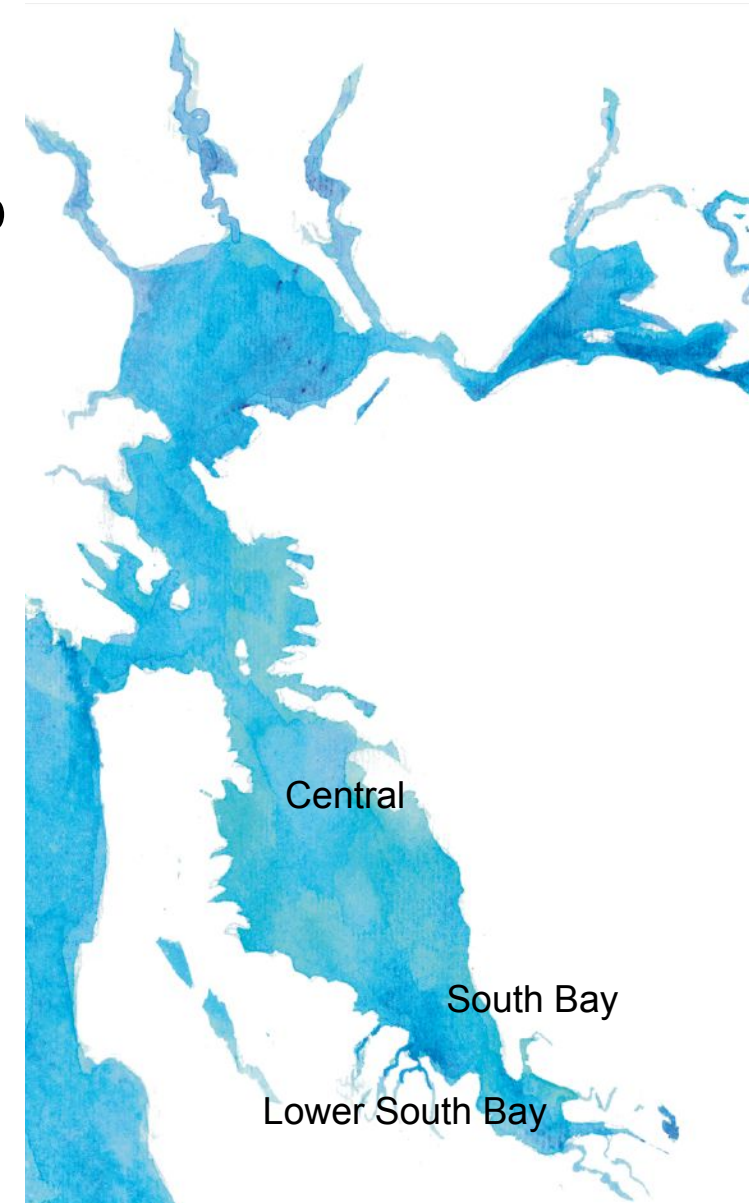


- Sized based re-scaling results in significantly higher levels of estimated microplastics
- Introduces significant uncertainty
 - Models are based on European data
 - Models lack data points for smallest particle sizes
- State Water Board water quality assessment indicates “beneficial uses may be potentially threatened”

Coffin et al., 2022. Risk characterization of microplastics in San Francisco Bay, California.

Approach - Field Sampling

- Limited ambient water monitoring to address data gap
- Leverage 2025 S&T Dry Season Water Cruise
- 10 sites from different subembayments
 - 10 Samples + 10 Replicates = 20 Total Samples



Approach - Field Sampling

- Develop in-line filtration device to collect microplastics down to 10 μm
- Surface water
- Evaluate microplastic number, morphology, polymer, and size distributions
- Compare with published particle size distribution models and related studies

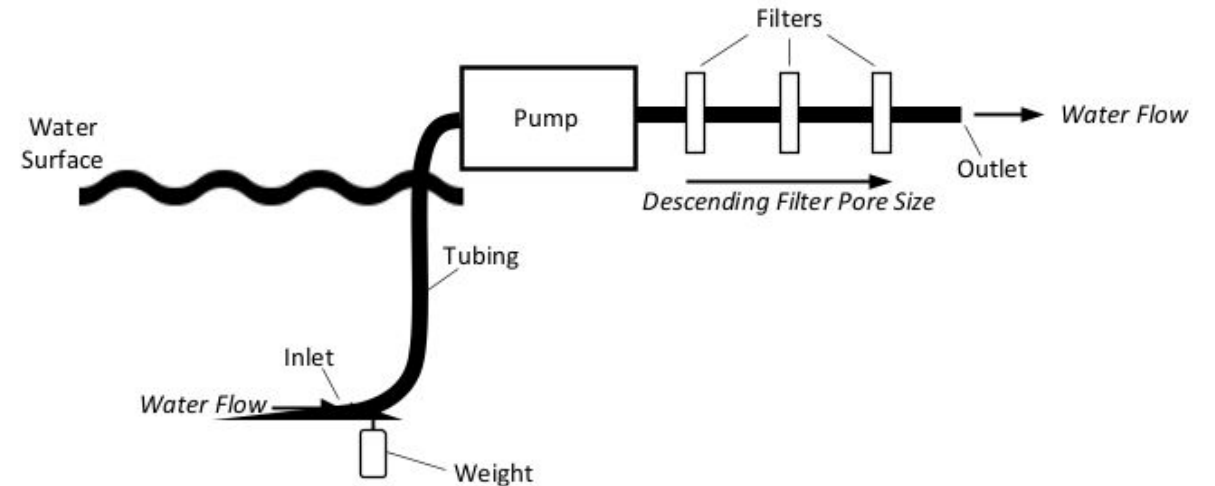


Image and schematics from Chelsea Rochman

Deliverables

- Draft and final technical report (draft manuscript)
- Inform RMP MPWG Strategy
 - monitoring strategy
 - future risk characterization
- Inform Statewide Plastics Monitoring Strategy and Plan and SCCWRP ambient water sampling guidance

Deliverables & Budget

Expense	Estimated Cost
Labor	
Study Design	25,300
Pilot and Sample Collection	28,500
Data Technical Services	15,000
Analysis and Reporting	
Subcontracts	
Microplastics analysis via FTIR/Raman spectroscopy (Ocean Diagnostics or equivalent laboratory)	57,200
Direct Costs	
Equipment and supplies (including filtration assembly)	9,000
Shipping	2,500
Open Access Publication	2,500
Grand Total	202,100



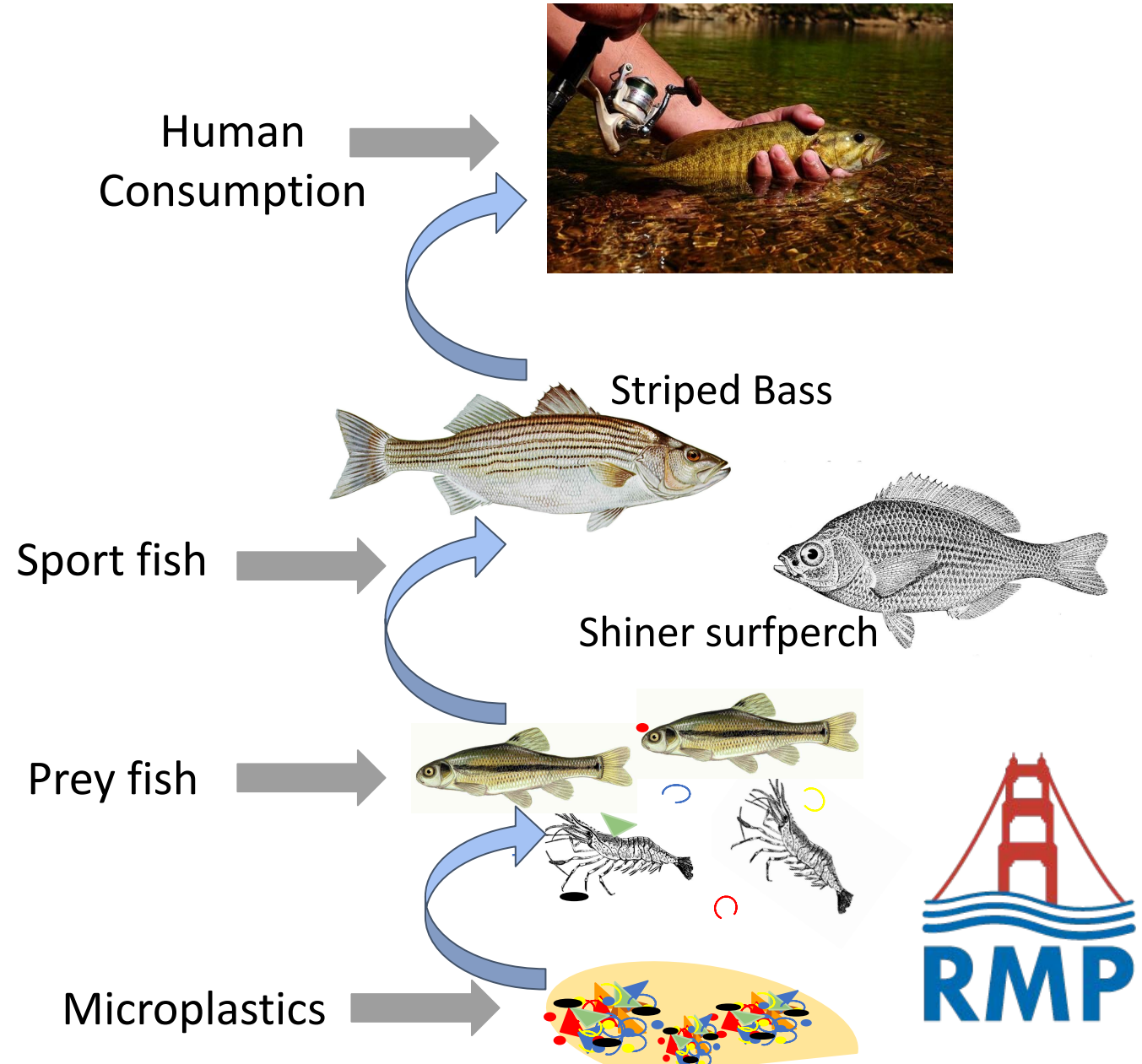
Microplastics in San Francisco Bay Sport Fish

Diana Lin, Chelsea Rochman



Motivation

- Sport fish data gap in Bay monitoring
- Leverage S&T sample collection
- Potential human exposure route



Approach

- Sport fish will be collected as part of the RMP S&T monitoring effort for the summer of 2024

	Shiner Surfperch	Striped Bass
Central Bay		10
San Francisco	10	
Berkeley	10	
South Bay	10	10
San Leandro Bay	10	
San Pablo Bay	10	
Totals	50	20



Deliverables & Budget

- Draft and final report
- Budget: \$130K



Tire proposals

(Informational only)

Reviewed and recommended for funding by ECWG



Tire Rubber Marker Analysis

- Improve methods to quantify tire wear particles in Bay Area samples
- Collaboration with Elisabeth Rødland, Norwegian Institute for Water Research
- Approach
 - Collect tire tread rubber samples from representative set of tires for region
 - Analyze for 4 tire rubber markers using pyrolysis GC-MS
 - Results used as reference database for current and future RMP tire studies

Budget: \$105,000



Tire Wear Emissions and Washoff Estimates Journal Paper

- RMP report *Tire Wear: Emissions Estimates and Market Insights to Inform Monitoring Design*
 - Estimated total tire wear emissions and washoff into surface water
 - Internationally unique ability to do these estimates for tires
 - To our knowledge, this is the first quantitative comparison between microplastic emissions and loads in urban runoff
- Sought publication partnership; none found
- Scientific journal paper would increase use
 - Improved study design and data interpretation by others would improve information available to the RMP

Budget: \$15,000



Questions

Tire Rubber Marker Analysis

Diana Lin, Kayli Paterson, Kelly Moran, Rebecca Sutton, and Elisabeth Rødland



Motivation

- Tire particles may be the largest source of microplastics entering SF Bay
- Tire related contaminants (Such as 6PPD-q) are also a big issue
- No comprehensive database for tire related additives exist for California
- A representative tire additive database will help improve tire concentration estimates



Approach

- Identify different tire models that would best represent Bay market
 - Vehicle class
 - Tire type (all season, winter)
 - Brand (Michelin, Goodyear, etc.)
 - Popularity
- Gather tread material from 30 tires
- Send to NIVA for tire marker analysis using Pyrolysis GC/MS
- Use database to improve Bay regional tire wear estimates
- Publish and share



Deliverables & Budget

- Draft and final report (draft manuscript)
- Budget: \$105K



Tire Wear Emissions and Washoff Estimates Journal Paper

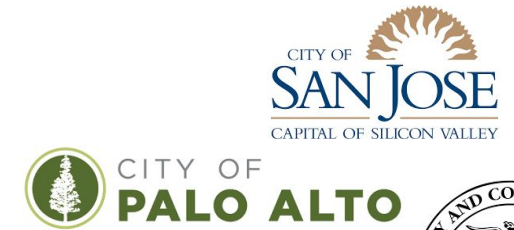
- RMP report *Tire Wear: Emissions Estimates and Market Insights to Inform Monitoring Design*
 - Estimated total tire wear emissions and washoff into surface water
 - Internationally unique ability to do these estimates for tires
 - To our knowledge, this is the first quantitative comparison between microplastic emissions and loads in urban runoff
- Sought publication partnership; none found
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Relevant Management Drivers



OCEAN
PROTECTION
COUNCIL



OEHHA
California Office of Environmental
Health Hazard Assessment



Background

- State Water Board water quality assessment indicates “beneficial uses may be potentially threatened”
 - Uncertainty in analysis

