SF BAY MICROPLASTICS PROJECT

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OUR MISSION IS TO EMPOWER ACTION AGAINST THE GLOBAL HEALTH CRISIS OF PLASTIC POLLUTION THROUGH SCIENCE, EDUCATION AND ADVENTURE
269,000 METRIC TONS
5.25 TRILLION PARTICLES
SAN FRANCISCO BAY
Regional Monitoring Program

Partnership to understand the health of San Francisco Bay

Implemented by SFEI, RMP Manager

Melissa Foley
MANAGEMENT QUESTIONS

MQ1) How much microplastic pollution is there in the Bay and in the surrounding ocean?

MQ2) What are the health risks?

MQ3) What are the sources, pathways, loadings, and processes leading to microplastic pollution in the Bay?

MQ4) Have the concentrations of microplastic in the Bay increased or decreased?

MQ5) Which management actions may be effective in reducing microplastic pollution?
MICROPLASTICS MONITORING TO INFORM POLICY

Pollution Pathways

Bay Monitoring

Wastewater (BACWA)

Sanctuary Samples

Transport Model

Sediment

Fish

Mussels*

Water

Marine Monitoring & Science
BAY AND SANCTUARY SURFACE WATERS

16 Bay and 11 Sanctuary sites

Sample Collection:
- Manta trawl collection (>355 μm)
- Pump (>20μm)
- 1-Liter Grab

Exploring questions on:
- Ambient conditions
- Comparing Bay vs Sanctuaries
- Seasonality

Field duplicates and blanks collected
SEDIMENT

30 samples

Exploring questions on:
• Ambient conditions
• Comparing mid-Bay sites vs nearshore (margin) sites
• Influence of pathways
• Spatial differences

Field duplicates and blanks collected
SMALL FISH

8 sites; co-located with sediment
  • Reference site included

20 individual fish
  • Anchovy & Topsmelt

Exploring questions on:
  • Influence of pathways
  • Spatial differences
  • Pelagic vs. benthic
PATHWAYS: WASTEWATER

2 samples collected at 8 Facilities around SF Bay
  • 24 hr composites
  • 355 and 125 µm sieves

Exploring questions on:
  • Treatment (secondary vs tertiary)
  • Location
  • Flow (40 to 160 million gallons per day)

Field duplicates and blanks collected

Diana Lin and Palo Alto Staff
PATHWAYS: STORMWATER

12 sites:
  • Large watersheds for loads
  • Potentially polluted areas

Composites of “sips” during storm
  • 355 and 125 µm sieves

Exploring questions on:
  • Urban vs rural
  • Watershed size
  • Trash hot spots

Field duplicates and blanks collected
LAB ANALYSIS
LAB ANALYSIS

Original Sample (Digestion, if needed)

Particles sieved into size fractions

Particles on grid for counting

Particles with size fraction identified / Subsample to RAMAN / FTIR

10 particles of each color/category picked for photographs / measurement

Original Sample Jar
LAB ANALYSIS IS TEDIOUS
LAB ANALYSIS

FTIR
• Particles >250µm

RAMAN
• Particles (<250µm)
QA/QC: BLANKS

Important to collect blanks and duplicates

Field contamination controlled by:
- No synthetic fabrics in field
- Pre-washed sieves, covered with foil
- Limited handling during sample collection

Lab contamination controlled by:
- Frequent lab cleaning schedule
- HEPA filtration
- Work in clean cabinet
MICROFIBERS WIDELY DETECTED

- Blanks
- Water
- Fish
- Sediment
- Wastewater
- Stormwater

Blanks and Water are confirmed. Fish, Sediment, and Stormwater are indicated with a question mark.
STAKEHOLDER INVOLVEMENT

✧ May 22, 2019 RMP Microplastics Stakeholder Meeting

✧ October 2, 2019 SF Bay Microplastics Symposium

California Statewide Microplastics Strategy (SB 1263)
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