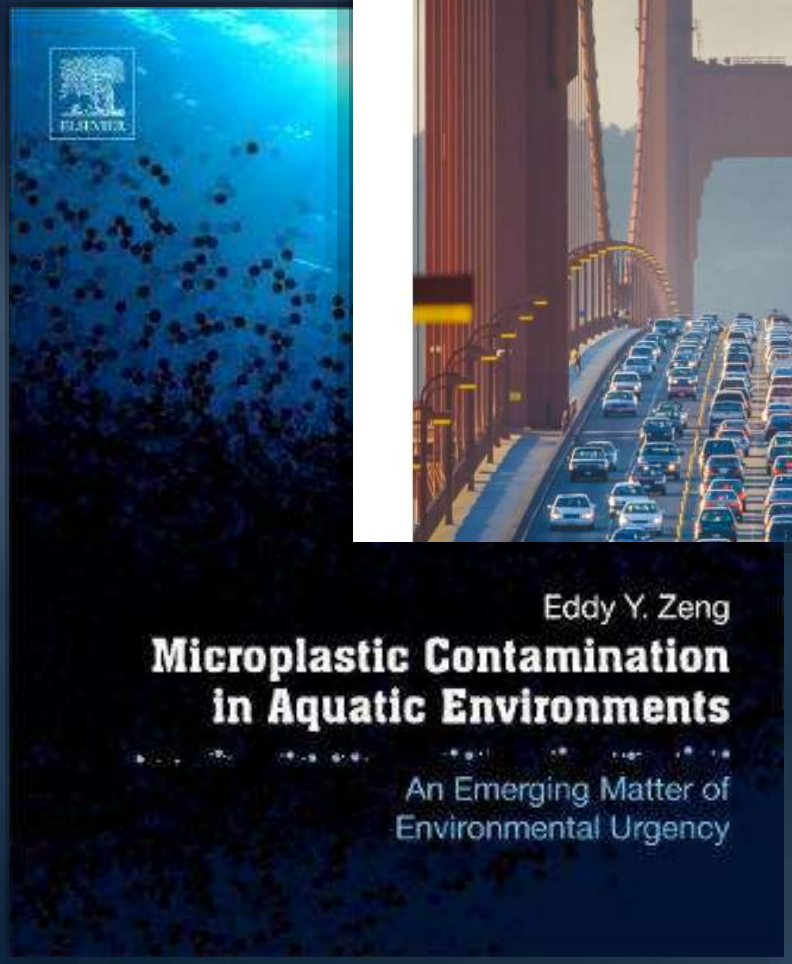
Update on Emerging Water Quality Issues: Microplastics

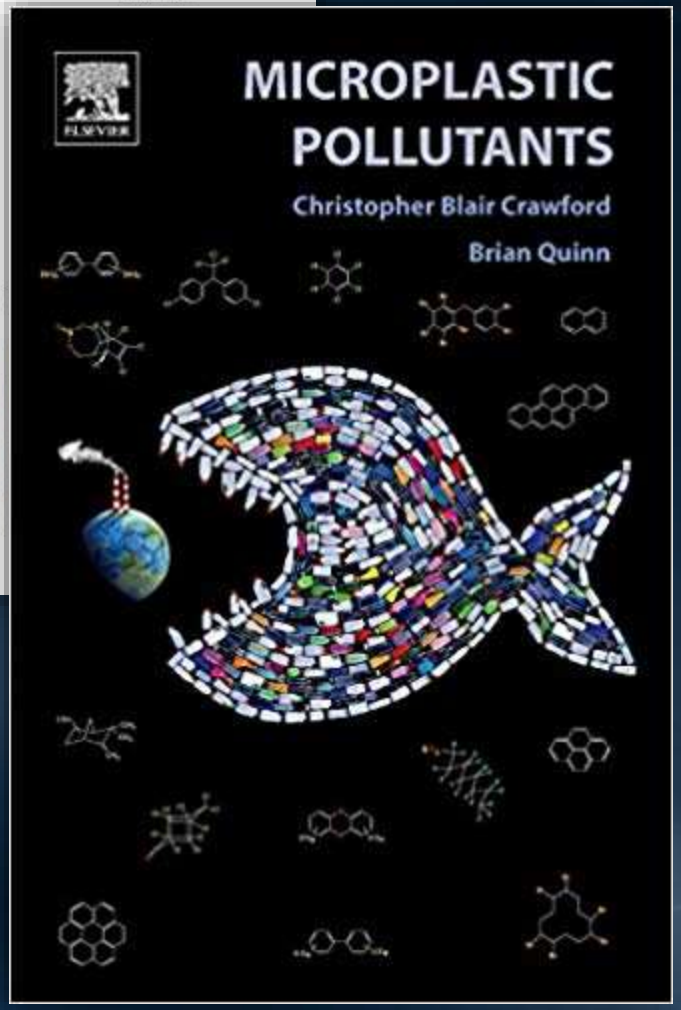
Engineering and Operations Committee
Item 6c
November 4, 2019

Los Angeles Times

CLIMATE & ENVIRONMENT

The biggest likely source of microplastics in California coastal waters? Our car tires





Background on Plastic

- Any synthetic or semisynthetic organic polymer made from petrochemicals
- Made with additives: colorants, plasticizers, stabilizers, fillers, and reinforcements
- Some Examples:

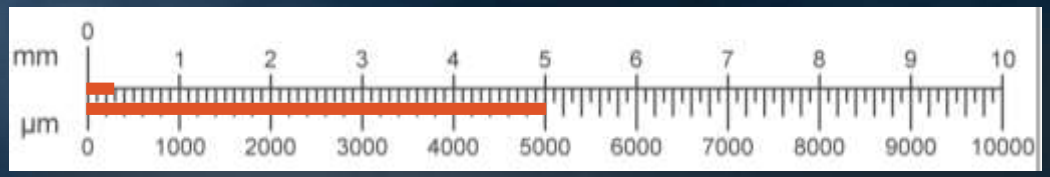
Polystyrene

Polypropylene

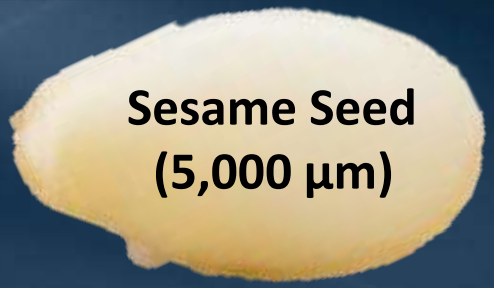
Polyvinyl chloride (PVC)

What are "Microplastics"?

- Small pieces of plastic between 1 and 5,000 µm in size (less than the size of a sesame seed)
  - Fibers
  - Pellets
  - Films
  - Fragments
  - Foam
  - Microbeads



Salt Crystal
(300 µm)



Sesame Seed
(5,000 µm)

- Mini-microplastics: 1 µm to 1,000 µm
- Nanoplastics: less than 1 µm

Definition source: The Microplastics Toolbox by A Rocha International;
Images: inch calculator.com (ruler); cleanpng.com (salt); dlpng.com (sesame seed)

Sources of Microplastics in Water

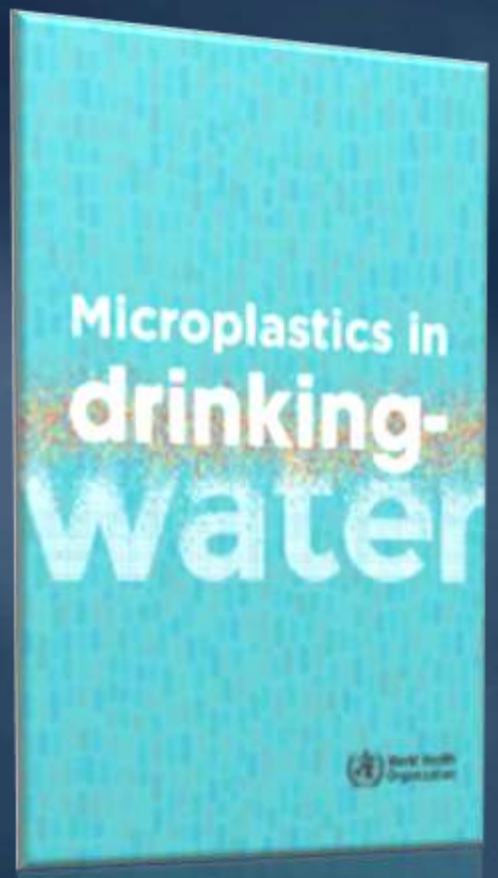
- Surface runoff
- Wastewater discharges
- Industrial discharges
- Atmospheric deposition

Laundry fibers

Car tires

Sources: WHO 2019. Microplastics in drinking-water; www.latimes.com/California-microplastics-ocean-study.

Microplastics in Drinking Water



- Challenges with analytical methods
  - No definitions
  - No standard sampling, extraction, and identification methods
  - Pervasive analytical errors
- 9 reliable water studies (of 50)
  - Bottled > Surface Tap > Ground Tap
- Water treatment processes are effective

Sources: Citation: WHO 2019. Microplastics in drinking-water.
Isobe et al., 2019. An interlaboratory comparison exercise for the determination of microplastics in standard sample bottles

Do microplastics in drinking water pose a risk to human health?

- WHO finds "low or no concern of human health hazards at this time"
- Food and animal studies indicate some concern
- Additional research needed to fully assess health impacts

Sources: WHO 2019. Microplastics in drinking-water. Tanaka, K. and Takada, H. 2016. Microplastic fragments and microbeads in digestive tracts of planktivorous fish

California Microplastics Legislation

- AB 888 Waste Management: Plastic Microbeads
- SB 1263 Statewide Microplastics Strategy
- SB 1422 California Safe Drinking Water Act: Microplastics
  - Define microplastics by July 1, 2020
  - Adopt by July 1, 2021:
    - Standard method to monitor drinking water
    - Accredit qualified laboratories
    - Develop testing, reporting, and notification requirements
    - Consider notification level

Microplastics Analytical Methods for Drinking Water

- Four microplastics analytical methods
  - Not standardized or validated
  - No sample collection procedures
  - Tedious, time consuming, and costly
- Microplastics Measurement Methods Evaluation Study (2019-2020)
  - Multi-laboratory evaluation
  - International team of investigators
  - Metropolitan is participating

http://www.sccwrp.org/news/international-microplastics-measurement-study

Summary and Next Steps

- Microplastics are a global concern and the science is still emerging
- Metropolitan's next steps
  - Participate in research efforts to establish standardized analytical methods
  - Track and engage in regulatory and legislative activities
  - Collaborate with industry organizations on communication strategies for this emerging water quality issue


THE METROPOLITAN WATER DISTRICT OF
SOUTHERN CALIFORNIA
1928