

Dueling reports show a healthy bay, threat from microplastics

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Scientists at the Romberg Tiburon Center for Environmental Studies say society must act immediately to reduce the amount of plastic in the environment after a recent sampling showed massive levels of microplastic contamination in San Francisco Bay.

While many are aware of the five massive gyres of plastic waste polluting the world's oceans — such as the Great Pacific Garbage Patch — the new report shows the problem hitting much closer to shore.

Biology professor Ed Carpenter reiterated the call for a statewide ban on microplastic beads, which are about the size of a pinhead and are still commonly used in cosmetics like face wash and toothpaste. State lawmakers recently passed a bill banning the use of such plastics by 2020, but Gov. Jerry Brown has yet to sign it.

"I think that microbeads should be banned from commercial products," said Carpenter, one of the first scientists to identify the potential dangers of ocean microplastic. "The fact that the microbeads will be ingested by filter-feeding organisms such as clams and mussels is cause for concern."

Romberg graduate researcher Heather Richard, who is studying ocean microplastic, said that the findings were a wake-up call that society must change.

"We need to figure out a society where we don't use plastic once and throw it away, (but) where it is normal to reuse something cradle to cradle," or in endless cycles of reuse, she said.

Sampling the bay

Researchers working with the San Francisco Bay Estuary Institute, a group of scientists and technologists based in Richmond, collected samples of surface water in the central and South Bay, as well as at eight wastewater treatment outflows from sites in those areas.

They found microplastic particles at levels more than twice that found in other urban waterways nationwide, including highly polluted Lake Erie, with more than 1 million

particles per square kilometer in the South Bay.

The water treatment plants, which currently do not screen for plastics, are disgorging an average of 490,000 particles of plastic a day into the bay, researchers said.

Some 8 trillion microbeads enter U.S. waterways every day.

Microplastic comes in many forms, such as beads; foamed plastic particles, like cigarette butts; and fibers, which can be released into wash water when synthetic clothing is washed. Other microplastics are formed when trash such as plastic bottles and bags break down under the influence of wave action and sunlight.

Scientists are concerned that these particles can be eaten by fish and filter-feeding organisms. Most worrisome is that the microplastic can bind to toxic chemicals such as polychlorinated biphenyls — the banned carcinogen known as PCBs — and heavy metals, which then may contaminate sea life and ultimately people who eat it.

Richard said the jury is still out on whether this process constitutes a risk to human health.

"Making that leap is something we (scientists) are just starting to do," she said. "We are not quite there yet. But many people are saying with this much plastic in the environment, do we really want to wait to find out?"

Researchers at the Estuary Institute collected surface water samples using a manta trawl net system pulled behind a boat. Concentrations of plastic ranged from 310,000 parts per square kilometer in the central bay to 1 million parts in the far South Bay.

There were no samples taken in the North Bay.

Richard cautioned that currents and winds can determine the level of plastic contamination in any one area of the bay. The level is necessarily higher where currents converge, she said. An earlier study conducted by the Estuary Institute in 2011 found much less plastic in the bay, she said.

Richards said she had collected a variety of microplastic samples off Sausalito and Tiburon, where the San Francisco State University marine biology station is located, but had not yet quantified the amount of plastic in the water.

She said she was not surprised by the Estuary Institute findings, saying she had always known there was plastic

in the bay but was pleased the widespread publicity had brought the issue to light.

"Now people know that its not just happening way out in the Pacific," she said. "You're going to see a lot of movement."

Encouraging news

News of heavy plastic contamination comes only days after another report determined that in some ways, the bay is healthier than it has been in many years. That report, by the San Francisco Estuary Partnership, assessed water quality, fish stocks, eelgrass coverage and numbers of marine and estuarine birds in the bay and in the delta. It did not address plastic in the water.

Called the State of the Estuary 2015, the report says that swimming conditions at most bay beaches are excellent, fish stocks in the central bay are at almost 400 percent of their level 20-30 years ago and that winter dabbling duck populations are increasing. Shorebirds are stable or increasing, especially in the North Bay, where marshlands have been reconstructed and tidal flow restored.

Richardson Bay continues to have one of the largest patches of eelgrass in the bay, and the team named Brickyard Cove off Strawberry Point as one of the top-scoring restoration sites for the native Olympia oyster; an Aug. 12 Ark article that focused on the oyster's recovery at that site is available online at arknews/straw_oyster.

The bay and upper estuary continues to be contaminated by historical pollutants such as mercury and PCBs however, making it risky to eat local fish. And in Marin, there is concern that marshes could be drowned by sea-level rise, leaving bayside development in Mill Valley and Corte Madera exposed to flooding and storm surge. The report urged communities to make sure tidal marshes have room to retreat inland from sea-level rise.

Contributing writer Gretchen Lang of Belvedere covers the environment. She spent 15 years abroad writing for newspapers including the Boston Globe and the International Herald Tribune.