

# Comment

## TRASH TSUNAMI

# Awash in a sea of synthetics

A car tire. A Japanese traffic cone. Ten-year-old water jugs. Fishing floats from China and Russia. Miles of tangled fishing nets. This is some of the bounty found floating in the middle of the Pacific Ocean in an area called the North Pacific subtropical gyre, which lies between Hawaii and California. Charles Moore, sea captain, sailor and ocean crusader, describes the area's combination of winds and currents as creating "a sort of toilet-bowl effect where you've got a little bit of depression in the middle and a circulating current brings stuff from the edges into the centre."

Since 1999, Capt. Moore has been trawling the ocean's garbage patches in his 50-foot catamaran research vessel *Algalita* ("little kelp plant" in Spanish). "It makes me very upset because I'm basically a marine mammal and my habitat is now trashed," he says.

He came across the gyre back in 1997, as he was returning home from a regatta in Hawaii, and decided to take a shortcut. The North Pacific subtropical gyre is an area of flat calm that sailors tend to avoid like the plague. His craft, however, was equipped with twin diesels and an extra fuel bladder, so he headed into it. Its currents collect decades worth of garbage. For 10 straight days, he couldn't look over the side without seeing plastic debris.

Capt. Moore would later learn that the area he had crossed is also known among oceanographers as the "eastern garbage patch," a term coined by the oceanographer and world-leading expert on floating debris, Curtis Ebbesmeyer. "You have to visualize twice the size of Texas, swirling around like the hand of a clock," says Prof. Ebbesmeyer.

When he examined several specimens of jellyfish from the Pacific under a microscope, he saw long slivers of fishing line and chunks of shredded bags embedded in their bodies. He also took pictures of albatross chicks literally filled with plastic bottle caps, lighters and balloons.

"People have seen the mother birds cough up a plastic toothbrush to give to the chicks," says Capt. Moore. "It's tragic." A former chemistry major and veteran of a Sixties Berkeley commune, Capt. Moore has used his personal inheritance from his family's sulphur plant to fund his non-profit organization, the Algalita Marine Research Foundation.

To quantify the gyre's synthetic soup of debris, he began trawling the patch using what he calls a manta trawl — basically, metal wings with a long, tapering sock to capture anything over one-third of a millimetre in size. He was shocked to discover six pounds of plastic debris for every pound of plankton.

The problem is not limited to the North



A flood of junk is flowing into the sea — some to circulate endlessly in currents, some to be eaten by fish, and then by us, warns TV documentary maker **IAN CONNACHER**



Captain Charles Moore floats near ocean debris as far from land as it's possible to get — halfway between California and Hawaii.

Pacific subtropical gyre: He's now trawling at the mouths of the Los Angeles and San Gabriel rivers, to learn where all this plastic is originating and how it travels. Just a little rain can wash it from the land to the rivers and on to open water. "It doesn't take a lot of rain to give us a lot of debris, because along with the rain

comes the wind and a lot of these things are very light," he says. "The Styrofoam cups and the plastic bags are our modern tumbleweeds."

After 15 minutes, the trawl is brought to the surface. At first, it doesn't look like much — some leaves, some plankton and a few insects. On closer inspection, with

the light just right, one can see tiny shards of blue, pink and white plastic.

The attributes that make plastic so ubiquitous today — it is indestructible, watertight and easy to shape — are the very reasons why it turns up in the middle of the ocean. "No. 1, it doesn't biodegrade," explains Ann Zellers, a research

biologist with the Algalita foundation. "No. 2, it just gets more friable and breaks into smaller pieces. As it breaks into smaller pieces, it becomes food for animals with the same sized mouth."

What's worse, petroleum-based plastics are hydrophobic — water-repellent — but also hydrophilic, which means they attract oily chemicals, some of which are toxic, such as polychlorinated biphenyls or PCBs. These chemicals accumulate in the fatty tissue of fish, and pass up into marine mammals and eventually humans. We'll eventually eat what we toss into the sea.

Capt. Moore steers the vessel past cargo ships anchored in the bay and into open water. He's looking for a line of debris called a "windrow." Within minutes, Styrofoam cups and plastic wrappers begin to appear in a long line stretching out to sea. Excited, Capt. Moore orders the manta trawl into the water.

After 30 minutes, the trawl is emptied. There's a plastic Powerade label, a plastic fork, a foam peanut with some plankton attached to it, and a handful of pre-production plastic pellets called "nurdles." In a three-month period, Capt. Moore's team has recovered more than a million nurdles on Orange County beaches, weighing more than two tons.

"We make a hundred billion pounds of these pellets every year," says Capt. Moore. "Every plastic object starts its life as one of these pellets. And they escape from factories and make their way into the ocean. They're the most common contaminant on our beaches."

Rob Krebs, director of communications for the American Plastics Council, insists that responsibility for this sea of synthetics does not lie with his industry alone: "This is a problem that we all share and understand. It is litter and it's human behaviour that's causing this amount of debris in the ocean."

Capt. Moore thinks one reason humans haven't yet galvanized around the issue of plastics pollution is that the oceans are so vast, it's hard to appreciate the scale of the problem — or the effort required to do something about it. "The average depth of the ocean is over a mile deep," Capt. Moore points out.

Meanwhile, out in the toilet bowl known as the North Pacific subtropical gyre, the human-made bits keep swirling round and round. Ranking environmental problems on a scale from one to 10, "I would rank oil spills as a one," says Prof. Ebbesmeyer. "Plastic is a nine."

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