

Scientists discover abundance of plastic built up in sea ice collected in the Arctic's Northwest Passage

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Brice Loose, URI associate professor of oceanography and chief expedition scientist with the Northwest Passage Project (r), and NPP research team collecting ice cores in the Arctic. Credit: Northwest Passage Project/Camera: Duncan Clark

A research team, led by the University of Rhode Island Graduate School of Oceanography, recently returning from a groundbreaking, 18-day

expedition aboard the Swedish Icebreaker Oden has made a discovery related to plastics in the Arctic Ocean. The team, traveling as part of the National Science Foundation funded Northwest Passage Project (NPP) to investigate the Canadian Arctic Archipelago, discovered a variety of plastics in the sea ice cores collected from floes in the Passage. The team of natural and social scientists, supported by 25 post-secondary students from the U.S. and Canada, were collecting water, ice and air samples as part of the NPP to better understand the impact of climate change on the Arctic environment and biological diversity in the Passage. Over the next few months, the scientists will be analyzing the wealth of samples and data they collected at sea.

According to Brice Loose, URI associate professor of oceanography and the expedition's chief scientist, the team found a disturbing amount of plastic—different types, sizes and colors—in ice cores collected along the ship's route. Since 2014, it's been known that plastic has been appearing in sea ice in the Central Arctic, Beaufort Gyre and the Eurasian Basin. However, this is the first time the presence of plastics has been discovered in ice—both multi-year and first-year ice—from the Northwest Passage.

"At the micro scale, where we used to just see plankton and zooplankton, we found quite a bit of plastic in the sea ice," said Loose.

Building on the research of colleagues who had been looking at the existence of plastics in the Central Arctic, the NPP team collected plastic from ice floes that were up to about 8 feet in thickness. Some of the sea ice collected is believed to have started out in the Central Arctic, moving east through the Nares Strait by Greenland, and then making its way into the Passage's Lancaster Sound last year.

Sea ice, says Loose, acts as a concentrator of everything that is in the water, as a result of the continual flushing of sea water through the ice,

even after its formation. Through this process, the ice tends to build up and concentrate nutrients, algae and—as researchers are discovering—microplastics.

"We thought we would need quite a bit of ice to find the plastics. So we started with an entire core of ice in order to concentrate it down to see how much plastic it contained," said. "As it turned out, there was so much plastic that you could look at it with your naked eye and see all of the beads, fibers and filaments just sitting there in the bottom of the containers."

The collected samples reinforce the observation that ice concentrates microplastics, which are found in a much greater abundance than in an equivalent volume of seawater. This may impact the structure of the ice and its absorption of solar radiation as well as the interaction of [plastic](#) particles with microorganisms, phytoplankton and zooplankton. While these potential relationships have not yet been established for sea ice covered regions, the sheer quantities of microplastics found does underscore how man made waste is impacting the environment—even in more remote, sheltered locations such as the Arctic.

"We don't know yet what the chemical composition of the plastics is," said Loose. "But, even knowing what we knew about the occurrence of plastics across the globe—for us, it was kind of a punch to the stomach to see what looked like a normal sea ice core taken in such a beautiful, pristine environment just chocked full of this material that is so completely foreign."

This is not the first discovery made over the course of the 18-day voyage. On July 25, the Oden recovered a research buoy launched by the Scripps Institution of Oceanography in San Diego that had been lost. The buoy contained a year's worth of recordings of the high-pitched clicks made by Beluga whales and the sounds of other marine mammals.

More information: Northwest Passage Project (NPP):
northwestpassageproject.org/

Provided by University of Rhode Island

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