



PRESS RELEASE (2024/09/24)

New study reveals a countdown to save oceans from plastic pollution

Researchers find that a 32% cut in plastic littering by 2035 is necessary to prevent further water pollution

Fukuoka, Japan—In a report published in [Marine Pollution Bulletin](#), researchers from Kyushu University have for the first time, provided a clear numerical target for global efforts to tackle marine plastic pollution. By mapping the flow and fate of plastic waste in the oceans, the team found that at a minimum there must be a 32% reduction in plastic littering by 2035 to prevent further marine damage.

Marine plastic pollution has been a growing issue for the world, and unless considerable interventions are placed the situation will only get worse. For several years, [Professor Atsuhiko Isobe](#) from Kyushu University's Research Institute for Applied Mechanics has been working to monitor and track plastic pollution in the ocean. In 2022, his research team reported that an estimated [25.3 million metric tons of plastic waste has entered our oceans](#), and nearly two-thirds of that cannot be monitored.

"My research focuses on tracking where plastic waste goes after being released into water sources such as rivers and oceans. We use computer models to track how plastics move and break down over time," explains [Chisa Higuchi](#), first author of the study and Post-doctoral Fellow in Isobe's lab.

Plastic waste persists for a long time; however, larger plastics gradually break down into smaller plastic particles. While larger plastics can be removed more easily, when they become smaller than 5 mm in size they are categorized into microplastics, making them more difficult to collect, and fish are more likely to consume them. So, even if littering stopped today, the amount of microplastics would continue to increase.

At the 2019 G20 Osaka Summit, representatives introduced the Osaka Blue Ocean Vision, with the aim to stop the increase in marine plastic pollution by 2050. This initiative seeks to improve waste management strategies around the world through international collaboration.

Higuchi explains, "We wanted to figure out what would be the ideal scenario for the Osaka Blue Ocean Vision to succeed. So, we utilized computational modeling along with fieldwork studies to understand where and how plastics flow into the oceans."

Researchers studied how long it takes for different types of plastics to break down into smaller particles. Additionally, they collected data from plastic emission routes from rivers and other resources leading to the ocean.

"What we came up with are something akin to weather forecast maps, but instead of showing when and where it will rain, these maps show different scenarios on when and where plastics will end up," explains Higuchi.

According to their trajectory, reducing plastic waste entering oceans by 32%, equivalent to 8.1 million tons, by 2035 would eventually result in more than 50% less plastic in the oceans by 2050. The effect is even more pronounced in heavily polluted areas like the Yellow and East China Seas. Here, plastic waste could be reduced by up to 63% under the team's scenarios.

"Not only does this give the Osaka Blue Ocean Vision concrete targets, but it also gives governments and businesses metric goals," says Higuchi. "Naturally, we need to go beyond cleaning existing pollution; we must cut new plastic waste entering our oceans and rivers."

"This target is attainable if we use strategies like improving waste management, promoting reusable alternatives to single-use plastics, and enhancing public awareness," concludes Isobe. "Many people can be pessimistic when hearing about the ongoing plastic waste problem in our lives. But I remain optimistic that we can find our way out of this predicament."

(By Negar Khalili)

###

For more information about this research, see "Reduction scenarios of plastic waste emission guided by the probability distribution model to avoid additional ocean plastic pollution by 2050s," Chisa Higuchi, Atsuhiko Isobe, *Marine Pollution Bulletin*, <https://doi.org/10.1016/j.marpolbul.2024.116791>

About Kyushu University

Founded in 1911, [Kyushu University](#) is one of Japan's leading research-oriented institutes of higher education, consistently ranking as one of the top ten Japanese universities in the Times Higher Education World University Rankings and the QS World Rankings. The university is one of the seven national universities in Japan, located in Fukuoka, on the island of Kyushu—the most southwestern of Japan's four main islands with a population and land size slightly larger than Belgium. Kyushu U's multiple campuses—home to around 19,000 students and 8000 faculty and staff—are located around Fukuoka City, a coastal metropolis that is frequently ranked among the world's most livable cities and historically known as Japan's gateway to Asia. Through its [VISION 2030](#), Kyushu U will "drive social change with integrative knowledge." By fusing the spectrum of knowledge, from the humanities and arts to engineering and medical sciences, Kyushu U will strengthen its research in the key areas of decarbonization, medicine and health, and environment and food, to tackle society's most pressing issues.



Fig. 1. Plastic trash on the beach in Thailand. Larger plastics are easier to collect, but it will be harder to remove when if they breakdown into microplastics. (Kyushu University/Isobe Lab)

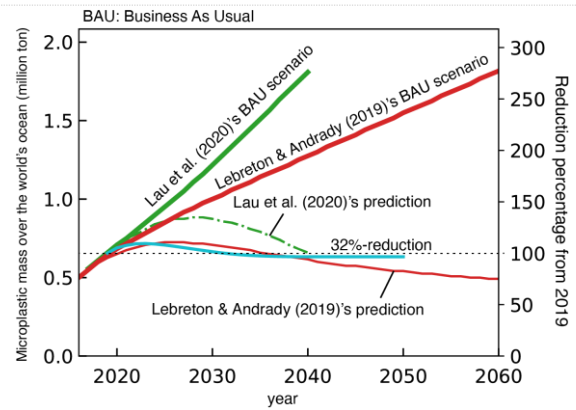


Fig. 2. Modeling microplastic mass in oceans. The graph outlines multiple scenarios on what will happen to plastic waste in the oceans under different interventions, or lack thereof. If we do not intervene and keep littering at the current rate, the microplastic mass will continue to increase. (Kyushu University/Isobe Lab)

[Contact]

Chisa Higuchi, Post-doctoral Fellow
 Research Institute for Applied Mechanics Center for Oceanic and Atmospheric Research
 Tel: +81 92-583-7908
 E-mail: higu@riam.kyushu-u.ac.jp

Atsuhiko Isobe, Professor
 Research Institute for Applied Mechanics Center for Oceanic and Atmospheric Research
 Tel: +81 92-583-7726
 E-mail: aisobe@riam.kyushu-u.ac.jp