



SCIENCE NEWS

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New model predicts how plastic from coast gets to middle of ocean

By [Brooks Hays](#)



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The latest simulations confirmed that the Great Pacific Garbage Patch is indeed the world's most prolific garbage patch. File Photo by Rich Carey/Shutterstock

March 2 (UPI) -- What are the odds that a piece of plastic blown into the surf end up into one of Earth's open-ocean garbage patches?

Scientists in Germany and the United States have developed a new model to predict the pathways of coastal plastic pollution.

To build their model -- described Tuesday [in the journal Chaos](#) -- researchers analyzed the movement data from surface buoys in different parts of Earth's oceans. Scientists relied on what's called transition path theory to work out the relationships between different ocean regions.

"Surface debris is released from the coast and distributed according to their location's share of the global land-based plastic waste entering the ocean," lead study author Philippe Miron said in a news release.

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"To observe the long-term distribution of floating debris, beached debris is reinjected into the system following the same distribution. We call this model 'pollution aware,' because it models the injection, dispersion, and recirculation of debris within the system," said Miron, an assistant scientist at the University of Miami.

Researchers used their new model able to simulate the trajectories of plastic pollution and calculate the odds of a piece of plastic making it from one ocean region to another.

"In this work, we focus on pathways from the coast to the subtropical gyres, from one gyre to another, and from the gyres to the coast," Miron said.

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The world's most famous garbage patch, the Great Pacific Garbage Patch, is located in the North Pacific, but Earth's oceans are home to numerous gyres that concentrate plastic pollution.

The odds of a piece of plastic ending up in any one gyre is at least partially dependent

on the ability of other gyre's to retain the trash they've accumulated.

The model developed by Miron and his colleagues was able to not just simulate the pathways between different gyres, but also the odds of a piece of plastic escaping one to join another.

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"We identified a high-probability transition channel connecting the Great Pacific Garbage Patch with the coasts of eastern Asia, which suggests an important source of plastic pollution there," said Miron. "And the weakness of the Indian Ocean gyre as a plastic debris trap is consistent with transition paths not converging within the gyre."

The model showed that most regional gyres are only weakly connected.

"Indeed, in the event of anomalously intense winds, a subtropical gyre is more likely to export garbage toward the coastlines than into another gyre," Miron said.

The latest simulations showed the Great Pacific Garbage Patch is indeed the world's most prolific garbage patch.

But the models also determined the South Pacific actually retains a larger percentage of its trash, as there are fewer pathways in and out of the South Pacific Garbage Patch.

"Our results, including prospects for garbage patches yet to be directly or robustly observed, namely in the Gulf of Guinea and in the Bay of Bengal, have implications for ocean cleanup activities," said Miron. "The reactive pollution routes we found provide targets -- aside from the great garbage patches themselves -- for those cleanup efforts."

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