

The Great Pacific Garbage Patch

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In news– In a recent study, researchers from Canada, the Netherlands, and the U.S. have **reported that coastal lifeforms have colonised plastic items in the Great Pacific Garbage Patch**, throwing up many dubious firsts.

Key findings-

- **The tsunami off the Japanese coast in 2011 contributed to the debris in this garbage patch.**
- Until at least 2017, researchers had found debris washing ashore on the West coast of North America containing live lifeforms originally found in Japan.
- From November 2018 to January 2019, researchers collected 105 pieces of plastic debris from the eastern part of the **North Pacific Subtropical Gyre (NPSG)**, the most heavily plastic-polluted ocean gyre on the globe.
- Based on studying them, **they reported that 98% of the debris items had invertebrate organisms.**
- They also found that **pelagic species (i.e. of the open ocean) were present on 94.3% of them and coastal species, on 70.5%.** That is, organisms found on coasts were getting by on small floating islands of garbage (to humans) out in the Pacific Ocean.
- The number of coastal species such as arthropods and molluscs identified rafting on plastic was over three-times greater than that of pelagic species that normally live in the open ocean.
- In all, **they found organisms belonging to 46 taxa, and 37 of them were coastal;** the rest were pelagic.
- Among both coastal and pelagic organisms, crustaceans were the most common.
- The coastal species were most commonly found on fishing

nets whereas the pelagic species, on crates.

- According to the paper, “**Nearly all taxa were of Northwest Pacific origin**”, including Japan.
- Similarly, most debris items (85.7%) did not have identifiable markings linked to origin, such as manufacture locations or company/brand names.
- However, eight of the remainder were from East Asia and five specifically from Japan. Four items were from North America.
- The researchers also found that 68% of the coastal taxa and 33% of the pelagic taxa reproduced asexually, and that there was evidence of sexual reproduction among the hydroids and the crustaceans, among others. They found a strong positive correlation between reproduction and mobility.



What is the Great Pacific Garbage Patch?

- There are some water currents in the oceans that, driven by winds and the Coriolis force, form loops. These are called gyres.
- The North Pacific Subtropical Gyre (NPSG) is one such, located just north of the equator in the Pacific Ocean.
- It consists of the Kuroshio, North Pacific, California, and North Equatorial currents and moves in a clockwise direction.
- These currents flow adjacent to 51 Pacific Rim countries. Any trash that enters one of these currents, from any of these countries, could become part of the

gyre.

- **Inside this gyre, just north of Hawai'i, lies a long east-west strip where some of the debris in these currents has collected over the years.**
- **The eastern part of this is the Great Pacific Garbage Patch.** It is, as per one estimate, **1.6 million sq. km big and more than 50 years old.**
- **The patch contains** an estimated 45,000-1,29,000 metric tonnes of plastic, **predominantly in the form of microplastics.**
- The numerical density of plastics here is around 4 particles per cubic metre.
- Mass-wise, however, **heavier, more visible objects** that haven't yet broken down into smaller particles accounted for 92% in 2018.