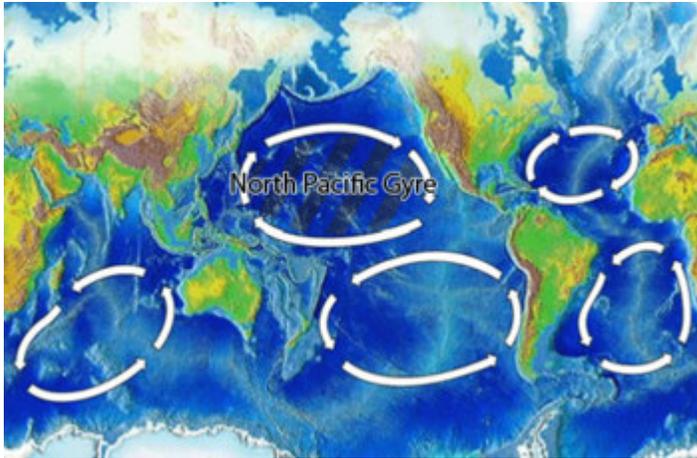


Great Pacific Garbage

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The Garbage Patch is located within the [North Pacific Gyre](#), one of the five major oceanic [gyres](#).

The **Great Pacific Garbage Patch**, also described as the **Eastern Garbage Patch** or the **Pacific Trash Vortex**, is a [gyre](#) of [marine debris](#) in the central North Pacific Ocean located roughly between 135° to 155°W and 35° to 42°N. The patch is characterized by exceptionally high concentrations of suspended plastic and other debris that have been trapped by the currents of the [North Pacific Gyre](#).

Discovery The existence of the Eastern Garbage Patch was predicted in a 1988 paper published by the [National Oceanic and Atmospheric Administration](#) (NOAA) of the [United States](#). The prediction was based on experimental results obtained by several Alaska-based researchers between 1985 and 1988 that measured [neustonic plastic](#) in the North Pacific Ocean.^[1] This research found high concentrations of marine debris accumulating in regions governed by particular patterns of ocean currents. Extrapolating from findings in the [Sea of Japan](#), the researchers postulated that similar conditions would occur in other parts of the Pacific Ocean where prevailing currents were favourable to the creation of relatively stable bodies of water. They specifically indicated the North Pacific Gyre.^[2] The existence of the garbage patch received wider public and scientific attention after it was documented in several articles written by Charles Moore, a California-based sea captain and [ocean researcher](#). Moore, returning home through the North Pacific Gyre after competing in the [Transpac](#) sailing race, came upon an enormous stretch of floating debris. Moore alerted the [oceanographer Curtis Ebbesmeyer](#) to the existence of the phenomenon, who subsequently dubbed the region the “Eastern Garbage Patch” (EGP). The area is frequently featured in media reports as an exceptional example of [marine pollution](#).^[3]

Formation Like other areas of concentrated marine debris in the world’s oceans, the Eastern Garbage Patch has formed gradually over time as a result of marine pollution gathered by the action of oceanic currents. The garbage patch occupies a large and relatively stationary region of the North Pacific Ocean bound by the North Pacific Gyre (a remote area commonly referred to as the [horse latitudes](#)). The rotational pattern created by the North Pacific Gyre draws in waste material from across the North Pacific Ocean, including the coastal waters off North America and Japan. As material is captured in the currents, wind-driven surface currents gradually move floating debris toward the center, trapping it in the region. The size of the affected region is unknown, but estimates range from 700,000 km² to more than 15 million km², (0.41% to 8.1% of the size of the Pacific Ocean). The area may contain over 100 million tons of debris.^[4] It has also been suggested that the patch may represent two areas of debris that are linked.^[5] **Sources of pollutants** **Charles Moore** estimates that 80% of the garbage comes from land-based sources, and 20% from ships at sea.^[6] Moore states that currents carry debris from the east coast of Asia to the center of the gyre in a year or less, and debris from the west coast of North America in about five years.^[6] **Plastic photodegradation in the ocean** The Eastern Garbage Patch has one of the highest levels of plastic particulate suspended in the upper water column. As a result, it is one of several oceanic regions where researchers have studied the effects and impact of plastic [photodegradation](#) in the neustonic layer of water.^[7] Unlike debris which [biodegrades](#), the photodegraded plastic disintegrates into ever smaller pieces while remaining a [polymer](#). This process continues down to the [molecular level](#).

As the plastic [flotsam](#) photodegrades into smaller and smaller pieces, it concentrates in the upper water column. As it disintegrates, the plastic ultimately becomes small enough to be ingested by aquatic organisms which reside near the ocean’s surface. Plastic waste thus enters the [food chain](#) through its intense concentration in the [neuston](#). **Density of neustonic plastics** Despite **Charles Moore’s** description, the eastern garbage patch cannot be characterised as a continuous visible field of densely floating marine debris. The process of disintegration means that the plastic particulate in much of the affected region may be too small to be seen. Researchers must estimate the overall extent and density of plastic pollution in the EGP by taking samples. In a 2001 study, researchers (including Moore) found that in certain areas of the patch, concentrations of plastic reached one million particles per square mile.^[8] The study found concentrations of plastics at 3.34 pieces with a mean mass of 5.1 [milligrams](#) per square meter. In many areas of the affected region, the overall concentration of plastics was greater than the concentration of [zooplankton](#) by a factor of seven. Samples collected at deeper points in the water column found much lower levels of plastic debris (primarily [monofilament fishing line](#)), confirming earlier observations that most plastic waste concentrates in the upper parts of the water column. **Impact on wildlife** see other side.