

Marine Debris on Fraser Island

Being surrounded by water doesn't insulate Fraser Island from pollution from abroad. The pollutants can be soluble (chemicals and radiation), suspended (silt), and floating (debris). This FIDO Backgrounder No. 70 examines the issues surrounding the floating debris being deposited on Fraser Island's shores, its source and its impacts.



Five major oceanic gyres

Gyres

There are five major oceanic gyres but the North Pacific Gyre is by far the largest. It has a clockwise circular pattern and is formed by four prevailing ocean currents. It is the site of an unusually intense collection of man-made marine debris, known as the Great Pacific Garbage Patch. The amount of debris in the Great Pacific Garbage Patch accumulates because much of it is not biodegradable. Many plastics, for instance, do not wear down; they simply break into tinier and tinier pieces.

The garbage in the gyres doesn't form into an island of trash floating on the ocean. The gyres are almost entirely made up of tiny bits of plastic, called microplastics. Microplastics can't always be seen by the naked eye. Even satellite imagery doesn't show a giant patch of garbage. The

microplastics of the Great Pacific Garbage Patch can simply make the water look like a cloudy soup. This soup is intermixed with larger items, such as fishing gear and shoes. The seafloor below may also be an underwater trash heap. Oceanographers and ecologists recently discovered that about 70% of marine debris sinks to the bottom of the ocean.

Not all of the marine debris ends up in gyres in mid-ocean. Some debris is swirled out to land on beaches such as on Fraser Island (Kgari)

Plastics

Plastics were only invented in the 1940s. Since then their use and volume of production globally has grown exponentially. So has the proportion of marine debris that is some form of plastic. The global demand for plastics results in the manufacture of almost 250,000,000 tonnes annually. About 75-80 million tonnes of plastics annually are used in packaging and plastic packaging is a major source of marine debris. In developed countries, about a third of plastic is used in packaging and another third in buildings. Luckily not all of the plastics used in packaging ends up in the marine environment but a significant

Decomposition

While organic debris biodegrades, photo-degraded plastic disintegrates into ever smaller pieces while remaining a polymer. This process continues down to the molecular level. Some plastics decompose within a year of entering the water, leaching potentially toxic chemicals such as bisphenol A, PCBs, and derivatives of polystyrene. The process of disintegration means that the plastic particulate in much of the affected region is too small to be seen.

Wildlife Impacts

A study done in the North Pacific found plastic particles in the stomachs of 8 of the 11 seabird species caught as by-catch. Plastics affect at least

267 species worldwide, including 86% of all sea turtle species, 44% of all seabird species, and 43% of all marine mammal species. Studies have shown that ingestion of plastics by seabirds had significantly increased during the 10-15 years interval between studies. The deleterious impacts on marine biota arise mainly due to ingestion of plastic debris and entanglement in packaging bands, synthetic ropes and lines, or drift nets.

K'Gari Marine Debris of the past

In the 1960s enough sawn timber washed ashore to allow Fraser Island resident Bob Oldfield to build much of his Eurong house with it. Thousands of glass buoys used to support Japanese fishing nets washed ashore along the beach. They were eagerly collected. Eager eyes looked for such flotsam after any big blow. Some were sold, but many were draped around K'Gari houses.

Many glass bottles were also deposited on the beach. Mostly they had held sake or other alcohol drinks and were casually tossed overboard. In the early 1970s Charlie Sinclair was beachcombing and found a note inside. He responded to the note. The bottle had been dropped overboard from a tramp steamer near New Caledonia many months earlier by an American Professor checking the ocean currents of the Pacific. In 2013 Don and Lesley Bradley found a bottle containing two Americans' business cards in it near Sandy Cape. It had been dropped in the ocean off either New Caledonia or West Samoa.

In the 1987 Cyclone Uma caused huge flooding in Vanuatu. Many huge trees lining rivers were scoured out by the torrents and carried by Pacific currents. Many of the larger logs remained a serious hazard for K'Gari beach traffic for some years.

The 2013 floods in the Burnett River carried much debris across Hervey Bay to be deposited on K'Gari's western beach particularly around the island's top end but a yacht washed up near Awinya Creek.

The ocean has deposited most debris on Fraser Island's Ocean Beach including many deposits of pumice from various volcanic eruptions around the Pacific. Amongst the debris of the 1970s were lots of thongs. While the marine debris is more visible on the Ocean side, the flood debris washed down the Mary River to be deposited on Great Sandy Strait is less obvious.

K'Gari's Ocean Beach

Despite a number of clean-ups along the Ocean beach unnatural litter continues to accumulate. That ignores pumice and the occasional flood debris that gets carried down Great Sandy Strait and ends up deposited along the beach south of Dilli Village. The heaviest concentrations of marine debris occurs around creek outlets where wave action takes advantage of the freshwater discharge to push the debris to the base of the foredunes where it may be covered up by sand only to be exposed by storm erosion. FIDO has recently attempted to gather the plastic litter in the vicinity of the beach car-park for Wabby Lakes. The volunteers were surprised by the number of small pieces of broken up bits of plastic that could be seen with the naked eye and they were only coloured plastics lying on the surface.

A number of groups including the 4WD clubs and OceanWatch Australia have been undertaking small and large scale litter clean-ups. OceanWatch has also been conducting litter monitoring. These are unfortunately not as well spread out across the calendar year as desirable.

FINIA is now working on a program to improve the coordination and logistics for gathering marine debris in the future.

What you see and what you can't: A previously overlooked form of plastics pollution are the small fragments of plastic (usually up to 0.5 mm across) that come from hand cleaners, cosmetic preparations and air-blast cleaning media. The environmental impact of these particles, as well as similar sized flakes from degradation of larger plastic litter, has not been properly established yet.

Seabirds with large plastic loads have reduced food consumption, which limits their ability to lay down fat deposits, thus reducing fitness. Other harmful effects from the ingestion of plastics include blockage of gastric enzyme secretion, diminished feeding stimulus, lowered steroid hormone levels, delayed ovulation and reproductive failure.



This varied assortment of marine debris was collected along about 50 metres on the remote uninhabited Tuma Island in PNG's Trobriand Island group. It is composed mainly of plastics.

K'Gari's Western shore

Plastic marine debris can be found on both sides of Fraser Island. The mangrove lined section of Great Sandy Strait and depositions of silt makes assessment of the scale of the visible marine debris washing up on Fraser Island's western shores difficult. However the discharges from the Mary River contains a lot plastic and silt as well as a lot of organic matter which is mainly flood debris. The amount of plastic (suspected to be mainly plastic shopping bags) and the origins is a great unknown and there are moves afoot to try to get a better understanding of the marine debris deposited between Moon Point and Hook Point. At present there is only supposition.

A 2008 BMRG study of the State of the Estuarine Environment reported on three west coast estuaries on Fraser Island: Wathumba, Bogimbah and Coongul Creeks. Like other estuaries in the region, the survey found low levels of litter and accumulation rates in Coongul. moderate levels of litter present but no new accumulation of litter in Bogimbah Creek, and high levels of litter accumulation in Wathumba Creek that has the largest estuary and is popular with yachties. If the other yachties' haven at Garry's Anchorage proves to have similar findings, then it seems that this yachtie-generated marine debris should be addressed by the yachting fraternity.

Between Moon Point and Sandy Cape there have been recent assessments. Little litter has originated from campers but severe flooding in the Burnett River has been washed ashore in the northern parts of Platypus Bay and Sandy Cape. Some litter is quite large such as this yacht washed out of the Burnett River in 2013 floods that may take years to degrade:



From its earliest days FIDO has been aware of the impacts of marine debris ending up on Fraser Island but there were other greater imperatives to deal with such as sandmining. In 1975 the Hervey Bay State High School decided to undertake a clean-up of the Ocean Beach and FIDO provided our camping equipment and transport to assist. Almost all of the debris came from ships. That remains the case, but it means environmentalists that get the ships to stop allowing any form of plastic being tossed or lost overboard at sea. FIDO is now supporting FINIA to assess and address the marine debris issue on K'Gari.