

# Far North Queensland Marine Debris Project

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## ABSTRACT

Citizen scientists without access to oceanic research vessels can gain a sense of the state of our nearby seas and oceans and the human impact on them at accessible coastal locations. Observation and analysis of the debris coming ashore can improve our perception of the problem and our understanding of the processes at work. Accumulating data from beach cleanups provides a growing knowledge base for conducting public education and influencing changes of practice at both individual, community, industry and government levels.

Tangaroa Blue Ocean Care Society, under its Australian Marine Debris Initiative, launched The Far North Queensland Marine Debris Project in 2007 engaging volunteers, communities, government and industries in the mitigation of marine debris between the Torres Strait Islands and Gladstone.

The Far North Queensland Marine Debris Project was formed to enable volunteers and citizen scientists to identify items of marine debris, tracing to the source wherever possible. This then provides data, evidence and information which can be used by all stakeholders to find practical solutions to the types and amounts of marine debris impacting each cleanup site.

This presentation will discuss how Tangaroa Blue Ocean Care Society developed the Far North Queensland Marine Debris Project, a summary of the data collected through the project, the importance of partnerships in the success of the project, as well as solutions and recommendations to stop the flow of marine debris into our oceans.

## INTRODUCTION

Photo 1: Turtles can confuse plastic bags for their natural prey jellyfish. Photo: Tray Mayne



The impacts of marine debris on the marine environment and fauna are well documented: "Injury and fatality to vertebrate marine life caused by ingestion of, or entanglement in, harmful marine debris" was listed in August 2003 as a key threatening process under the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). The Australian Government's Threat Abatement Plan for the impacts of marine debris on vertebrate marine life (1) – states that "Harmful marine debris impacts on a range of marine life, including protected species of birds, sharks, turtles and marine mammals." Twenty

marine species listed as threatened under the EPBC Act were identified as part of the designation of marine debris as a key threatening process, as they are known to be impacted by harmful marine debris. Impacts of marine debris on wildlife include entanglement that can cause restricted mobility, drowning, starvation, smothering and wounding, in turn leading to infections, amputation of limbs and death. Debris such as plastic bags, rubber, balloons, plastic fragments and confectionery wrappers may be confused with prey species and ingested by marine wildlife, causing physical blockages in the digestive system leading to internal injuries and starvation. There is also increasing concern about the impact of micro plastic particles coming from several sources, but mainly from the breakdown of beach litter. Micro plastics enter the food web at very

basic levels (e.g. zooplankton) and transport harmful persistent chemicals into the food web via this pathway.

In 2004 Tangaroa Blue Ocean Care Society (TBOCS) founded the West Australian Marine Debris Project to focus on the issue of marine debris, and in 2007 this model was brought to the Far North Queensland coastline with an aim of finding ways of reducing the amount of marine debris making its way into our oceans and impacting on our marine life. In 2010 the Australian Marine Debris Initiative was formed, and now there are ongoing marine debris programs operating around Australia, New Zealand and Hawaii.

Beaches are the one place where the average citizen can directly experience the problem of marine debris and begin their contribution to its solution. Many citizens are ready to act to protect their local coastal environments and by encouraging them to identify and record their findings the overall experience can be broadened and valuable data and information obtained.

The importance of removing plastic debris from beaches needs to be stressed. Reducing the exposure of marine life to plastic debris, such as ingestible plastic, rope, cigarette butts and so on is essential and will be an ongoing task. There is also a second main reason and that is the importance of removing plastic litter from beaches before it begins to weather and produce micro particles. A recent paper discussing micro plastics in the marine environment underlines beach cleanups as an “effective mitigation strategy” which “can have an ecological benefit far beyond the aesthetic improvements of beaches, and by removing micro plastics, contributes towards the health of the food web”. (2)

## BACKGROUND

Photo 2: Volunteers clean up on Snapper Island.



Since 2007, Tangaroa Blue Ocean Care Society volunteers have conducted regular coastal cleanups on beaches between the Whitsunday Islands, Cape York and the Torres Strait Islands, in Far North Queensland. During this time more than 2,700 volunteers have removed over 276,000 items of marine debris. Data collected during clean ups indicate that marine debris is continually present along the Far North Queensland coastline, originates from a variety of sources and impacts on local marine life including turtles, dugongs, whales and seabirds.

The Far North Queensland Marine Debris Project comprises:

1. The annual Snapper Island & Cape Kimberley Beach Clean Ups – community coastal cleanup events in the Daintree region of Queensland;
2. Since 2007, nine sites along the Far North Queensland coastline have been monitored on a monthly basis and detailed data collected on marine debris found, significant weather changes and major beach erosion occurrences. AQIS tags, oil spills and other reportable finds have also been reported to the appropriate authorities and data used by government agencies including the CSIRO;
3. One-off cleanups by community members and organisations have contributed to the project through the removal of debris, data collection and anecdotal and summary reports from many additional locations.

## METHODS

To mitigate marine debris many aspects need to be addressed. The Far North Queensland Marine Debris Project focuses on the removal of debris from the coast, data collection and tracing of debris to find its sources, workshops and reports to examine ways to change practices and designs to reduce marine debris. Presentations and workshops are carried out to educate the broader community, industry and agencies on the impacts of marine debris and practical ways we can all help to reduce it. Our methods include:

1. Workshops to train volunteers in collection and data recording methods;

2. Provision of marine debris educational materials including our Marine Debris Identification Manual and the Marine Debris Fact Sheets;

3. Marine debris educational presentations for community groups and schools. The project has a strong educational message, which is spread through the community via presentations and workshops and is key to creating a stewardship for local communities for their coastal and marine environments;

4. Our educational marine debris website [www.oceancare.org.au](http://www.oceancare.org.au) is a networking tool for organisations, industries, government agencies, schools and the broader community focusing on marine debris issues. We have had over 9.9 million hits on the site since mid 2007, and over 1,948 registered users from around the world;

5. Papers and reports based on the data collection in the project are distributed to all stakeholders and interested parties to enable policy, legislation and best practices to be implemented, based on the issues identified through the data.

## RESULTS

The Far North Queensland Marine Debris Project has continued to expand in both geographical terms and numbers of volunteers, supporters and partners.

There is now a growing network of individuals and organisations committed to tackling the problem of marine debris in Queensland. This network is established throughout regional Queensland and is able to submit data in a uniform format into a central database thus providing some broad descriptive statistics which are uniform and comparable across the state and also nationally.

The table below illustrates this by showing, for example, that over 50% of the beach debris recorded at 4 Mile Beach, Port Douglas results from beach littering and other local sources



Photo 3: Volunteers collecting data at Cape Kimberley

Photo 4: Chili Beach plastic is predominantly from offshore sources.



such as emissions from drains and creeks. Chili Beach near Lockhart River, on the other hand receives 96% of its marine debris from distant sources.

Table 1: Litter index and percentage of plastic items for selected cleanup areas

Region	Index of litter locally generated	Index of litter from offshore sources	Plastic percentage	Cleanup details
Torres Strait Islands	0.68	0.32	53%	5 islands, 19 cleanups
Chili Beach	0.04	0.96	90%	Chili Beach, 7 cleanups
Port Douglas 4 Mile Beach	0.52	0.48	76%	153 cleanups
Whitsunday Mainland	.42	.58	57%	4 cleanups
Whitsunday Islands	.17	.83	89%	8 cleanups, 6 Islands

The very high levels of plastic found at remote sites demonstrates how the more buoyant plastic items migrate to these sites where they begin breaking down and forming micro plastics, while items such as plastic bags and cigarette butts tend to remain closer to their point of origin, either submerging into the water column, degrading quickly or becoming snagged or trapped. The table below shows the top ten marine debris items found during beach clean ups for the whole state of Queensland.

Table 2: Top 10 marine debris items from all Queensland data

Top 10 Items (Queensland data)	Sum Of Total
Plastic Hard Pieces	99,967
Lids/Bottle Tops/Corks	24,247
Polystyrene Foam	21,152
Cigarettes/Filters	17,319
Plastic Drink Bottles	12,279
Glass Broken	11,201
Aluminium Cans	8,515
Plastic Wrap - Food	7,501
Broken Glass/Crockery	4,947
Glass Beer Stubbies	4,803
10	211,931

## DISCUSSION

Large volumes of marine debris are consistently recorded during beach cleanups along the Queensland coast. There is considerable available literature on the impact of this debris on sea mammals, turtles and sea birds. Impacts on fish species are less documented and impacts at basic levels of the food web from micro plastics are largely unstudied. Our litter index, when averaged for the whole state of Queensland, shows half of all debris found so far could have been prevented. Much of this preventable debris is plastic, single-use packaging. Our data also shows large amounts of plastic in the process of breaking down into micro plastics on remote coastal and island beaches. Marine debris presents a serious threat to the ecological health of Queensland's marine environment.

## CONCLUSIONS

With the continued occurrence of marine debris on Far North Queensland beaches, it is critical that industries and governments take proactive steps in changing and improving products, tools and legislation in order to have a resulting effect on the current unsustainable situation. Marine debris prevention needs to begin at the planning and design stages of community, industry and government activities.



Photo 5: An example of the foam from a weather balloon found at Tongue Reef.

For example, polystyrene foam is both a hazard to marine life and the third highest item found during beach cleanups. A contributor to this polystyrene foam load comes from the Bureau of Meteorology's weather balloons that are let off at offices around Australia in some cases more than 4 times a day. This item is made of polystyrene foam, silver lining, balloons, string and at night torches with batteries. Both new and broken down parts of this item are being recovered continuously both out on reefs of the Great Barrier Reef and along beaches between Whitsundays and Cape York. We would urge the Bureau of Meteorology to look at this item and find an environmentally safe alternative for this purpose.

Environmentally safe products and packaging is the responsibility of both manufacturers and consumers.

The Far North Queensland region is well-known for its high social value providing many recreational activities including snorkelling, diving, recreational fishing and spending time at the beach. The data suggests that people engaging in these activities also contribute to high levels of marine debris. Infrastructure provided by local and state authorities is key to providing people the option to dispose of their rubbish correctly. Large amounts of litter have consistently been found at popular beaches including 4 Mile Beach, Port Douglas, adjacent to the Great Barrier Reef. There is very limited rubbish infrastructure available for visitors and no enforcement of anti-litter and beach fire laws, which contributes to much rubbish being left along the beach.

Enforcement of anti-littering laws by local Shire Rangers is vital in getting the message across to those community members who offend and do not learn by other means.

There is increasing scope to design data collection strategies for targeted areas and for ongoing monitoring, and, looking ahead this will be a focus for Tangaroa Blue Ocean Care Society. In addition, we look forward to further expansion of the Marine Debris Project as a national initiative and invite any organisation or agency interested in joining or creating a Marine Debris Project in their area to contact Tangaroa Blue Ocean Care Society.

The close partnerships formed with government agencies, organisations, industry members and the broader community has enabled the beginnings of an holistic approach to addressing marine debris in Far North Queensland and given rise to a successful and long-term monitoring project.

## TAKE HOME MESSAGES

Include marine debris prevention in your planning whether it be for a trip to the beach, buying a consumer item, planning the construction of a coastal facility or any other activity.

Everyone can make a difference!

## **ACKNOWLEDGMENTS**

We would like to thank the Great Barrier Reef Marine Park Authority and the Reef Guardian Schools Program, Department of Environment and Resource Management, Keep Australia Beautiful Council QLD, Cairns Regional Council, Port Douglas Coast Guard, Eco Barge Services Airlie Beach, Port Douglas Local Marine Advisory Committee, Low Isles Preservation Society, Kawadji Kanidji Indigenous Land and Sea Rangers, Yuku-Baja-Muliku Rangers, Cape York Marine Advisory Group and Douglas Shire Sustainability Group for their continued support. Many hands make light work!

We would also like to show our appreciation and thanks to the volunteers who have removed such a huge amount of debris from our coastline over the years, helping to protect our marine environment.

## **REFERENCES**

- (1) Australian Government (2009) Threat Abatement Plan for the impacts of marine debris on vertebrate marine life
- (2) Andrady A (2011) Microplastics in the Marine Environment