TANGAROA BLUE OCEAN CARE SOCIETY

2009 Far North Queensland Marine Debris Project Report

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"Pollution is a symbol of design failure." *William McDonough, American architect.*

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1. EXECUTIVE SUMMARY

Tangaroa Blue Ocean Care Society (TBOCS), www.oceancare.org.au is a non-profit organisation dedicated to ocean conservation and protection.

The goals of the society are:

- To create community awareness of marine environmental and conservation issues through marine environment science projects; and
- To proactively participate in and organise marine conservation projects which address marine conservation issues.

In 2004 TBOCS founded the South West Marine Debris Project (SWMDP) to focus on the issue of marine debris in the south west region of Western Australia. The aim of the project is to find ways of reducing the amount of marine debris making its way into our oceans and impacting marine life.

In 2007 TBOCS launched the Far North Queensland Marine Debris Project (FNQMDP) with an aim of identifying the types of debris that is impacting the region, then to find ways of reducing those items from ending up in the ocean.

Over 3,000 TBOCS volunteers have collected more than 500,000 items of rubbish from beaches around Australia and New Zealand since 2004. In its fifth year of the Australian Marine Debris Project, data on what is making up the debris and where it is coming from is helping to create strategies to reduce the amount of rubbish in local waters.

In every square mile of ocean it is estimated that there are over 46,000 pieces of plastic, resulting in the deaths of more than 1 million seabirds and 100,000 marine animals every year. This includes 20 Australian endangered animals, including sharks, turtles and marine mammals.

Impacts of marine debris on wildlife include entanglement that can cause restricted mobility, drowning, starvation, smothering and wounding, which in turn leads to infections, amputation of limbs and death. Debris may also be confused with prey species and ingested by marine wildlife, causing physical blockage in the digestive system and leading to internal injuries and starvation.

Table 1.1 Summary of the monitoring clean ups from Far North QLD beaches in 2009.

Number of volunteers	895
Number of individual cleanup sites	27
Number of individual pieces of marine debris collected	61,453
Weight of marine debris collected	3,233.4kg
Number of bags filled	591
Number of kilometres cleaned over the project period	389.3km
% of marine debris made of plastic	66%

Debris collected during the year produced data which shows an endemic litter problem in the major population and tourist centres adjacent to the Great Barrier Reef. Data suggests this litter accumulates and remains confined within the lagoon system of the reef but with a northward movement towards the Cape York region. At the south end of the reef more ocean sourced debris is evident. Future data from both the south end of the reef and the Torres Strait areas will shed light on the processes in those areas.

Based on the FNQMDP data we estimate 53% of all rubbish collected during the project results from littering. Of the total rubbish collected, 47% is made up of consumer end user and packaging items, the FNQMDP will therefore target cigarette butts and plastic packaging ending up as marine debris in 2010.

In particular, 4 Mile Beach, Port Douglas has high visitation numbers, and data has shown that 55% of the debris found on this beach is end user items and packaging. We believe that this strongly correlates with the lack of rubbish bin infrastructure along the beach and recommend at least 3 additional bins with educational stickers/signage be positioned along the beach access points.

Illegal beach fires are also a problem on many north Queensland beaches. These fires are often left still burning with broken glass bottles, cigarette butts, drug paraphernalia and other litter smouldering. Not only is this an eyesore, but a potential hazard to beach users, in particular children.

Partnerships between the local council, local police, Department of Environment and Resource Management and the Great Barrier Reef Marine Park Authority to enforce anti-littering laws and beach fire laws are vital in getting the message across to those community members who offend and do not learn by other means.

Hundreds of plastic flowers left on the beach after wedding ceremonies were collected during cleanups in 2009. We recommend that as part of the contract between the wedding parties and local authorities that the use of these plastic flowers be banned from beach weddings to prevent them from becoming marine debris.

We've also become aware of a misconception in the community about the availability of recycling by local council. Many people use both recycling bins and normal waste bins for both types of rubbish with a belief that recycling does not occur in the region. We would like council to provide an educational campaign to show the recycling process in the region and information on what types of rubbish can be recycled to assist in the maximum amount of rubbish being recycled as possible.

During 2009, the FNQMDP project has successfully delivered an educational message on the impacts of marine debris throughout the community via educational presentations at schools and community groups engaging over 560 participants.

There have also been over 9 million hits on the www.oceancare.org.au website which has assisted TBOCS in promoting and expanding marine debris projects throughout Queensland, Australia and New Zealand.

Further detailed information on the marine debris collected during the 2009 Far North Queensland Marine Debris Project is available on request.

2. INTRODUCTION

Tangaroa Blue Ocean Care Society, www.oceancare.org.au - is a non-profit organisation dedicated to ocean conservation and protection.

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- To create community awareness of marine environmental and conservation issues through marine environment science projects; and
- To proactively participate in and organise marine conservation projects which address marine conservation issues.

In 2004 TBOCS founded the South West Marine Debris Project (SWMDP) to focus on the issue of marine debris in the south west region of Western Australia. The aim of the project is to find ways of reducing the amount of marine debris making its way into our oceans and impacting marine life.

In 2007 TBOCS launched the Far North Queensland Marine Debris Project (FNQMDP) with an aim of identifying the types of debris that are impacting the region, as well as finding ways of reducing those items from ending up in the ocean.

The Far North Queensland Marine Debris Project comprises:

- The annual Snapper Island Clean Up – a community clean up event on Snapper Island;
- Monthly marine debris monitoring of 4 northern Queensland beaches and one island;
- An educational marine debris website www.oceancare.org.au;
- Marine Debris Educational Presentations for community groups and schools;
- Marine Debris Educational Materials including the Marine Debris Identification Manual and the Marine Debris Fact Sheets;
- Scientific papers and reports based on the data collected in the project.

The 2009 Far North Queensland Marine Debris Project Report aims to provide an update of our research findings and a list of recommendations which focus on reducing the amount of marine debris being found in local waters.

Thanks to the following government agencies and organisations for funding and support, enabling us to continue the South West Marine Debris Project.

3. THE IMPACT OF MARINE DEBRIS

Photo copyright & courtesy of Tray Mayne

Under *Key Threatening Processes* in the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*, "harmful marine debris" is defined as consisting of: "…land sourced plastic garbage, fishing gear from recreational and commercial fishing abandoned into the sea, and ship sourced, solid non-biodegradable floating materials disposed of at sea."

'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 Draft Threat Abatement Plan for the impacts of marine debris on vertebrate marine life 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 being 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 blockage in the digestive system and leading to internal injuries and starvation. Within marine food webs, plastic debris can also serve as a transport medium and a potential source of toxic chemicals such as polychlorinated biphenyls (PCBs), endocrine-active substances, and chemicals similar to dichlorodiphenyltrichloroethane (DDT). These chemicals are known to compromise immunity and cause infertility in animals, even at very low levels.

- "Every year more than 6 million tonnes of rubbish are dumped in the world's oceans."
The Department of Environment and Heritage's "Keep the Sea Plastic Free – Bin It"

- "In every square mile of ocean it is estimated that there are over 46,000 pieces of plastic."
The Department of Environment and Heritage's "Keep the Sea Plastic Free – Bin It"

"About one million seabirds and 100,000 marine mammals (including 30,000 seals) and turtles are killed by plastic marine litter every year, around the world." *Dr David Kemp, Minister for the Environment & Heritage March 2004*

Plastics are polymers which are made up of individual units called monomers. Plastics photodegrade when exposed to sunlight. When plastic breaks down it does not fully degrade but simply becomes more and more smaller pieces of the same material. Plastics not only contain harmful chemicals in their makeup but also absorb toxic chemicals from seawater. *Tangaroa Blue Ocean Care Society 2007 www.oceancare.org.au*

Researchers estimate that it could take several centuries for these plastic pieces to biodegrade. 60 billion tons of plastic are being produced every year, and most of this for single use. *PELAGIC PLASTIC; Paper Prepared For AB 259 (Krekorian), AB 820 (Karnette), & AB 904 (Feuer); From Algalita Marine Research Foundation (AMRF); April 9, 2007*

A 1997 study found that at least 267 species have been affected by marine debris worldwide, including 86% of all sea turtle species, 44% of all seabird species, and 43% of all marine mammal species, as well as numerous fish and crustaceans. *Laist, D.W. "Impacts of Marine Debris: Entanglement of Marine Life in Marine Debris, Including a Comprehensive List of Species with Entanglement and Ingestion Records." In Marine Debris: Sources, Impacts and Solutions, eds. J.M. Coe and D.B. Rogers. New York, NY: Springer-Verlag, 1997.*

4. RESULTS FROM THE 2009 FAR NORTH QLD MARINE DEBRIS PROJECT

2009 was the first year that a full year's worth of data was collected from 27 sections of coastline and islands in Far North Queensland. Members of the community, industry and authorities were invited to participate in the project which addresses marine debris in Far North Queensland and collates data on the marine debris found. The data is then used by government agencies, industry and the broader community to find practical ways of reducing the number of the most commonly found items from ending up in our oceans.

The Far North Queensland Marine Debris Project's goals are to:

- raise public awareness about marine debris and its impact on the marine environment;
- clean up Far North Queensland beaches, coastline and islands;
- collect detailed data and information on the amount and types of marine debris being found; and
- collate the marine debris data and distribute to all parties with an interest in the ocean and coast, highlighting areas that can be worked on to reduce marine debris in our local waters.

During 2009, 895 volunteers from the community, government agencies and industry participated in the Far North QLD Marine Debris Project. Volunteers cleaned up 27 coastal sites between Airlie Beach and Saibai Island, Torres Strait, in north east Queensland.

4.1 Project Statistics 2009 Far North QLD Marine Debris Project

Number of volunteers	895
Number of individual cleanup sites	27
Number of individual pieces of marine debris collected	61,453
Weight of marine debris collected	3,233.4kg
Number of bags filled	591
Number of kilometres cleaned over the project period	389.3km
% of marine debris made of plastic	66%

Left: Volunteers on Woody Island and Snapper Island during 2009 cleanups
Above: Mossman school students helping clean up at Cooya Beach.

4.2 Summary of Cleanups Grouped into Areas - 2009 Far North QLD Marine Debris Project

Cleanup Sites Grouped Into Areas	Total Items	Number of Cleanups	Number of Bags	Weight Kg	Number of Volunteers
Airlie Beach and Whitsunday Group	6,039.5	3	117	995.5	27
Cairns	2,531.2	9	50	199	72
Port Douglas 4 Mile Beach	24,220.5	268	197	784.8	122
Cooya, Newell & Wonga Beaches	7,175.6	380	64	296.6	136
Low Isles, Woody & Snapper Islands	18,087.3	311	131	750.5	429
Torres Strait Islands	3,399	5	32	207	109
Grand Totals	**61,453.1**	**976**	**591**	**3,233.4**	**895**

4.3 Material Composition of Items by Area - 2009 Far North QLD Marine Debris Project

Material	Airlie Beach & Whitsunday Group	Cairns	Port Douglas 4 Mile Beach	Cooya, Newell & Wonga Beaches	Low Isles, Woody & Snapper Islands	Torres Strait Islands	Project Average
Composite	4%	3%	3%	2%	4%	4%	3%
Fabric	0%	2%	1%	1%	0%	2%	1%
Glass and Ceramic	1%	15%	6%	23%	29%	21%	16%
Metal	3%	14%	3%	18%	4%	16%	10%
Organic	0%	0%	1%	1%	0%	0%	0%
Plastic	88%	58%	83%	53%	61%	53%	66%
Pulp	0%	6%	3%	3%	1%	3%	3%
Rubber	0%	1%	1%	0%	0%	0%	0%
Wax	0%	0%	0%	0%	0%	0%	0%
Wood	4%	0%	1%	0%	0%	0%	1%
Totals	100%	100%	100%	100%	100%	100%	100%

* Composite refers to items made from 2 or more materials in roughly equal proportions.

4.4 Basic Analysis of the Data - 2009 Far North QLD Marine Debris Project

Interpreting the Data

Cleanup data in this report is allocated into seven categories enabling a cleanup "signature" to be produced. This signature shows at a quick glance what kind of debris is impacting the site.

The categories are:

1) End User Items (consumables);

2) Packaging (all packaging and wrapping);

3) Industrial and Commercial Items;

4) Linear Items (e.g. rope measured in metres, each metre is counted as one item);

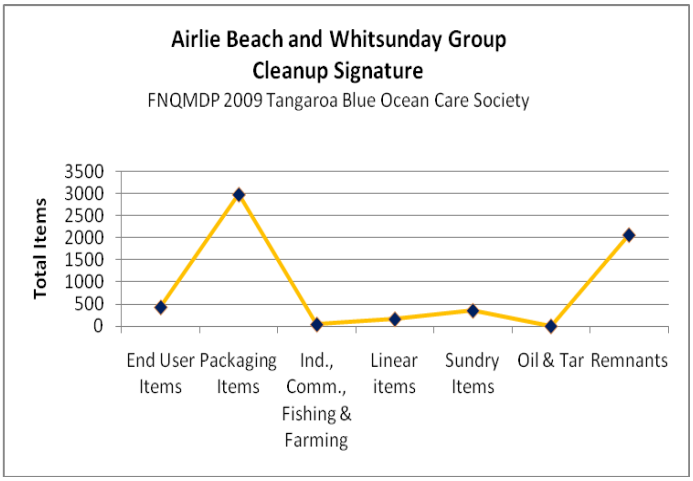
5) Sundry Items (items not fitting the other categories including items possibly dumped);

6) Oil and Tar; and

7) Remnants (remains and fragments of marine debris including lids and tops).

Following is a summary of the items and item categories evident in the data for each cleanup area.

Airlie Beach and Whitsunday Group



Top 10 Items	Total
Airlie Beach and Whitsunday Group	
Plastic Drink Bottles	1,934
Lids/Bottle Tops/Corks	1,415
Bleach/Cleaner Bottles	500
Polystyrene Foam	415
Wood	230
Plastic Hard Pieces	200
Plastic Bags	194
Shoes	136
Aluminium Cans	120
Rope - metres	100
10	5,244

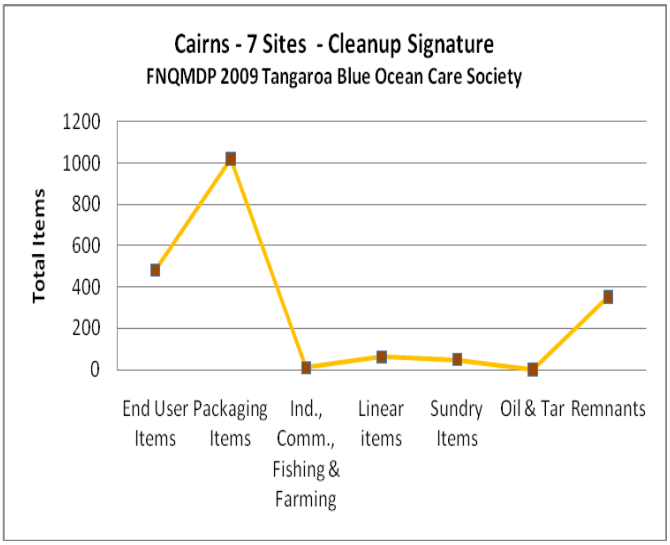
Although data is just coming on-stream for this area two things are evident. First is the large amount of plastic drink bottles both on the islands and the mainland. Turtle Bay on Whitsunday Island produced 867 plastic bottles, Saba Bay 361 and Grimston Point produced 706 plastic bottles. Second is the mix of debris which includes bleach cleaner bottles, aerosol cans, 20 litre drums etc that suggests an offshore and (most likely) shipping input of rubbish. Saba Bay on the south east coast of South Hook Island shows a strong offshore and shipping composition while Turtle Bay on Whitsunday Island facing the same direction is a little more sheltered and shows small amounts of litter alongside its 867 plastic drink bottles. The large number of

plastic drink bottles at each site may indicate this highly mobile item is present in high numbers throughout this area. A survey of the label information on these bottles will help identify their origin/s.

From the 3 cleanups where data was collected, shoes were the main end user item with 14 at Grimston Point, Airlie Beach on the mainland and 122 at Saba Bay, South Hook Island. Grimston Point topped the remnants data with 1,122 items including 806 lids and bottle tops, 200 pieces of hard plastic and 100 pieces of polystyrene foam. Saba Bay, with 929 remnant items, gave up 609 lids and bottle tops and 315 polystyrene pieces while Turtle Bay produced 20 commercial fishing remnants. The mix of items in this area indicates offshore and shipping debris.

Thanks to Libby Edge and Eco Barge Services for their contribution to the Far North QLD Marine Debris Project.

Cairns Beaches



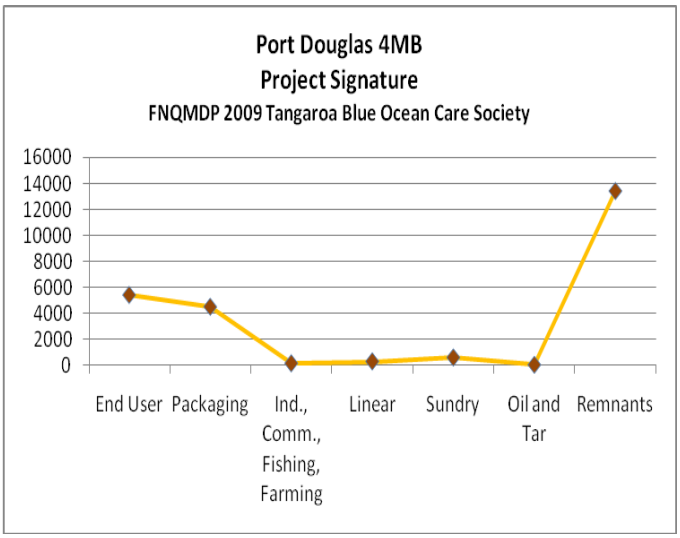
Top 10 Items	Total
Cairns - 7 Sites	
Cigarettes/Filters	279
Glass Drink Bottles	160
Aluminium Cans	138
Plastic Hard Pieces	122
Plastic Drink Bottles	113
Plastic Wrap - Food	103
Lids/Bottle Tops/Corks	82
Paper/Newspaper/Cardboard	79
Plastic Bags	75
Aluminium Cans	54
10	1,205

Packaging items predominated in each of the seven Cairns sites – 3 in town, 2 near Buchan Point and Wangetti Beach halfway towards Yule Point. Yorkeys Knob in town produced 255 cigarette butts.

Thanks to Alice Crabtree and the Conservation Volunteers Australia Cairns volunteers for coordinating the Cairns cleanups for the Far North QLD Marine Debris Project.

Port Douglas 4 Mile Beach

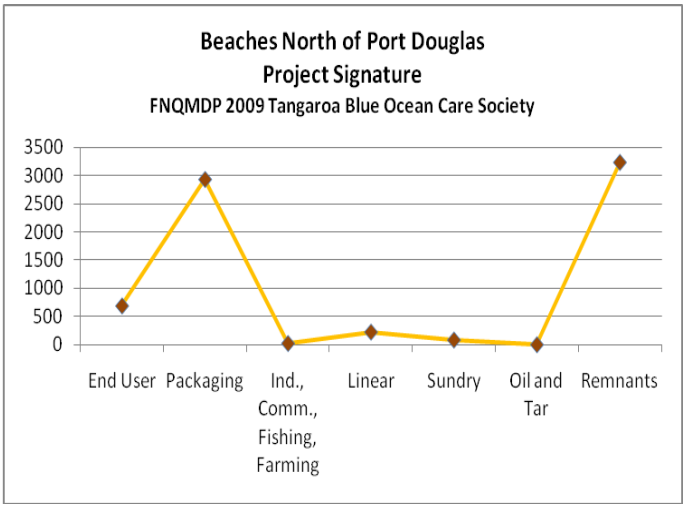
Port Douglas is treated in detail below; however a brief look here shows that from 268 clean ups, remnants (13,414 items) to be the main contributor with end user (5,391 items) and packaging (4,477 items) indicating a significant litter related issue.



Top 10 Items	Total
Port Douglas 4MB	
Plastic Hard Pieces	7,338
Lids/Bottle Tops/Corks	3,154
Cigarettes/Filters	2,726
Polystyrene Foam	2,319
Plastic Wrap - Food	919
Glass Drink Bottles	845
Aluminium Cans	535
Glass Broken	432
Plastic Drink Bottles	424
Straws	392
10	19,084

Cooya, Newell & Wonga Beaches

These beaches also looked at in detail below, show from the 380 clean ups that drink packaging is a main contributor to the rubbish on the beaches.

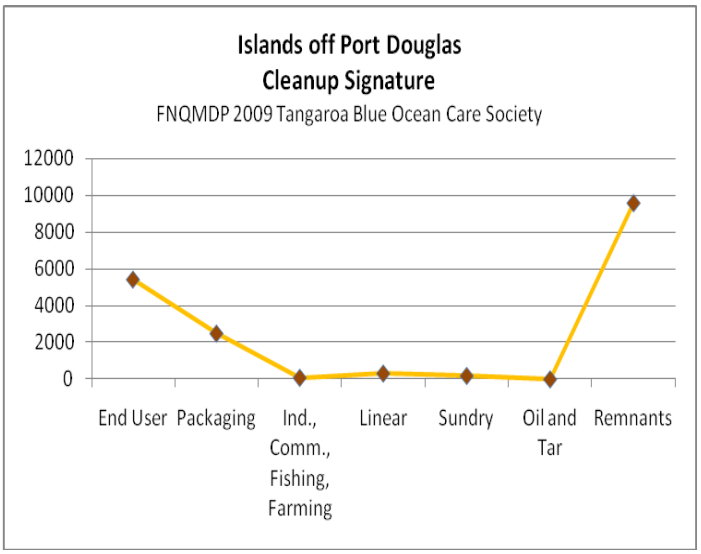


Top 10 Items	Total
Cooya, Newell and Wonga	
Glass Broken	1,277
Plastic Hard Pieces	1,204
Aluminium Cans	1,028
Plastic Drink Bottles	431
Lids/Bottle Tops/Corks	410
Glass Drink Bottles	367
Plastic Wrap - Food	334
Polystyrene Foam	226
Fishing Line - metres	183
Paper/Newspaper/Cardboard	165
10	5,625

Low Isles, Woody & Snapper Islands

Also examined below, the islands off Port Douglas show an interesting pattern of debris. From the 311 clean ups, remnants are also strongly present (The figure for cigarette/filters includes a proportion of items counted from special bins and indicates the amount of cigarette butts potentially affecting this area. Cigarette butts left on the beach are now being recorded separately).

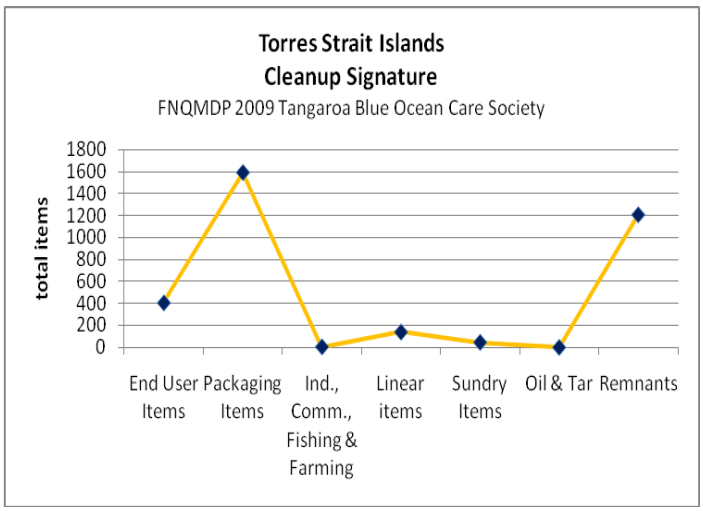
Thanks to the Low Isles Preservation Society for their contribution to the Far North QLD Marine Debris Project.



Top 10 Items	Total
Woody, Low and Snapper Islands	
Old Tip - Glass/Crockery	4,731
Cigarettes/Filters	4,489
Polystyrene Foam	2,000
Plastic Hard Pieces	1,649
Plastic Drink Bottles	1,108
Lids/Bottle Tops/Corks	407
Shoes	374
Glass Broken	350
Rope - metres	259.8
Old Tip - Metal	251
Plastic Wrap - Food	251
11	15,869.8

Torres Strait Islands

This is the first data from the Torres Strait schools project run through the Tagai State College. From the 5 cleanups packaging shows as the most numerous of the categories. Aluminium cans numbered 184 at Darnley Island, Saibai Island produced 98 and the 3 sites at Thursday Island produced 191 cans. Combined totals of plastic wrap both food and non-food and plastic drink bottles numbered 287 at Saibai Island, 156 at Darnley Island and 227 for the 3 sites at Thursday Island.



Top 10 Items	Total
Torres Strait Islands	
Glass Broken	686
Aluminium Cans	473
Plastic Hard Pieces	437
Plastic Wrap - Non Food	358
Plastic Bags	199
Plastic Wrap - Food	173
Plastic Drink Bottles	139
Fishing Line - metres	124
Paper/Newspaper/Cardboard	99
Shoes	82
10	2,770

4.5 Distribution Pattern of Debris in the Project Area

Taking into account additional data and reports from the Cooktown area and from Fraser Island during 2008, an attempt to understand the marine debris distribution pattern for North East Queensland would take into account the following points.

1. High to very high litter inputs at or near beaches in built up areas.
2. Possible high input of litter (especially plastic drink bottles) from pleasure craft.
3. Wet season run off introducing large volumes of town litter onto the beaches by way of drains and creeks.
4. Wet season and king tide actions causing debris to be flushed out from beach sand, mangroves and other temporary trapping features along the coast generally.
5. An input from offshore sources which varies with the different areas.
6. Data from each broad area in the region suggests distribution features which are here summarised:
    - Torres Strait Islands: Apart from the local litter inputs, shipping debris and ocean current borne debris are also brought into the vicinity of these islands. An offshoot of the South Equatorial Current may bring debris from as far afield as the New Hebrides and New Caledonia. Closer inputs will include Northern Australia, New Guinea and possibly South East Asia during the monsoon period.
    - Eastern Cape York: In its report "Eastern Cape York Peninsula Beach Rubbish Assessment 2007 & 2008", The Cape York Marine Advisory Group discusses New Guinea, South East Asia, and fishing and shipping as all being potential sources but urges further investigation. Also discussed was the possible movement of debris from as far south as Townsville northward into the Cape York area.
    - Inshore of the Great Barrier Reef: Large amounts of litter are generated in the main population centres of this area. There is evidence of a south to north flow of debris in this localised system with some input of fishing, shipping and other offshore items showing up particularly on the islands and especially to the south.
    - Fraser Island: Further south, the East Australia Current flows past the south east coast of Fraser Island where current borne and shipping debris is blown inshore. On Fraser Island, volunteer Jennifer Parkhurst, recovers 7 to 8 fully laden bags plus other large items for each cleanup from small stretches of beach. From here the East Australia Current moves debris southwards while the South Easterly winds blowing across the direction of the current flow will be moving some of this debris northwards into the reef lagoon system.

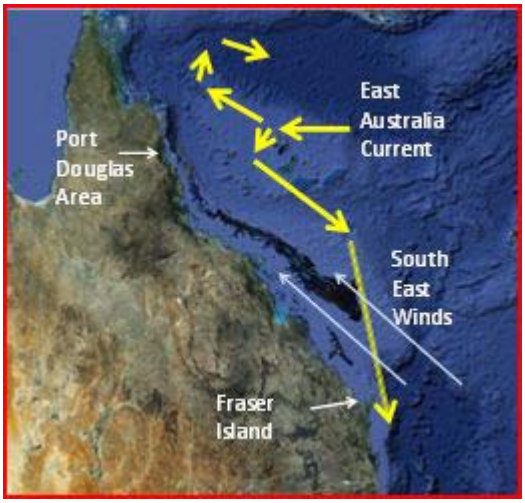


Image courtesy of Google Earth

5. MONTHLY MONITORING PROJECT

Monthly monitoring cleanups have been taking place along north east beaches since 2007. In 2009 four sections of 4 Mile Beach, Port Douglas as well as Newell Beach, Cooya Beach, Wonga Beach and Low Isles were selected for a detailed monthly monitoring project. Volunteers visit their nominated site on a regular basis (between daily and monthly), collecting marine debris as well as documenting their findings. Below is a summary of each of the monthly monitoring projects.

5.1 Port Douglas 4 Mile Beach Data Summary

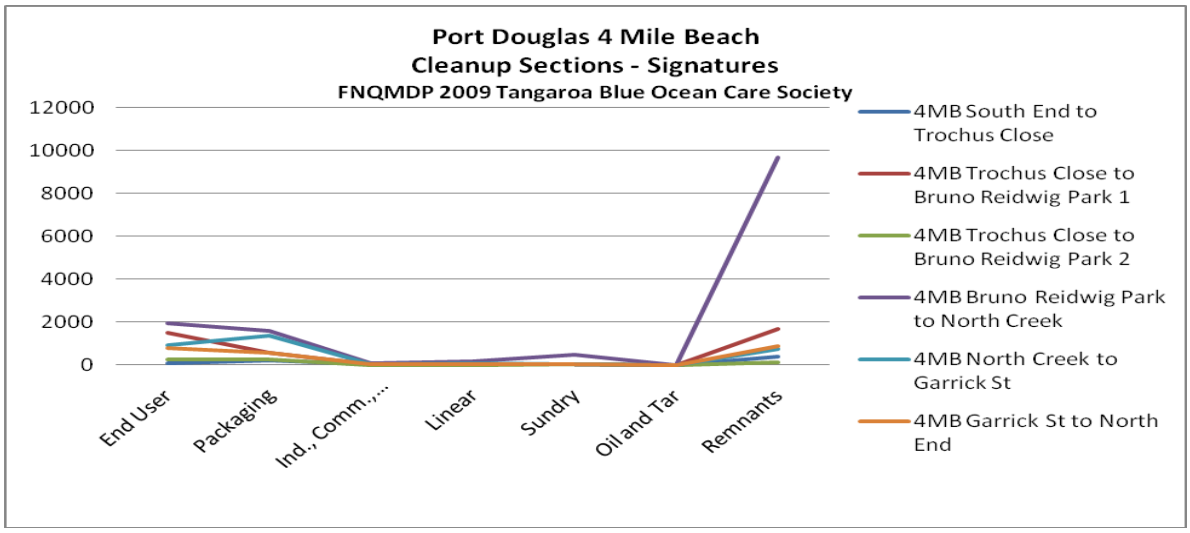
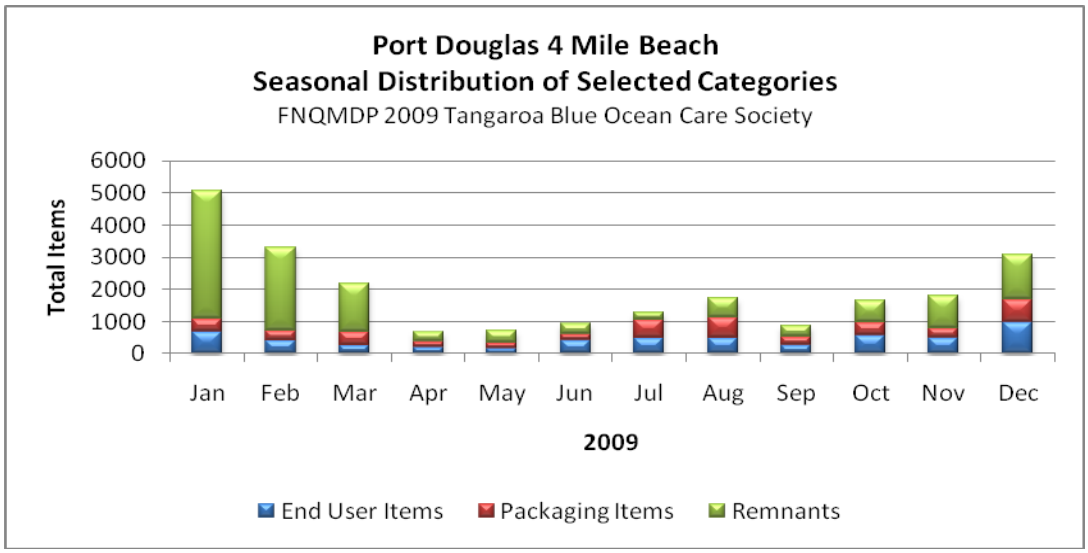


Figure 5.1a

The above comparison of 4 Mile Beach signatures shows each beach section displaying a similar distribution pattern with one exception, this being the North Creek to Garrick St section where packaging exceeds end user items. This was due to aluminium cans and glass and plastic drink bottles totalling 867 of the 1363 (64%) packaging items. The other noticeable feature is the number of remnant items in the Bruno Reidwig Park to North Creek section (middle section). This very high influx including 3,741 plastic hard pieces, 1,456 lids and bottle tops and 1,129 polystyrene foam pieces was strongly related to the wet season processes.

4 Mile Beach, Port Douglas Beach Sections	Number of Cleanups
4MB South End to Trochus Close	24
4MB Trochus Close to Bruno Reidwig Park 1 & 2	33
4MB Bruno Reidwig Park to North Creek (Sheraton)	19
North Creek (Sheraton) to Garrick St Access Point	192
Garrick St Access Point to North End	2

The most numerous remnant items are pieces of hard plastic, lids and bottle tops and polystyrene foam pieces, all strongly buoyant and generally small in size. There are several places where these items can accumulate including in and around the town, buried in the beach sand, mixed up in beach rubble and caught up in the mangrove systems on the coast and up into the creeks.



The action of both heavy rainfall and high creek levels and king tides will flush out most of these areas. Being highly buoyant and hence highly mobile in nature these items will distribute freely while afloat.

Figure 5.1b Correlation between the wet season and the amount of debris on the beach.

Port Douglas 4 Mile Beach Litter Analysis

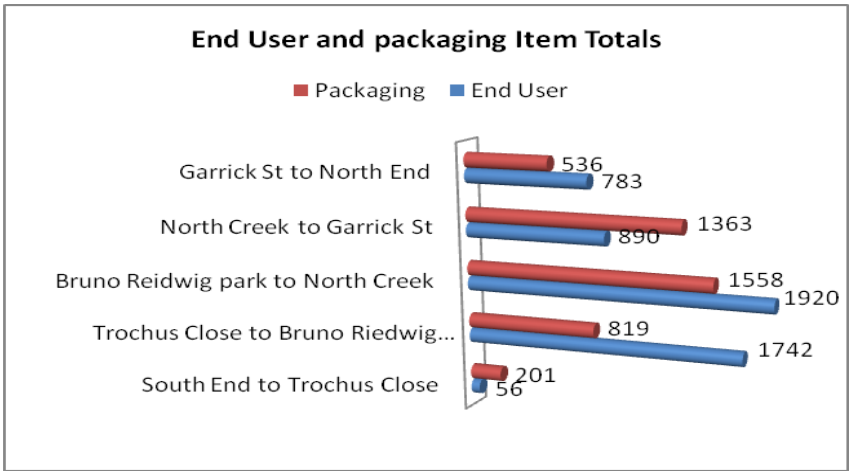


Figure 5.1c: End user and packaging items cover all the litter from direct and indirect (e.g. creek runoff) sources on 4 Mile Beach. This graph suggests the level of input at different sections of the beach. (A direct comparison of quantities of debris is affected by a number of cleanup variables such as timing, conditions etc. The Garrick St to North End section figures are for 2 cleanups, indicating high inputs in that section which is closest to town and includes the official swimming area. There is also likely to be some longshore drift of items from the southern sections towards the north end while the south easterly winds are blowing.

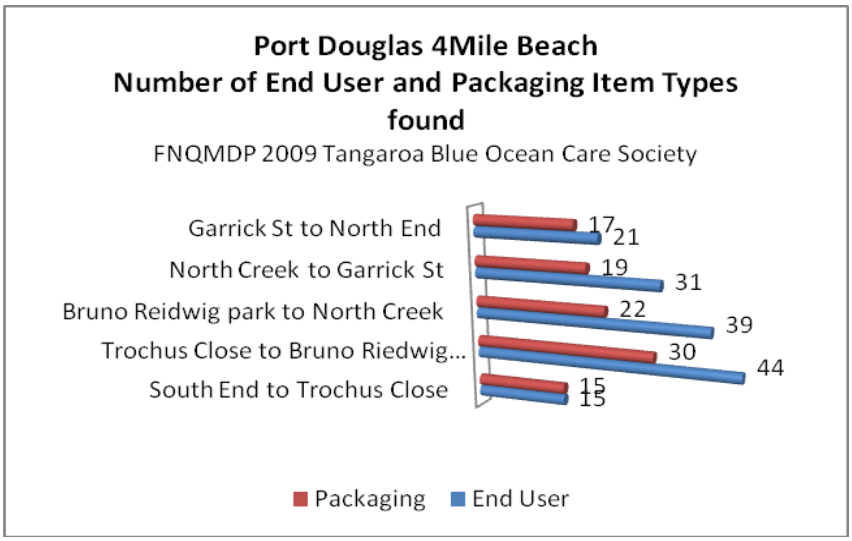
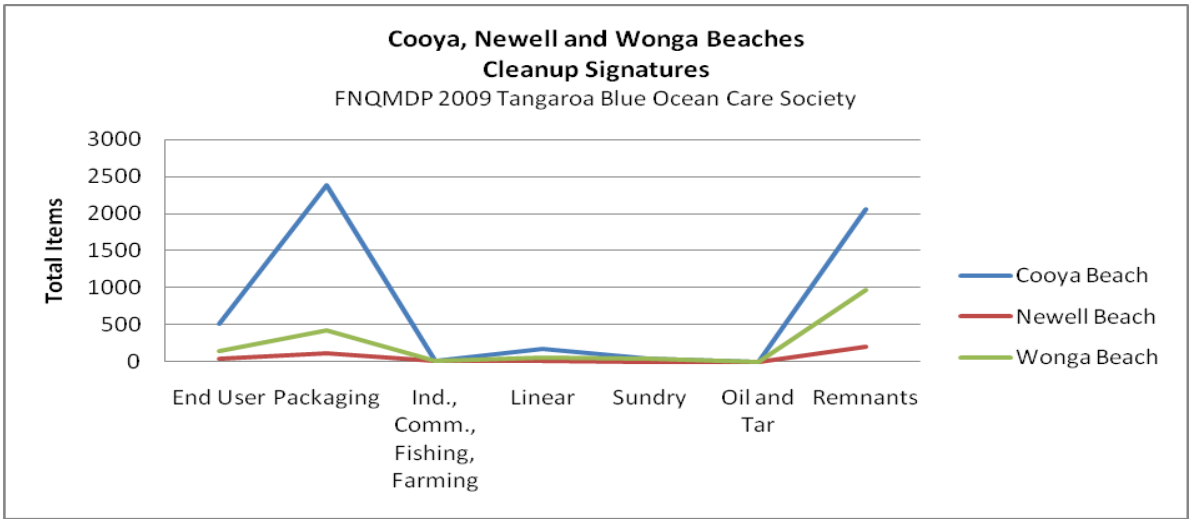


Figure 5.1d shows the numbers of different end user and packaging items found at each beach section. In the Bruno Reidwig Park to North Creek stretch all 39 end user items and 22 packaging items were present on the beach during the January king tides and heavy rains, showing in part the amount and variety of litter flushed from the town into the creeks and drains.

5.2 Newell Beach, Cooya Beach & Wonga Beach Data Summary



During 2009, local volunteers conducted rubbish collections along sections of Newell, Cooya and Wonga Beaches. Over a 12 month period 409 rubbish collections took place. A total of 7,380 individual pieces of rubbish were collected from along these beaches weighing a total of 305kg.

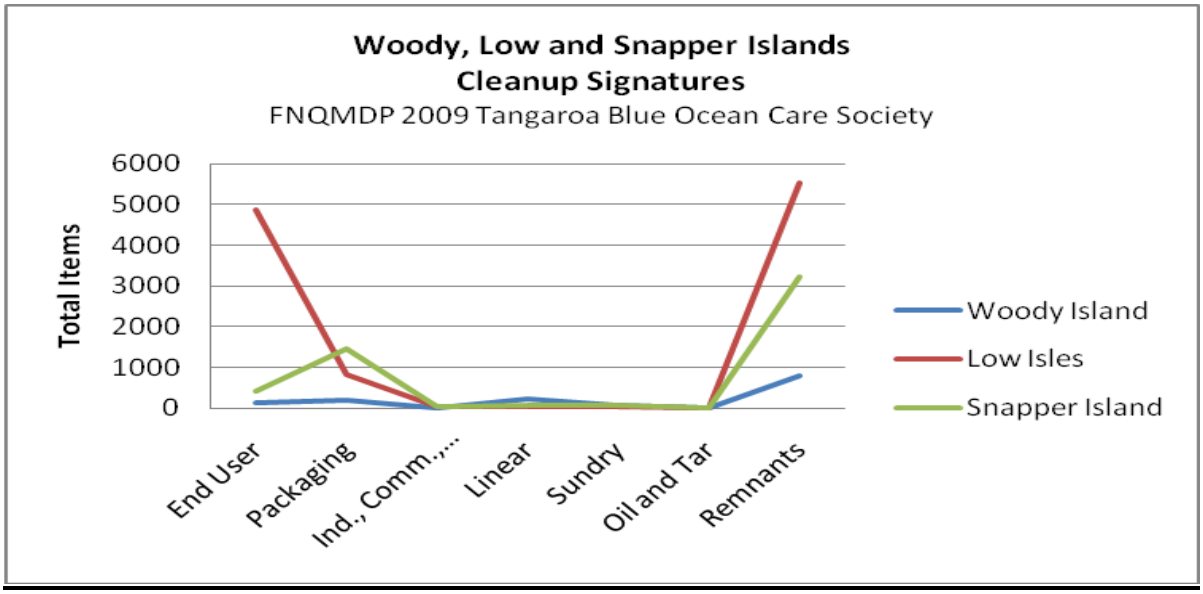
Cooya Beach, just north of Port Douglas, shows a large number of packaging items indicating a high litter input. Further north, the highly mobile remnant items come to dominate the data. A south to north movement of debris will tend to deposit these items in places between Wonga Beach and Snapper Island where there is a south east facing pocket centred around the Daintree River mouth .

Top 10 Items	Total
Cooya Beach	
Glass Broken	1,245
Aluminium Cans	945
Plastic Hard Pieces	383
Plastic Drink Bottles	358
Glass Drink Bottles	312
Plastic Wrap - Food	233
Lids/Bottle Tops/Corks	190
Fishing Line - metres	164
Polystyrene Foam	136
Cigarettes/Filters	136
10	4,102

Top 10 Items	Total
Newell Beach	
Plastic Hard Pieces	88
Polystyrene Foam	58
Lids/Bottle Tops/Corks	33
Plastic Wrap - Food	32
Glass Broken	22
Plastic Drink Bottles	22
Aluminium Cans	21
Plastic Containers	12
Cable Ties/Tags	10
Plastic Bags	10
10	308

Top 10 Items	Total
Wonga Beach	
Plastic Hard Pieces	733
Lids/Bottle Tops/Corks	187
Paper/Newspaper/Cardboard	85
Plastic Wrap - Food	69
Aluminium Cans	62
Glass Drink Bottles	52
Plastic Drink Bottles	51
Plastic Containers	45
Shoes	44
Polystyrene Foam	32
10	1,360

5.3 Low Isles, Woody Island & Snapper Island Data Summary

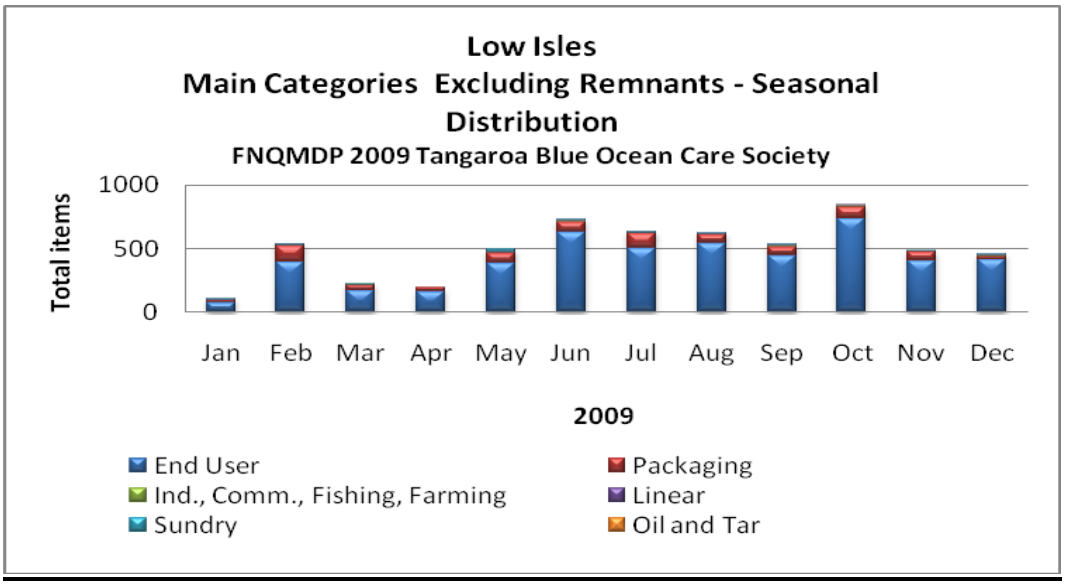


Top 10 Items	Total
Woody Island	
Plastic Hard Pieces	508
Rope - metres	205
Polystyrene Foam	159
Lids/Bottle Tops/Corks	121
Plastic Drink Bottles	88
Shoes	60
Building Materials	55
Cigarettes/Filters	50
Glass Drink Bottles	27
Aluminium Cans	17
10	1,290

Top 10 Items	Total
Low Isles	
Old Tip - Glass/Crockery	4,577
Cigarettes/Filters	4,052
Old Tip - Metal	251
Pull Tabs	207
Plastic Hard Pieces	202
Plastic Wrap - Food	184
Paper/Newspaper/Cardboard	148
Lids/Bottle Tops/Corks	126
Tissues	77
Old Tip – Battery Parts	72
10	9,896

Top 10 Items	Total
Snapper Island - Top 10 Ranked	
Polystyrene Foam	1,773
Plastic Drink Bottles	964
Plastic Hard Pieces	933
Glass Broken	342
Shoes	277
Aluminium Cans	153
Lids/Bottle Tops/Corks	152
Plastic Containers	113
Glass Drink Bottles	69
Rope - metres	49.5
10	4,825.5

These islands present an interesting picture. Woody Island partly shelters Low Isles from the south east winds and the mix of debris on Woody suggests a larger proportion of offshore debris. Low Isles data show mainly old tip debris being eroded and cigarette butts from visiting tourists but also a wide range of items. Further north at Snapper Island the mix of debris shows more offshore input. Most of the debris accumulates on the south west facing part of the island and forms part of the "pocket" around the Daintree River mouth. The south to north movement of debris is strongly indicated in the distribution pattern on these islands. The graph below shows the tourist driven distribution of debris for Low Isles on a monthly basis.



5.4 Cleanup and Data Collecting Strategies

A number of strategies are suggested here to both test and explore the distribution pattern of debris in the region as proposed above. The practical aim of this is to determine the best times and places to target resources as well as identifying sources and identifying areas of high impact potential on wildlife.

Islands

- Identifying which parts of the island are consistently impacted with offshore debris and which parts are mainly impacted by litter.
- Identify and record shipping and foreign sourced items from label information and also record fishing gear by fisheries type when possible.

Inshore of the Great Barrier Reef

- Identify items that act as trace items which can show the south to north flow of debris. These might be brand packaging or fishing items not specific to the area.
- Identify places where debris is trapped – these will give an indication of which way the debris is moving.
- Are there similar items that indicate the movement of debris from the mainland onto the reef?
- Are there similar items or sites that indicate the movement of debris across the reef from the open ocean?
- Surveying the mangrove areas especially in and around creeks for sites where debris becomes trapped.

Report any known or discovered debris hotspots in any area to us for inclusion into our register of "hotspots". Include if you can a GPS reading, a nearby road or town and how and when you think the area traps debris.

6. RECOMMENDATIONS

With the continued occurrence of marine debris on north Queensland beaches, it is critical that industries and governments take proactive steps in changing and improving products, tools and legislations in order to have a resulting effect on the current unsustainable situation. The first step is to identify sources of debris production and then to work on ways of stopping the continued input of debris into the oceans and waterways.

6.1 Cigarette Butts & Plastic Packaging

Photo below: Lance Ferris – Australian Seabird Rescue
76 small pieces of plastic were found in this turtle's intestines and stomach causing it to die of starvation and septicaemia

Items such as cigarette butts and plastic packaging, present a threat to marine life. Marine Biologist Dr. Kathy Townsend from Moreton Bay Research Station, The University of QLD, confirms that approximately 40% of the turtles she autopsies have plastics, including plastic bags, in their intestinal tract. "The turtles appear to mistake floating plastic bags for jelly fish." says Dr. Townsend. In August 2000, an eight metre Bryde's whale died soon after becoming stranded on a Cairns beach. An autopsy found that the whale's stomach was tightly packed with $6m^2$ of plastic, including many plastic check-out bags. Such obstructions in animals cause severe pain, distress and death. Local marine life and seabirds are all being threatened by this marine debris, it is vital that the "No Littering" message is highlighted throughout the region.

Environmentally safe packaging is the responsibility of both manufacturers and consumers. Proactive measures must be taken by both parties to reduce the amount of one-time used packaging and the percentage of packaging ending up as marine debris and litter.

After analysing the data from the last 12 months, the FNQMDP will target cigarette butts and plastic packaging ending up as marine debris in 2010. We plan to work with all stakeholders to find practical ways of reducing this type of marine debris in the next stage of this project.

6.2 Infrastructure, Education, Enforcement & Recycling

Tropical Queensland is well-known for its high social value providing many recreational activities including spending time at the beach, snorkelling, diving, kite surfing, fishing and boating. The data suggests that people taking part in these activities contribute to high levels of marine debris. We estimate 47% of end user and packaging items in the FNQMDP data are from littering at popular sites with this percentage being as high as 80% on some beaches in the main centres.

4 Mile Beach, Port Douglas has high visitation numbers, and data has shown that 55% of the debris found on this beach is end user items and packaging. We believe that this has a direct correlation to the lack of rubbish bin infrastructure along the beach.

Currently bins are provided on the northern end of 4 Mile Beach at the Esplanade and Surf Lifesaving Club, however there are no bins along the beach for a further 4kms until the Reef Park in the south.

We would, therefore recommend that at least 3 additional bins are positioned along the beach access points (visible from the beach near the stinger vinegar stands) between the Surf Lifesaving Club and Reef Park. We would also recommend that educational stickers and/or signage accompany these bins to ensure that visitors are aware of what damage their rubbish can cause if left on the beaches and coast.

We believe that this would then allow visitors to the beach the opportunity to dispose of rubbish properly as well as remove debris that they find on the beach, which could be proved through continued monthly monitoring clean ups at 4 Mile Beach.

During high visitation times, illegal beach fires are also a problem on many north Queensland beaches. These fires are often left still burning with broken glass bottles, cigarette butts, drug paraphernalia and other litter smouldering. Not only is this an eyesore, but a potential hazard to beach users, in particular children.

Partnerships between the local council, local police, Department of Environment and Resource Management and the Great Barrier Reef Marine Park Authority to enforce anti-littering laws and beach fire laws are vital in getting the message across to those community members who offend and do not learn by other means.

Hundreds of plastic flowers that had been left on the beach after wedding ceremonies were collected during cleanups. We recommend that as part of the contract between the wedding parties and the local authorities that using these plastic flowers be banned from beach weddings to prevent them from becoming marine debris.

Tangaroa Blue Ocean Care Society has also become aware of a misconception in the community about the availability of recycling by local council. Many people use both recycling bins and normal waste bins for both types of rubbish with a belief that recycling does not occur in the region. We would like council to provide an educational campaign to show the recycling process in the region and information on what types of rubbish can be recycled to assist in the maximum amount of rubbish being recycled as possible.

7. EDUCATIONAL WEBSITE WWW.OCEANCARE.ORG.AU

The creation of www.oceancare.org.au has enabled TBOCS to increase awareness and provide information on marine debris to regions both inside and outside of Queensland. Over 9 million hits have been recorded on the website since mid 2007.

The website also allows school groups, community groups, industry and agencies to download educational materials and tools, data reports and scientific papers on marine debris. These materials will be regularly updated as new information and data comes to hand.

8. MARINE DEBRIS EDUCATIONAL PRESENTATIONS

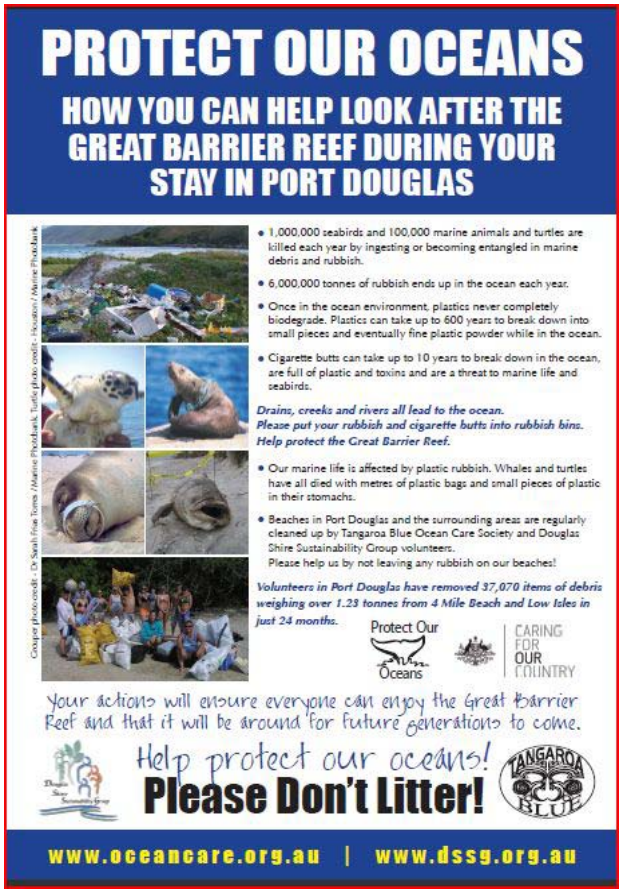
8.1 School & Community Group Presentations & Workshops

During 2009, a total of 24 presentations to more than 560 participants were held for local schools, community groups, workshops and conferences on the issue of marine debris, its impact on the marine ecosystem and the Far North Queensland Marine Debris Project.

At each school, these presentations created an introduction to marine debris that was then expanded to include a beach cleanup. The data was also contributed to the TBOCS database.

As the world's and nation's population continues to boom, educating the next generation about human's negative impact on the earth is vital in creating good environmental behaviour and practices.

8.2 Educational Poster & Flyer



An educational A3 poster and A4 flyer were created and distributed to Port Douglas accommodation houses and tour operators to help engage both tourists and locals alike in addressing marine debris in the area.

A total of 100 posters and 2000 flyers are now being displayed in 72 locations around Port Douglas.

We would like to thank all these businesses for participating in the Far North Queensland Marine Debris Project.

9. ACKNOWLEDGMENTS

I would like to make a special thanks to the following people for their ongoing support for Tangaroa Blue's Far North Queensland Marine Debris Project. With their dedication, thousands of pieces of debris are being removed from Queensland beaches every year, helping to protect our precious marine life.
You are making a difference!!

Wally Smith James Watson Jan & Gregg Buchanan Alex Mateer & Rick Kilpatrick Vicki Thomas

To the following groups and people, thank you for participating in the Far North Queensland Marine Debris Project and helping us protect our oceans, we look forward to your support again in 2010!

Low Isles Preservation Society
Surfrider Foundation Australia
Douglas Shire Sustainability Group
Rhona Eastment
Janine Paterson
The Poseidon Outer Reef Cruises Crew
Jennifer Gilbert
Conservation Volunteers Australia - Cairns
Tagai State College – Torres Strait Islands
Port Douglas Primary School
Mossman Primary School
St Augustine's Primary School - Mossman
Libby Edge & Eco Barge Services – Airlie Beach
Cape York Marine Advisory Group
Port Douglas Coast Guard
Conservation Foundation Australia
Australian Rainforest Foundation

To all the individual volunteers, we appreciate your time and efforts in helping us clean up our coastline during the Far North Queensland Marine Debris Project, we hope to have you back again in 2010!!

And thank you for the support from the following organisations and agencies that supported this project through funding, insurance, materials, time, effort and lots of encouragement.
We look forward to working with you again in 2010!

Caring For Our Country – Australian Government
Cairns Regional Council
Reef Guardian Schools
Great Barrier Reef Marine Park Authority
Nick Leigh Web Designer
David Smith Design
Environmental Protection Agency – Queensland
Keep Australia Beautiful Council, QLD
Clean Up Australia Organisation
Port Douglas Catering
Island Point Marine
Project Aware