TANGAROA BLUE OCEAN CARE SOCIETY

2010-11 Victorian Surf Coast

Marine Debris Project Report

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

Tangaroa Blue Ocean Care Society

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Introduction

Tangaroa Blue Ocean Care Society (TBOCS), www.oceancare.org.au is a non-profit organisation registered on the Department of Environment's Register of Environmental Organisations.

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 2010 TBOCS launched the Victorian Marine Debris Project with the support of Surfrider Foundation Australia and with funding from a Caring for our Country Grant. The aim of the project was to remove debris, identify those items impacting the Victorian coastline, contributing to the National Marine Debris Database and engage communities into a national marine debris project.

Over 5,000 TBOCS volunteers have collected more than 650,000 items of rubbish from beaches around Australia and New Zealand since 2004. In its seventh year of the Australian Marine Debris Initiative, 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.

Cigarette butt bins installed along the Great Ocean Rd by students from St Bernard's College Santa Monica Campus

Summary

The Victorian Surf Coast 2010-2011 project collected 26,670 items of debris weighing 1907Kg from Victorian beaches. This enabled us to characterise the debris, indicate debris sources and to give a very basic comparison between debris on the Surf Coast and inside Port Phillip Bay.

Beach litter and street litter are indicated as the main sources of debris on Victoria's Surf Coast and within Port Phillip Bay. The levels of debris within this project period are likely to reflect a high input of land based litter generated in the September 2010 and the January – February 2011 flood events especially in Port Phillip Bay.

Plastic items made up 82% of the project total and cigarette butts were the most numerous item.

Data from this project shows half of the debris on the Surf Coast is due to litter generated on site or coming from runoff. Offshore inputs of debris onto the Surf coast do not appear substantial - especially at the northern end and inputs of debris onto the Surf Coast from Port Phillip Bay are also likely to be minimal. Longer term monitoring is needed to provide more information about the offshore inputs.

Slightly more than half of the debris on beaches in Port Phillip Bay is also generated directly by littering at the site and coming from nearby and stormwater runoff. The remaining fraction comes from offshore only in the sense of coming from other locations in the bay and again this originates from beach and street litter along with inputs from shipping, boating and fishing activities in the bay.

Regular cleanups carried out between Moggs Creek and Grassy Creek near Fairhaven by St Bernard's College students were conducted in both summer and winter months. Totals of items collected within each of the six months involved ranged from 579 to 1988 items indicating a consistent high level of debris across seasons.

Plastic resin pellets were evident on the Surf Coast and widely found in Port Phillip Bay. Their presence suggests other forms of micro plastic pollutants will also be present within the bay. These include plastic micro particles coming from abrasion of ropes, plastic in the process of breaking down and an emerging class of micro plastic pollutants coming from domestic sources via sewage.

Ongoing community based monitoring and data collection for marine debris on Victorian coasts is highly desirable. Identification of hotspots, runoff sources, debris movement and seasonal fluctuations enables better resource allocation and targeting for mitigation activities. Community involvement also generates community engagement with the marine debris problem.

Litter on the Yarra Riverbank Melbourne December 2010

Project Site and Cleanup Details

Table 1 – Clean Up Site Details

Victorian Cleanups Feb 2010 to April 2011					
Site	**Date**	**Total**	**Weight Kg**	**Bags**	**Length M**
SA Border to Cape Ottway (South West Coast)					
East Narrawong Beach	13/02/2010	17.5	0.20	0.25	1000
Cape Ottway to Point Lonsdale (Surf Coast)					
Cathedral Rock to Grassy Creek	10/11/2010	570	59.05	8.00	4000
Moggs Creek to Grassy Creek	3/02/2010	601	36.00	5.00	4000
Moggs Creek to Grassy Creek	4/03/2010	1099	32.00	6.00	5000
Moggs Creek to Grassy Creek	22/04/2010	777	30.00	7.00	5000
Moggs Creek to Grassy Creek	13/03/2010	103	4.00	1.00	300
Moggs Creek to Grassy Creek	15/07/2010	1988	51.67	7.00	5000
Moggs Creek to Grassy Creek	19/08/2010	579	44.29	6.00	4500
Moggs Creek to Grassy Creek	16/03/2011	613	36.90	5.00	3000
Painkalac Creek to Moggs Creek	25/05/2010	1200	40.00	7.00	3500
Aireys Inlet Rivermouth to Archway	13/10/2010	838	29.52	4.00	5000
Aireys Inlet Lighthouse to Urquharts Bluff	15/02/2011	191	36.90	5.00	5000
Point Roadknight to Hutt Gully	12/03/2011	176	36.90	5.00	3000
Southside Beach	7/11/2010	98	29.52	4.00	2000
Bells Beach	21/11/2010	1164	100.00	10.00	2000
Jan Juc Beach	9/05/2010	398	50.00	4.00	500
Cosy Corner Torquay	24/02/2011	982	70.00	2.00	1000
Fisherman's Beach Torquay	4/11/2010	0	Data Not Collected		1000
Port Phillip Bay					
Corio Bay Geelong	27/02/2010	1911	177.00	14.00	2000
Sandridge Beach Melbourne	7/11/2010	1327	33.94	4.60	1000
City of Port Phillip Foreshore	6/03/2011	7611.5	693.81	94.00	11000
Kerferd Rd Pier Melbourne	9/12/2010	2386	17.00	1.50	200
St Kilda Beach	23/01/2011	887	59.05	8.00	100
St Kilda Beach	22/01/2011	960	234.00	31.70	1070
Wilsons Promontory to NSW Border (South East Coast)					
Sealers Cove	22/02/2011	3	0.50	0.25	100
Port Welshpool	21/02/2011	190	4.86	1.25	500
26	**Totals**	**26670**	**1907.12**	**241.56**	**70770**

Details of items Collected

Table 2 - Top 10 Items - Project

Rank	Item	Total
1	Cigarettes/Filters	7285
2	Polystyrene Foam	2694
3	Plastic Hard Pieces	2341
4	Plastic Wrap - Food	2020
5	Lids/Bottle Tops/Corks	1206
6	Plastic Bag Remnants	877
7	Plastic Bags	877
8	Plastic Drink Bottles	776
9	Paper/Newspaper/Cardboard	761
10	Aluminum Cans	598

Table 3 - Material Makeup of Items by Site

Site	Plastic	Glass	Metal	Other
East Narrawong Beach	94%	6%	0%	0%
Cathedral Rock to Grassy Creek	70%	10%	5%	16%
Moggs Creek to Grassy Creek	84%	3%	3%	10%
Painkalac Creek to Moggs Creek	70%	13%	4%	13%
Aireys Inlet Rivermouth to Archway	87%	1%	1%	10%
Aireys Inlet Lighthouse to Urquharts Bluff	59%	16%	4%	21%
Point Roadknight to Hutt Gully	84%	2%	2%	12%
Southside Beach	51%	2%	4%	43%
Bells Beach	77%	3%	6%	14%
Jan Juc Beach	80%	6%	1%	13%
Cosy Corner Torquay	89%	5%	2%	3%
Corio Bay Geelong	55%	3%	9%	33%
City of Port Phillip Foreshore	83%	2%	4%	10%
Sandridge Beach Melbourne	84%	6%	2%	8%
Kerferd Rd Pier Melbourne	93%	2%	2%	3%
St Kilda Beach	92%	3%	2%	4%
Sealers Cove	100%	0%	0%	0%
Port Welshpool	61%	11%	18%	11%
Project Average	82%	4%	4%	11%

Debris Sources

The types of items in table 2 - especially cigarette butts, food wrappers, plastic bags, paper products and aluminum cans - indicate a strong litter component. Sources for these are littering practices at the clean up sites and street litter entering beaches from drains and creeks. Although there is no sub set of data to map the pre- and post flood events of early September 2010 and January, February 2011 debris carried by runoff from these events will have been a strong contributor in the bay and on the beaches.

Comparison of data from the Surf Coast and Port Phillip Bay

Figure 1 below shows most debris for each region coming from end user (consumer) items and packaging followed by remnant items including fragments of polystyrene, hard plastic and bottle lids.

Figure 1 Comparison of Clean Up Signatures Surf Coast and Port Phillip Bay

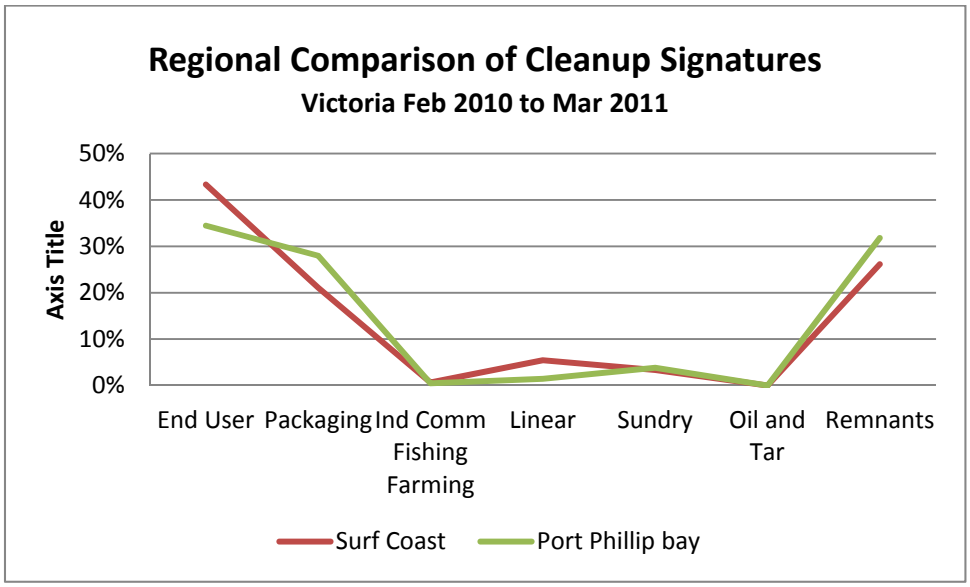

Table 4 Comparison of Top 10 Items Surf Coast and Port Phillip Bay

Surf Coast				Port Phillip Bay	
Rank	Item	Total		Item	Total
1	Cigarettes/Filters	4102		Cigarettes/Filters	3178
2	Plastic Hard Pieces	1233		Polystyrene Foam	2019
3	Polystyrene Foam	667		Plastic Wrap - Food	1620
4	Plastic Bags	520		Plastic Hard Pieces	1105
5	Paper/Newspaper/Cardboard	367		Lids/Bottle Tops/Corks	907
6	Plastic Wrap - Food	352		Plastic Drink Bottles	556
7	Fishing Line - Metres	350		Plastic Bag Remnants	512
8	Plastic Bag Remnants	333		Straws	403
9	Lids/Bottle Tops/Corks	299		Paper/Newspaper/Cardboard	391
10	Glass Broken	284		Cups/Plates/Cutlery	368
	10	8507		10	11059

The proportion in each region attributable to littering or other local inputs* is about half according to our estimates. Where does the non local half come from? Port Phillip Bay is a largely closed system with an exchange of waters with Bass Strait occurring approximately once every 12 months, suggesting debris will remain circulating in the bay. If it stays in the bay as suggested, the remaining non local fraction at any one site will consist of litter from other parts of the bay including episodic influxes from the river and drainage system together with an unidentified proportion from shipping, boating and fishing activity. To put it another way the data from the project suggests most debris is generated in the bay and remains trapped in the bay. On the Surf Coast there may be some offshore input from shipping and boating activities but the data from this project suggests this is not very substantial. The non local fraction may be more due to alongshore movement and from river borne debris which is likely to be episodically high especially from the Barwon River. Inputs onto the Surf Coast coming from Port Phillip Bay are likely to be minimal.

*according to our litter and local index which is a basic estimate of the proportion of a sample coming from littering or other local sources.

Table 5 Comparison of Litter Index Victorian Coasts

Regional Comparisons - Litter Index (averaged), total items and Percentage of Plastic Items

	Average of Litter & Local Index	Average of Non Local Index	Total Items	Percentage of Plastic Items
South West Coast	0.42	0.58	17.5	94%
Surf Coast	0.50	0.50	11377	81%
Port Phillip Bay	0.58	0.42	15082.5	82%
South East Coast	0.43	0.57	193	62%
Project Average	**0.48**	**0.52**	**26670**	**82%**

Plastic Resin Pellets

Plastic resin pellets were evident at some sites on the Surf Coast and were found to be a widespread pollutant within Port Phillip Bay, at this stage mainly on beaches in the north eastern sector of the bay. The Port Phillip Bay plastic resin pellet problem is covered in our Marine Micro pollution Newsletter No 2 May 2011.

Plastic Resin Pellets on the beach at Kerferd Road Pier Melbourne December 2010

Wildlife

A number of dead fairy penguins, mutton birds, cormorants and one albatross were recorded in the data from the Surf Coast.

Thanks to

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Surfrider Foundation Torquay Branch & Melbourne Branch

St Kilda Eco Centre

St Bernards College – Santa Monica Campus and Mark Smith

Great Ocean Road Coast Committee

City of Port Phillip

3206 Beach Patrol

3207 Beach Patrol

Sea Shepherd Conservation Society Melbourne Branch

Two Hands Project

Jack Johnson – Ohana Foundation

Caring for our Country – Australian Government

Clean Across Bass Strait kayaking team