AUSTRALIAN MARINE DEBRIS INITIATIVE







2018 WA Marine Debris Project

Report Card









Disclaimer: Tangaroa Blue Foundation advises that the data provided to the Austra Debris Initiative Database comes from a variety of organisations and individuals and to certain controls, Tangaroa Blue Foundation takes the data at face value. The dat to give a preliminary overview of items of debris occurring at clean-up locations. The not be relied upon or acted upon without additional professional or technical advic Citation: Maher, M., Hastings, K., Smith, W., and Taylor, H (2019). 2018 WA Marine Debrace Card. Tangaroa Blue Foundation, Margaret River, WA, Australia.	d whilst subject a is intended e data should be. Preferred

Highlights

The 2018 WA Marine Debris Project marked the 14th year of this special event in the Tangaroa Blue Foundation (TBF) calendar, with support from Keep Australia Beautiful WA. Hundreds of people from across the community spent over 2,500 volunteer hours participating, from dedicated environmental groups, to workplace teams, businesses and groups of families and friends.

This year the former WA Beach Clean-up event took on a new name and a renewed focus to reflect the importance of data collection as part of the process to reduce marine debris and stop litter at its source.

On and around the weekend of the 14th & 15th of October, 125 beaches, estuaries and coastal areas across the state were cleaned up, from the remote beaches of Pender Bay on the Dampier Peninsula in the north of the state, to Kanidal Beach on the south-east coast; to wild coastal tracks and easy to access metropolitan beaches.

Across the 161 km of coast covered, a total of 58,097 items, weighing in at 5,114 kg, were removed and audited by volunteers and this data entered into the Australian Marine Debris Initiative (AMDI) Database. A new App, launched in 2018, provided another tool to make debris audits easier and enable data to be sent directly to the Australian Marine Debris Initiative Database.

Unpredictable weekend weather at some locations provided a few challenges for groups, but most prevailed with a few scheduling adjustments and work was completed at their designated sites.

Besides the expected and common marine debris items, some of the more unusual finds included a piece of coal on a Geraldton beach that local historians suggest could date back to a wreck in Champion Bay in the mid-20th century and a chocolate bar wrapper from 1992 - that's 26 years in the environment!

Volunteer groups ranged from individuals to large groups including 80 people that gathered to remove 500 kg of debris from Broome's famous Cable Beach and 55 people that formed a team and collected 200 kg of debris at the Finucane Island boat ramp at Port Hedland.

At Fremantle's Bathers Beach, volunteers and local researchers uncovered vast amounts of plastic resin pellets in a very localised search area, highlighting the insidious threat of microplastics and suggesting there may be many more to be uncovered. Without moving from one spot or digging, two people collected more than 600 plastic resin pellets from the high tide line.

As usual many schools were involved in the event and some used the experience to extend learning opportunities. Students from Scotch College Junior School said they thoroughly enjoyed taking part in the event and made use of the debris collected to build a tree for the Bunnings recycled Xmas tree competition...and won!

Our thanks to all the volunteers involved, from new recruits to those who have participated over the years, we value your dedication and commitment to making an impact on marine debris across the state

Summary

The 2018 WA Marine Debris Project attracted volunteers from across the regions with most clean-up events concentrated in the South West Catchments Council, Perth NRM and the Northern Agricultural Catchments Council regions. While the Indian Ocean Territories did not participate at this event, their participation in the WA Marine Debris Project earlier in the year warrants the inclusion of data relating to their beach clean-ups and audits. Data from the southern region of Rangelands NRM was minimal for this event so monthly 2018 data has also been used to give a more complete overview of marine debris in the Rangelands South region.

Most of the data described in this report is drawn from data returned to Tangaroa Blue Foundation post-event, which accounts for 74% of the total number of clean-ups registered for the 2018 WA Marine Debris Project. As such, it provides a snapshot of the participation, items collected, and distances covered at the majority of the registered locations. As a result of the variations between regions in site numbers, distances covered and volunteer numbers, the regions are not comparable to each other, but they can be compared with reports from the same areas from previous years.

Of the total 161 km of coastline cleaned, nearly half of this distance was located in the South West Catchments Council NRM region. With 38 events, that region consequently had the highest tally of items removed however, the Perth NRM region had the highest density of marine debris removed with 1,859 items collected per kilometre of beach. The data from the Indian Ocean Territories from earlier in the year demonstrated the serious impact of marine debris on remote locations with an astounding 324,368 items per kilometre recorded.

Plastic bits and pieces hard and solid (remnants) represented the highest percentage of the audited items (28%), reflecting the persistent and universal threat to our marine environment from plastic pollution. Marine debris data collected across the state in 2018 highlights that marine debris continues to have an impact on WA coastlines with debris originating from both land and sea sources.

Clean-up summary by NRM							
	Clean -ups	Items	Weight kg	Volunteers	Total hours	Distance km	Density items / km
South Coast NRM	7	5,638	122	55	170	19	297
South West Catchments Council	38	25,027	2,811	283	722	77	326
Peel-Harvey Catchment Council	1	1,282	25	13	26	0.04	IDFA*
Perth NRM	20	16,956	506	375	720	17	1,023
Northern Agricultural Catchments Council	20	5,320	349	118	209	38	140
Rangelands NRM (north)	7	3,774	1,202	220	645	10	377
Rangelands NRM (south)	1	100	100	4	9	1	IDFA*

^{*}Insufficient data for average

Top 10	Top 10 items collected across all sites									
Rank	ltem	Total items	%							
1	Plastic bits & pieces hard & solid (remnants)	16,518	28%							
2	Cigarette butts & filters	4,245	7%							
3	Plastic film remnants (bits of plastic bag, wrap etc)	3,545	6%							
4	Rope & net scraps less than 1 metre	2,821	5%							
5	Lids & tops, pump spray, flow restrictor & similar	2,538	4%							
6	Glass or ceramic broken	2,452	4%							
7	Plastic packaging food (wrap, packets, containers)	2,316	4%							
8	Foam insulation & packaging (whole and remnants)	1,781	3%							
9	Paper & cardboard packaging	1,761	3%							
10	Aluminium cans	1,447	2%							

Container Deposit Scheme items

A total of 3,901 items were collected and audited that will attract a 10-cent refund once the planned Western Australian State Government's Container Deposit Scheme (CDS) is implemented in 2020. The data from this event and that from previous years' events will provide a useful comparison to ascertain the effectiveness of the new CDS in engaging the public in the collection and refund process, and ultimately reducing litter from beverage containers included in the scheme.

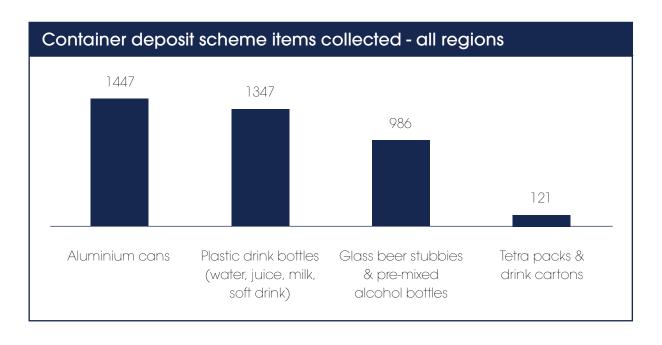
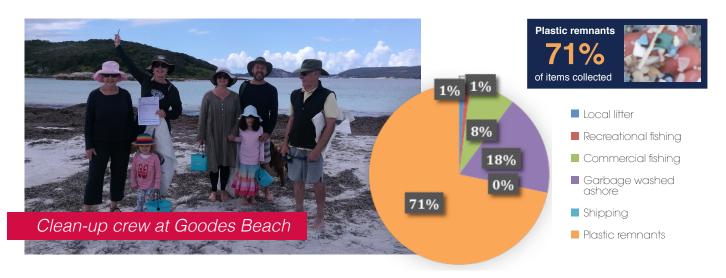




Figure 1: WA Natural Resource Management Regions and the Indian Ocean Territories

South Coast NRM

Clean -ups	Items	Weight Kg	Volunteers	Total hours	Distance Km	Avg items per Km
7	5,638	122.2	55	169.5	18.97	297



Summary: Marine debris in this region shows a very high percentage of plastic items. Sources include garbage washed ashore and commercial fishing waste. This region has a long coastline, which is mainly sparsely populated.

Options for action: Collaboration with other regions on commercial and recreational fishing debris, litter prevention around the local towns.

Major sources: Leeuwin Current conveying debris and fishing gear mainly from the Mid West coast; debris from the Southern Ocean; accumulated plastic remnants from the coastal system.

Top 10	Items 2018	*CDS if	ems in bold
Rank	Item	Total items	%
1	Plastic bits & pieces hard & solid	3982	71%
2	Rope & net scraps less than 1 metre	336	6%
3	Lids & tops, pump spray, flow restrictor & similar	241	4%
4	Foam insulation & packaging (whole and remnants)	233	4%
5	Foam cups, food packs & trays	192	3%
6	Plastic drink bottles (water, juice, milk, soft drink)	58	1%
7	Strapping band scraps	56	1%
8	Rope (estimated length in metres)	41	1%
9	Recreation fishing items (lures, floats, rods, reels)	38	1%
10	Straws, confection sticks, cups, plates & cutlery	30	1%

South West Catchments Council

Clean -ups	Items	Weight Kg	Volunteers	Total hours	Distance Km	Avg items per Km
38	25,027	2810.6	283	722.25	76.72	326



Summary: Plastic remnants and garbage washed ashore contributes the greatest number of items to marine debris in this region. Commercial fishing items are high compared to most other regions despite there being few commercial fishers working in this region. A large quantity of nails were collected at Buffalo beach where wooden pallets which had washed ashore were used as fuel for campfires. This resulted in the item - Metal building & trades materials, fixings and fittings - showing up in the top 10 list.

Options for action: Collaboration with other regions on commercial fishing debris; involving local community groups in Source Reduction Plans; education and awareness programs to reduce local litter and engaging recreational fishers.

Major sources: Recreational beach users – in particular, recreational fishers; the Leeuwin Current which carries debris and fishing waste.

Top 10) Items 2018	*CDS if	*CD\$ items in bold		
Rank	Item	Total items	%		
1	Plastic bits & pieces hard & solid	10384	44%		
2	Rope & net scraps less than 1 metre	1827	7%		
3	Lids & tops, pump spray, flow restrictor & similar	1312	5%		
4	Foam insulation & packaging (whole and remnants)	1110	4%		
5	Metal building & trades materials, fixings & fittings	1009	4%		
6	Rope (estimated length in metres)	813	3%		
7	Plastic film remnants (bits of plastic bag, wrap etc)	732	3%		
8	Cigarette butts & filters	582	2%		
9	Commercial fishing remnants (float, pot, crate bits)	549	2%		
10	Fishing line in metres (recreational)	517	2%		

Peel-Harvey Catchment Council

Clean -ups	ltems	Weight Kg	Volunteers	Total hours	Distance Km	Avg items per Km	
1	1,282	24.8	13	26	0.04	IDFA*	

*Insufficient data for average



Summary: With just one clean-up in the Peel-Harvey Catchment Council region, data is limited. The clean-up was on the Coodanup foreshore and much of the collected debris is of a local litter origin. This is an urban area and the site is used for recreation purposes which is reflected in the high number of consumer and food items collected.

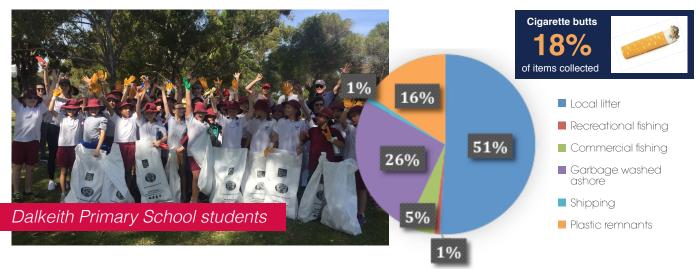
Options for action: Local signage, infrastructure and education and awareness programs to reduce litter and dumping; engagement of local community groups in Source Reduction Plans.

Major sources: Mainly recreational foreshore users.

Top 10) Items 2018	*CDS if	ems in bold
Rank	Item	Total items	%
1	Plastic film remnants (bits of plastic bag, wrap etc)	655	51%
2	Lids & tops, pump spray, flow restrictor & similar	95	7%
3	Paper & cardboard packaging	89	7%
4	Plastic packaging food (wrap, packets, containers)	70	5%
5	Straws, confection sticks, cups, plates & cutlery	64	5%
6	Aluminium cans	53	4%
7	Rope (estimated length in metres)	40	3%
8	Metal bottle caps, lids & pull tabs	40	3%
9	Plastic drink bottles (water, juice, milk, soft drink)	37	3%
10	Glass wine, spirit and similar bottles	21	2%

Perth NRM

Clean -ups	Items	Weight Kg	Volunteers	Total hours	Distance Km	Avg items per Km
20	16956	505.75	375	720	16.58	1,023



Summary: This metropolitan region has the highest population and the highest density of marine debris collected in WA (outside of the Indian Ocean Territories). Local litter comprises the greatest proportion of all debris collected, especially cigarette butts and filters.

Options for action: Litter prevention strategies including improved signage and infrastructure around butt litter; working with government agencies and community groups on behaviour change strategies to prevent litter entering rivers, tributaries and drains which transport litter to the ocean. Adoption of the Operation Clean Sweep® program by logistics and plastics industry members to address plastic resin pellet pollution.

Major sources: Recreational beach users and visitors; stormwater systems; Leeuwin current (in winter and spring)

Top 10	Items 2018	*CDS if	ems in bold
Rank	Item	Total items	%
1	Cigarette butts & filters	3123	18%
2	Plastic film remnants (bits of plastic bag, wrap etc)	1923	11%
3	Plastic bits & pieces hard & solid	1571	9%
4	Plastic packaging food (wrap, packets, containers)	1465	9%
5	Glass or ceramic broken	864	5%
6	Paper & cardboard packaging	750	4%
7	Plastic bags supermarket, garbage, dog poo, ice	739	4%
8	Straws, confection sticks, cups, plates & cutlery	570	3%
9	Lids & tops, pump spray, flow restrictor & similar	528	3%
10	Rope & net scraps less than 1 metre	490	3%

Northern Agricultural Catchments Council

Clean -ups	Items	Weight Kg	Volunteers	Total hours	Distance Km	Avg items per Km
20	5320	348.7	118	208.9	37.95	140



Summary: Local litter and garbage washed ashore contribute the greatest number of items to marine debris in this region with commercial and recreational fishing also having an impact. A high level of broken glass suggests clean-ups may have been concentrated on fishing and camping spots. The events combined to cover a large distance of coastline with a relatively low density of overall debris.

Options for action: Litter prevention strategies including improved signage and infrastructure and the involvement of ranger groups to police litter hotspots. Working with industry on strategies for reducing commercial fishing gear loss; identification and remediation program for coastal hotspots especially where fishing gear accumulates.

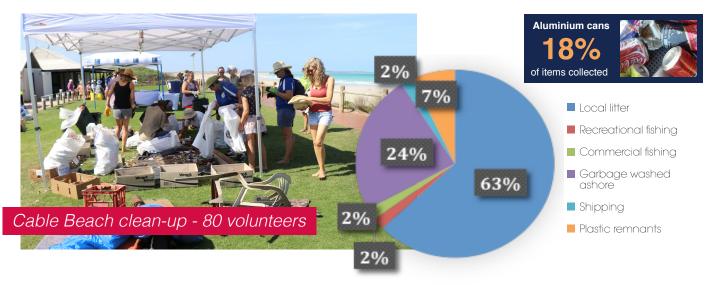
Major sources: Garbage from offshore; recreational beach users and visitors; commercial fishing loss

Top 10) Items 2018	*CDS items in bold		
Rank	Item	Total items	%	
1	Glass or ceramic broken	850	16%	
2	Plastic bits & pieces hard & solid	428	8%	
3	Lids & tops, pump spray, flow restrictor & similar	272	5%	
4	Rope (estimated length in metres)	263	5%	
5	Commercial fishing remnants (float, pot, crate bits)	247	5%	
6	Newspaper, magazines & brochures	242	5%	
7	Plastic bags supermarket, garbage, dog poo, ice	219	4%	
8	Plastic drink bottles (water, juice, milk, soft drink)	213	4%	
9	Paper & cardboard packaging	174	3%	
10	Aluminium cans	174	3%	

Remote Mystery Beach is the most westerly beach in Australia. To get there the team of 3 adults and 7 young people travelled 3.5 hours by bus, 4 hours by 4WD, then a barge crossing from Sheltered Bay, and finally another 4.5 hours of 4WD action to get to Mystery Beach!

Rangelands NRM (north)

Clean -ups	Items	Weight Kg	Volunteers	Total hours	Distance Km	Avg items per Km	
7	3774	1202	220	644.5	10.01	377	



Summary: This region is the largest and most sparsely populated NRM region yet almost two thirds of items were from local litter. Data highlighted consumer food and beverage items and smoking litter from land based sources as contributing to the majority of items removed. 34% of items were Container Deposit Scheme items.

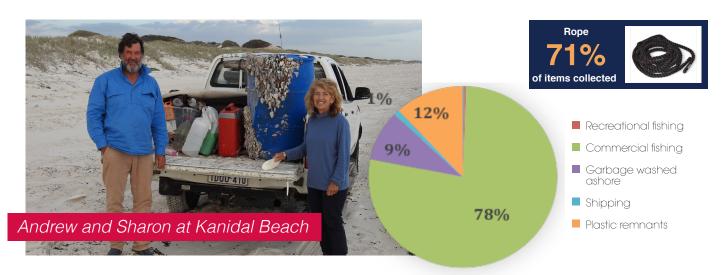
Options for action: Litter prevention strategies including improved signage and infrastructure and the involvement of ranger groups to police litter hotspots. Involvement of local community and tourism industry on Source Reduction Plans and education and awareness programs to reduce littering.

Major sources: Predominantly recreational beach and coastal users.

Top 10 Items 2018 *CDS items i						
Rank	Item	Total items	%			
1	Aluminium cans	667	18%			
2	Cigarette butts & filters	361	10%			
3	Plastic drink bottles (water, juice, milk, soft drink)	302	8%			
4	Glass beer stubbies & pre-mixed alcohol bottles	301	8%			
5	Paper & cardboard packaging	290	8%			
6	Glass or ceramic broken	234	6%			
7	Plastic packaging food (wrap, packets, containers)	176	5%			
8	Glass wine, spirit and similar bottles	154	4%			
9	Plastic bits & pieces hard & solid	151	4%			
10	Plastic film remnants (bits of plastic bag, wrap etc)	118	3%			

Rangelands NRM (South)

Clean -ups	Items	Weight Kg	Volunteers	Total hours	Distance Km	Avg items per Km
7	100	100	4	9	1300	1.3



Summary: Data for the October event in this region was for one clean-up only which consisted mostly of recovered items from a stranded vehicle, therefore, to provide an accurate picture for the Top 10 and Source of Debris we have substituted the data from the whole of 2018 from Kanidal Beach, cleaned regularly by Birds Australia Volunteer caretakers of the Eyre Bird Observatory. Kanidal is representative of this region and the annual data shows that commercial fishing waste was the biggest contributor to waste in this region.

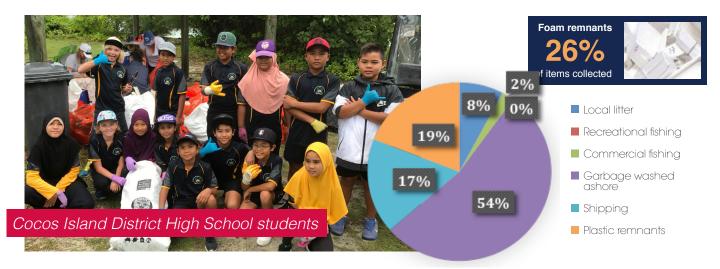
Options for action: This is a very remote stretch of coast and any data on marine debris is welcomed.

Major sources: Commercial fishing and garbage from offshore.

Top 10	ltems 2018	*CDS if	*CD\$ items in bold		
Rank	Item	Total items	%		
1	Rope (estimated length in metres)	2169	71%		
2	Plastic bits & pieces hard & solid	324	11%		
3	Rope & net scraps less than 1 metre	75	2%		
4	Commercial fishing remnants (float, pot, crate bits)	56	2%		
5	Plastic containers non-food (oil, sealant, chemical)	49	2%		
6	Strapping band scraps	36	1%		
7	Plastic drink bottles (water, juice, milk, soft drink)	36	1%		
8	Plastic film remnants (bits of plastic bag, wrap etc)	34	1%		
9	Glass beer stubbies & pre-mixed alcohol bottles	24	1%		
10	Lids & tops, pump spray, flow restrictor & similar	23	1%		

Indian Ocean Territories (IOT) - Cocos Keeling Islands and Christmas Island

	Clean -ups	Items	Weight Kg	Volunteers	Total hours	Distance Km	Avg items per Km
Cocos Keeling Islands	4	48,661	1207.7	111	554	1.106	43,997
Christmas Island	4	92,445	2190.7	74	425.5	0.285	324,368



Summary: The amount of marine debris in this region is overwhelming and highlights the enormous issue of plastics in our oceans. This region has the highest density of marine debris compared with WA mainland regions.

Options for action: Addressing the issue will take a collective approach by the local communities, in collaboration with national and international governments and corporations/industry.

Major sources: Garbage and plastic remnants washed ashore originate mainly from South East Asia, conveyed westward by the South Equatorial Current (SEC). Some debris from Southern Indian Ocean latitudes is conveyed northward by the West Australian Current which meets the SEC and turns west.

Top 10) Items 2018	*CDS items in bold		
Rank	Item	Total items	%	
1	Foam insulation & packaging (whole and remnants)	36,656	26%	
2	Rubber remnants	23,872	17%	
3	Plastic bits & pieces hard & solid	22,908	16%	
4	Lids & tops, pump spray, flow restrictor & similar	10,548	7%	
5	Rubber footwear & thongs	8,951	6%	
6	Plastic packaging food (wrap, packets, containers)	8,270	6%	
7	Straws, confection sticks, cups, plates & cutlery	8,087	6%	
8	Plastic film remnants (bits of plastic bag, wrap etc)	3,827	3%	
9	Plastic drink bottles (water, juice, milk, soft drink)	3,732	2%	
10	Personal care & pharmaceutical packaging	2,755	2%	

Getting to work on regional marine debris management

Approach

Tangaroa Blue Foundation encourages a whole of landscape approach for addressing the marine debris issue. TBF defines the term 'marine debris' in a broad sense that includes manmade waste, litter and debris in any oceanic, coastal, inland water and shoreline environment.

Marine debris data from beach clean-ups have been presented in this report in the context of the six coastal natural resource management regions in Western Australia (Figure 1) and the Indian Ocean Territories. Different regions have different sources of debris and therefore different approaches to management will be appropriate.

Managing local inputs of waste and litter contributing to marine debris are fundamentally different to those needed for managing offshore inputs of debris onto our coasts. A river catchment captures waste and litter from built areas, with drainage systems and rivers conveying the debris load to the sea. By considering the litter and waste processes occurring across the whole landscape, more effective strategies can be developed. Sources of marine debris from offshore are shipping, fishing and the background debris load in the oceans which is circulated by ocean currents over vast distances. Government and industry policies address these issues and regional feedback about effectiveness is recommended.

Strategies

Strategy A: For regions just getting started on the marine debris issue:

- Identify a person, position or group who are able and prepared to keep an eye on local marine debris issues.
- Support background activities such as clean-up events, education programs and source reduction activities.

Strategy B: For regions with some experience in marine debris activities:

- Identify a person, position or group who are able and prepared to coordinate marine debris activities in the region.
- Consider or continue items under Strategy A.
- Consider regular monitoring of identified hotspot areas.
- Find ways to target local activities to hotspot areas.
- Find ways of incorporating an ongoing marine debris component into existing activities and processes.

Strategy C: For regions with larger towns and cities:

- Establish a stakeholder group which is prepared to undertake substantial coordination activities in the region.
- Consider or continue items under Strategies A and B.
- Consider developing a regional marine debris monitoring plan.
- Consider supporting or developing industry management plans for specific waste issues.

Strategy D: For remote regions:

- Consider items under Strategy A.
- Develop local awareness of marine debris presenting environmental, quarantine and similar issues.
- Consider partnerships with other regions to tackle sources such as commercial fishing.
- Consider supporting the creation of a regional management plan for the monitoring, collection, disposal and supportive actions towards mitigation.

Strategic directions

WA Container Deposit Scheme

The WA Government have committed to introduce a Container Deposit Scheme by 2020. Under the scheme, a 10-cent refund will be available for anyone who returns an empty eligible beverage container to an approved collection depot or reverse vending machine. Introduction of the scheme will bring WA into line with the Australian Capital Territory, which announced their intention to implement a container deposit scheme, and South Australia, New South Wales, Queensland and the Northern Territory which have existing schemes.



Plastic bag bans

A state-wide plastic bag ban was introduced on 1 July 2018, banning the supply of lightweight plastic bags in Western Australia. This change brings WA into line with other Australian states—South Australia, Tasmania, the Northern Territory, the Australian Capital Territory and Queensland, who already have similar bans in place. Victoria has announced its intention to introduce a ban in 2019. Because plastic bags eventually break up and shred into plastic film fragments volunteers who collect marine debris data are encouraged to include data on film fragments to ensure measurements represent the true impact of plastic bags on the environment, along with identifying what types of plastic bags are being found.



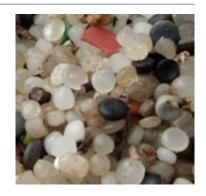
Commercial fishing

Tangaroa Blue Foundation aims to work with the WA commercial fishing industry to identify opportunities to reduce the loss of gear and to reduce the potential for fishing gear, such as floats, to break up into smaller pieces, thereby creating a risk of ingestion for marine life. Potential options include improving practices to ensure that landing tags are not lost at the processing facility due to poor handling. Further research into the materials used for commercial fishing gear may also identify opportunities for alternative materials for items that regularly break apart.



Plastic resin pellets

Plastic resin pellets are regularly found on beaches throughout Western Australia, implying that management of pellets to prevent spillage requires improvement. During 2016 Tangaroa Blue Foundation were successful in implementing Operation Clean Sweep® in Victoria. This program was introduced by the chemical industry in the USA in 1992. Since then it has also been successfully implemented in over 22 jurisdictions including Europe, New Zealand and Canada. The program provides guidance, assessment and management protocols with the aim of achieving zero pellet loss from the plastics and transportation industries. Tangaroa Blue Foundation would like to see all businesses that use or move plastic resin pellets to adopt this program throughout the state.



Acknowledgements

Tangaroa Blue Foundation would like to thank Keep Australia Beautiful WA, Department of Biodiversity, Conservation and Attractions and local government authorities around the state, as well as all the dedicated volunteers for their ongoing support for this annual event. Thanks also to WODUP, Two Fins and Savvy Jerky for their support.

A heartfelt thanks is extended to everyone that participated in the 2018 WA Marine Debris Project. The following community groups and partners supported and participated in the event:

- Apex Club of Albany
- Batavia Coastcare Network
- BHP
- Bunbury Regional Community
 College
- Cambridge Scout Group
- Care for Hedland
- Care for Hedland Environmental
 Association Inc
- Community volunteers
- Conservation Volunteers Australia
- Cowaramup Bay Conservation
 Group
- Dalkeith Primary School
- Denmark Senior High School
- Dolphin Discovery Centre
- Eyre Bird Observatory
- Friends of Freo Beaches
- Friends of Redgate Beach
- Green S Team, Alcoa Staff
- Kalbarri Offshore Angling Club Inc
- Keep Australia Beautiful Council WA
- Murdoch University Divers Club
- Museum of the Great Southern
- Northampton District High School

- Parks and Wildlife Service WA
- Peel-Harvey Catchment Council
- Pemberton Discovery Tours
- Penrhos College
- Perth Advocates for the Earth Inc.
- Perth NRM, Cottesloe Coastcare
- Pilbara Ports Authority
- Prevelly Penguins
- Pullman Bunker Bay Resort
- Quobba Station
- Responsible Runners Bunbury
- Scotch College Junior School
- Shire of Harvey
- South West Fco Discoveries
- St Stephens School
- Surfrider Foundation Perth
- Tangaroa Blue Foundation
- Undalup Association
- University of Western Australia
- We-Refill
- Wilderness Society
- William Bay National Parks Association
- Yallingup LCDC



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