

2021 WA Beach Clean-up Report

Tackling marine debris impacting the Western Australian coastline and marine environment



AUSTRALIAN
MARINE DEBRIS INITIATIVE



Tangaroa Blue Foundation would like to acknowledge the First Nations people as the Traditional Owners of country across Australia and recognise their continuing connection to land, waters and culture.

We pay our deep respects to all Elders past, present and emerging.

EXECUTIVE SUMMARY

This report summarises the 2021 Western Australian Beach Clean-up events. State-wide event statistics are provided and then broken down for each Natural Resource Management (NRM) region. The Land Sea Source Index (LSSI) is also estimated for each NRM region, and is displayed as a ratio of debris estimated to come from a local origin compared to that coming from an offshore origin. In each region, the debris density is calculated as the number of pieces per square metre, using an average site width of 45 m for each clean-up. This metric is used to ensure that the data is directly comparable to other programs run by Tangaroa Blue Foundation. The top three items found in each region is also provided. For each NRM region, data from one site is then highlighted to provide context to the debris found.

Over 90 organisations, volunteer groups, community members and businesses joined in the 2021 Western Australian Beach Clean-up. At 100 events, over 3 tonnes of debris was removed by 1,439 volunteers over 3,800 hours and 214 kilometres. While fewer events were held in 2021 than 2020 and 2019, more volunteers contributed to the event and collected a larger weight of debris over a greater distance. Volunteer effort, was unsurprisingly, concentrated in the most populous regions, the South West and Swan River. Christmas Island had the highest density of debris at 0.141 pieces per square metre, while the South Coast region had the lowest density at 0.001. In regional and remote areas, the debris was dominated by items from an offshore source, such as the high levels of rope and net scraps found in the South Rangelands region. Plastic materials such as plastic bits & pieces, plastic food packaging, and plastic film remnants dominated the top three item lists in all regions, with rope and cigarette butts and filters found at high levels in several regions as well. All data was entered into the AMDI Database and will inform management strategy recommendations and plans in the future.



The beautiful Foul Bay in the South West region (Credit: Casey Woodward – Tangaroa Blue Foundation).

Cover photo: Walpole-Nornalup National Parks Association (WNNPA) volunteers at Circus Beach on the South Coast (Credit: Department of Biodiversity Conservation and Attractions WA).

Back page photo: West Busselton Primary School students cleaning up at Busselton Jetty (Credit: West Busselton Primary School).






WHAT IS WABCU?

Each October, Indigenous Land and Sea Rangers, workplace teams, business and dedicated individuals and groups come together to clean-up beaches, estuaries and coastal areas right around the state for the annual Western Australia Beach Clean-up (WABCU). Starting in 2005 with a focus on the southwest corner of Western Australia (WA), the program has changed shape and now expanded to cover even the remote corners of WA in its 17th year in 2021. Interested parties register their own event and are sent a clean-up pack. After the event, data is submitted to the Australian Marine Debris Initiative (AMDII) Database, a national database contributing toward the understanding, monitoring and managing of marine debris in Australia.

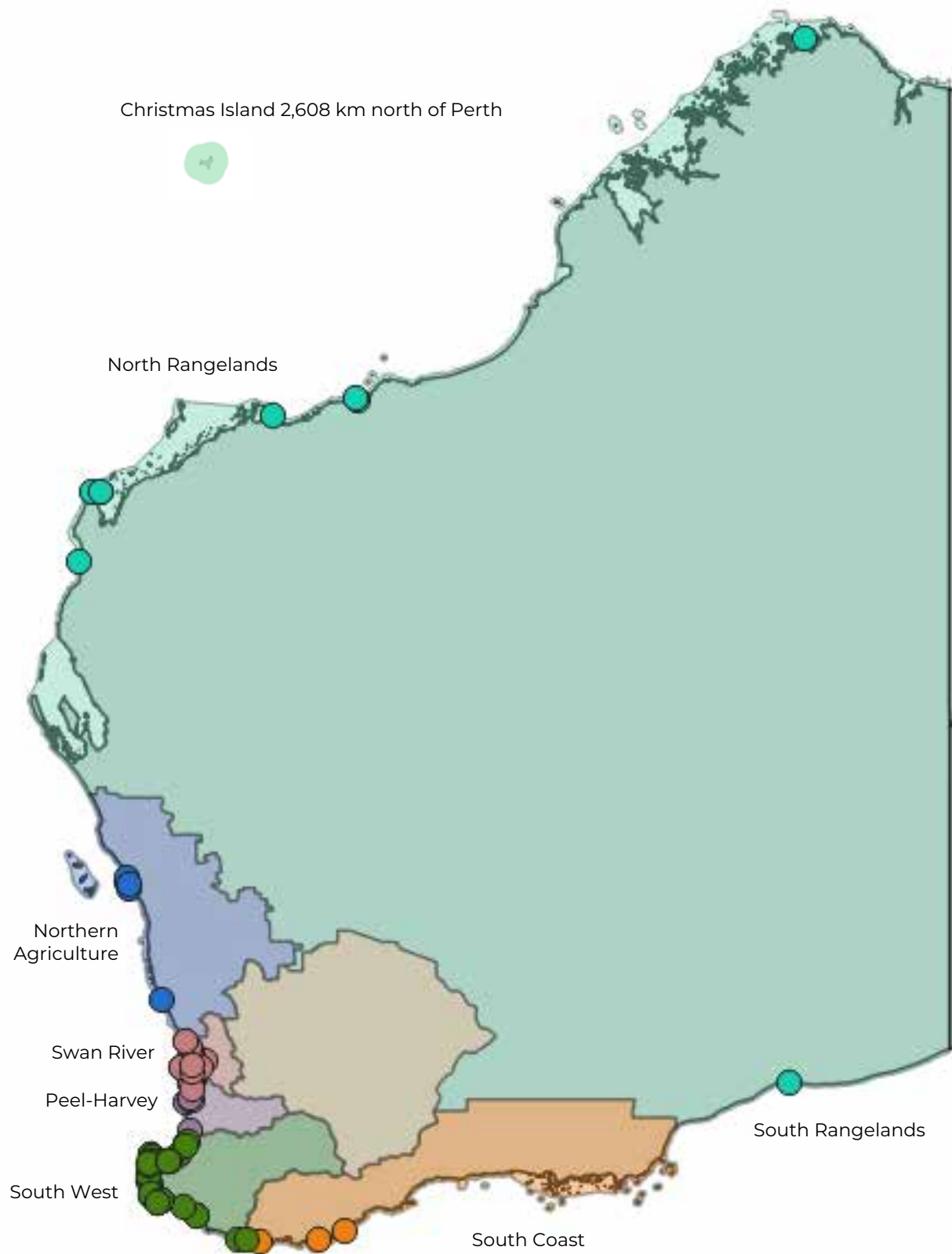
We are grateful to long-term partners Keep Australia Beautiful WA as well as Tallwood Custom Built Homes and Baywest Blinds and Shutters for their support of the 2021 Western Australia Beach Clean-up.

Tangaroa Blue Foundation (TBF) defines marine debris as man-made waste, litter and debris in any oceanic, coastal, inland water and shoreline environment.

17TH YEAR OF THE WA BEACH CLEAN-UP

| | | 2021 | 2020 | 2019 |
|---|-----------------------|-------|-------|-------|
|  | NUMBER OF EVENTS HELD | 100 | 107 | 128 |
|  | WEIGHT IN KILOGRAMS | 3,230 | 2,780 | 3,550 |
|  | KILOMETRES COVERED | 215 | 185 | 141 |
|  | NUMBER OF VOLUNTEERS | 1,439 | 1,200 | 1,180 |
|  | VOLUNTEER HOURS | 3,800 | 2,770 | 3,500 |

WA NRMS



CLEAN-UP DETAILS BY NRM

| | No. of events | Volunteer occasions | Volunteer hours | Weight kg | Debris Density (pieces / m ²) | Land Sea Source Index (LSSI) (% local : % offshore) |
|--------------------------|---------------|---------------------|-----------------|-----------|---|---|
| Indian Ocean Territories | 5 | 43 | 60 | 257 | 0.141 | 6 : 94 |
| North Rangelands | 7 | 90 | 558.5 | 101.8 | 0.006 | 70 : 30 |
| Northern Agricultural | 5 | 39 | 102 | 192 | 0.005 | 20 : 80 |
| Swan River | 32 | 592 | 1243 | 872.4 | 0.012 | 79 : 21 |
| Peel-Harvey | 5 | 162 | 424.5 | 329.5 | 0.009 | 63 : 37 |
| South West | 43 | 494 | 1190 | 1,342.5 | 0.005 | 24 : 76 |
| South Coast | 2 | 9 | 15 | 5 | 0.001 | 43 : 57 |
| South Rangelands | 1 | 10 | 100 | 120 | 0.002 | 1 : 99 |

TOP ITEMS

| | 1 | 2 | 3 |
|--------------------------|--|---|--|
| Indian Ocean Territories | Foam insulation & packaging (whole and remnants) | Plastic packaging food (wrap, packets, containers) | Plastic drink bottles (water, juice, milk, soft drink) |
| North Rangelands | Cigarette butts & filters | Plastic packaging food (wrap, packets, containers) | Plastic bits & pieces (hard & solid) |
| Northern Agricultural | Rope & net scraps (<1m) | Plastic bits & pieces (hard & solid) | Strapping band scraps |
| Swan River | Cigarette butts & filters | Plastic film remnants (bits of plastic bag, wrap etc) | Plastic packaging food (wrap, packets, containers) |
| Peel-Harvey | Plastic bits & pieces (hard & solid) | Plastic packaging food (wrap, packets, containers) | Rope |
| South West | Plastic bits & pieces (hard & solid) | Rope & net scraps (<1m) | Lids & tops, pump spray, flow restrictor & similar |
| South Coast | Plastic bits & pieces hard & solid | Plastic film remnants (bits of plastic bag, wrap etc) | Cigarette butts & filters |
| South Rangelands | Rope & net scraps (<1m) | Plastic bits & pieces (hard & solid) | Rope |

CLEAN-UP LOCATIONS BY NRM

INDIAN OCEAN TERRITORIES

Flying Fish Cove, Christmas Island
North West Beach, Cocos (K) Islands
The Dales, Christmas Island

RANGELANDS NORTH

Boat Beach Wickham
Butcher Bay, Anjo Peninsula North
Kimberley
Cemetery Beach
Coral Bay
Pretty Pool River and Beach
Tantabiddi Boat Ramp, Jurabi Coastal Park
Town Beach, Exmouth

NORTHERN AGRICULTURAL

Champion Bay
Glenfield Beach
Greenough Rivermouth
Tarcoola Beach
Wedge Island South

PEEL-HARVEY

Binningup Beach North
Coodanup Foreshore
Dawesville Cut Embankment South Side
Mandurah Estuary, Underwater
Mandurah Quay

SWAN RIVER

Capricorn Beach
Challenger Beach
CY O'Connor Beach
East Street Jetty, East Fremantle
Floreat Beach
Fremantle Bridge, Swan River
Hillarys
Iluka Beach, Iluka
J Dolan Park, Foreshore.
Leighton Beach
Minim Cove, Mosman Park
Mullaloo
Palm Beach Jetty, Rockingham
Underwater
Peron Foreshore, Point Peron
Point Walter Reserve
Port Beach
Port Coogee Marina Infrastructure
Quinns Beach
Rockingham Dog Beach
Rockingham Foreshore
Secret Harbour
South Beach, Fremantle
Swan River, West Swan Road to Reid
Highway
Swanbourne Beach
Thomson Bay, Rottnest Island
Yanchep Beach and Lagoon

SOUTH WEST

Abbey Beach
Bunbury Back Beach
Bunker Bay
Busselton Jetty Foreshore
Busselton Jetty Underwater
Circus Beach
Conto Spring
Dallyellup Beach
Dolphin Road to Vasse Diversion Drain
Eagle Bay
East Busselton Foreshore
Foul Bay
Geographe Foreshore
Gnarabup Boat Ramp & Beach
Hamelin Bay
Holgate Street to Dolphin Road Boatramp,
Busselton
Injidup
Jasper Beach
Kilcarnup
Koombana Bay, Bunbury
Left Handers Beach

Lighthouse Beach and Other Side Of The
Moon
Mandalay Beach
Mindalong Beach
Old Rivermouth to Ledge Point, Scott River
Peppermint Grove Beach, Capel
Quarry Bay
Quindalup Boat Ramp
Shelly Cove
Siesta Park
Skippy Rock Beach
Smiths Beach
Surfers Point to Rivermouth
West Busselton Foreshore
Windows
Yeagarup Beach
Yeagarup West

SOUTH COAST

Middleton Beach, Albany
Peaceful Bay

RANGELANDS SOUTH

Kanidal Beach

SAMPLE CLEAN-UP DATA

The following case studies have been selected from one clean-up location from each NRM. The overall clean-up details for each NRM are located on page 3.

INDIAN OCEAN TERRITORIES – THE DALES (CI)

Christmas Island is renowned for its stunning and unique landscapes and animals, with the famous red crabs migrating from rainforest to the beach and hundreds of fish species along the volcanic coastline. In 2022, a new National Park was declared in the waters around Christmas Island, including critical area for the spawning of bluefin tuna, a common target for illegal international fishing.

With this being such an significant environmental region, it is particularly important to keep this area free of marine debris. In 2021, the Dales was cleaned for the first time as part of the WA Beach Clean-up in partnership with Island Care Christmas Island and Christmas Island Adventurers. This site is located at the end of a beautiful 3.5km walk through the tropical rainforest. Being such a remote site, it is not surprising that the LSSI suggested that almost all (99%) of the debris found had washed in from the ocean. This was supported by volunteers reporting that the plastic remnants found likely had an Asian origin. Despite little local source input, debris was found at a relatively high density of 0.996 pieces per m².



**NUMBER OF
EVENTS HELD**

2



**NUMBER OF
VOLUNTEERS**

18



VOLUNTEER HOURS

102.75





67.5

WEIGHT IN
KILOGRAMS



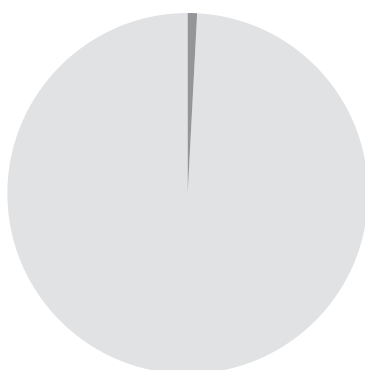
DEBRIS
DENSITY

0.996 pieces per m²

LAND SEA
SOURCE INDEX

1:99

Land Sea



TOP ITEMS



Foam insulation & packaging (whole and remnants)



Plastic packaging food (wrap, packets, containers)



Plastic drink bottles (water, juice, milk, soft drink)

Top: Volunteers with debris collected from the Dales | Right: Volunteers hiking into the Dales.
(All photo credits: Island Care Christmas Island & Christmas Island Adventures).

NORTH RANGELANDS - PRETTY POOL RIVER & BEACH

Pretty Pool River and Beach in Port Hedland is an important long-term monitoring and clean-up site for the Care for Hedland Environmental Association, with this being a crucial nesting site for threatened Flatback sea turtles (*Natator depressus*). The community group found considerably lower levels of debris this year compared to past years, with just 37 pieces collected across a one-kilometre stretch of beach equating to 0.001 pieces per m². This is compared to 0.007 pieces per m² in 2020 and 0.009 in 2019.

This site is a popular free overnight camping site and recreational use area for families, reflected in the type of debris found over the last few years. Rubber balloons and foil wrappers were the top items found in 2021, whereas aluminium cans, glass beer bottles and plastic food packaging have been among the most prominent since 2017.



**NUMBER OF
EVENTS HELD**

1



**NUMBER OF
VOLUNTEERS**

4



VOLUNTEER HOURS

8



Volunteers at Pretty Pool River and Beach (Credit: Care for Hedland).



13.42

WEIGHT IN
KILOGRAMS



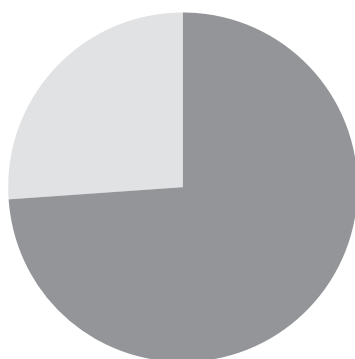
DEBRIS
DENSITY

0.001 pieces per m²

LAND SEA
SOURCE INDEX

74:26

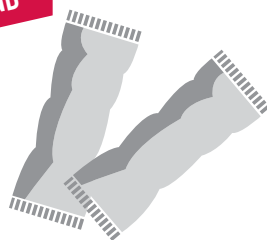
Land Sea



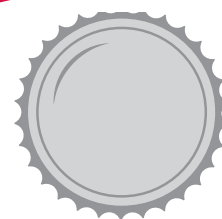
TOP ITEMS



Rubber balloons,
balls & toys, elastic
straps & bands



Foil wrappers,
packets, bladders
& alfoil



Metal bottle caps,
lids & pull tabs

Top / Right: Debris collected by Care for Hedland volunteers at Pretty Pool River and Beach in the northern Rangelands region (Credit: Care for Hedland).

NORTHERN AGRICULTURAL – TARCOOLA BEACH

Tarcoola Beach is a beautiful 3.2km stretch of coastline in Geraldton, a major west coast seaport. In 2021, debris at the beach was at a density of 0.002 pieces per m², with a slight decrease from when it was last cleaned up in 2018 (0.0003 pieces per m²) and 2017 (0.005 pieces per m²).

Rope and net scraps (<1m) were the most commonly found item in 2021, while commercial fishing remnants, foam buoys and rope were the most common items in 2018. As a result of the high proportion of fishing related debris, the Land Sea Source Index (LSSI) suggests that the percentage of debris found with a likely offshore origin was 80%, compared to 20% with a local origin in 2021.



**NUMBER OF
EVENTS HELD**

1



**NUMBER OF
VOLUNTEERS**

2



VOLUNTEER HOURS

6





kg **7**

**WEIGHT IN
KILOGRAMS**



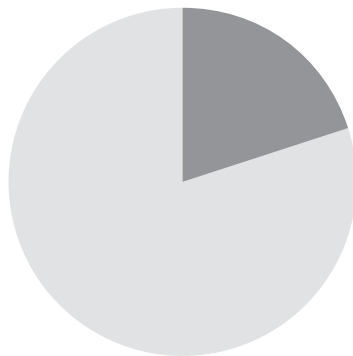
**DEBRIS
DENSITY**

0.002 pieces per m²

**LAND SEA
SOURCE INDEX**

20:80

■ Land ■ Sea



TOP ITEMS



Rope & net scraps
(<1m)



Plastic film remnants
(bits of plastic bag,
wrap etc)



Plastic bits & pieces
(hard & solid)

SWAN RIVER – MINIM COVE, MOSMAN PARK

Minim Cove is a bushland site at Mosman Park on the Swan River in the heart of Perth. The area contains the only mainland population of Winged Boronia (*Boronia alata*) and is part of the Bush Forever government plan which aims to protect and manage local bushland.

Alarming high levels of marine debris have been found by volunteers from Ocean Remedy over a small area at Minim Cove over the last few years, with debris at a density of 6.02 pieces per m² in 2021 and 13.80 in 2020. Volunteers have consistently collected very high numbers of plastic film remnants and plastic bits and pieces (hard and solid), including frequently finding nurdles (small plastic pellets used to create bigger plastic items). It appears that Minim Cove is acting as a sink for debris coming from further upstream, resulting in the worrying levels of plastic found here and at nearby sites.



**NUMBER OF
EVENTS HELD**

1



**NUMBER OF
VOLUNTEERS**

17



VOLUNTEER HOURS

59.5



Minim Cove before being cleaned-up by Ocean Remedy volunteers (Credit: Claire O'Loughlin).



15

WEIGHT IN
KILOGRAMS



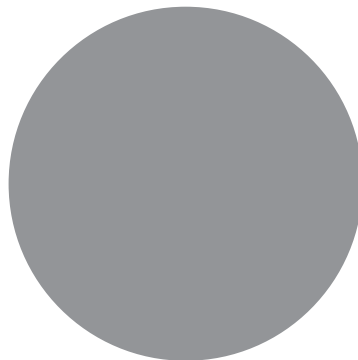
DEBRIS
DENSITY

6.02 pieces per m²

LAND SEA
SOURCE INDEX

100:0

■ Land ■ Sea



TOP ITEMS



Plastic film remnants
(bits of plastic bag,
wrap etc)



Plastic bits & pieces
(hard & solid)



Rope & net scraps
(<1m)

Top: Ocean Remedy volunteers at Minim Cove in the Swan River region (Credit: Claire O'Loughlin).

Right: Ocean Remedy volunteers straining waters at Minim Cove (Credit: Claire O'Loughlin).

PEEL-HARVEY – DAWESVILLE CUT EMBANKMENT SOUTH SITE

The Dawesville Cut is an artificial channel created in 1994 to allow water movement between the open ocean and the Collins Pool estuarine zone. This area is a popular fishing spot for locals and subsequently, recreational fishing line was the most common item found in both 2021 and 2020. Volunteers from the Coastal Waste Warriors group also found a significant amount of cigarette butts and filters and plastic food packaging found in 2021, with debris at a density of 0.026 pieces per m². This is concerning given that there were 0.006 and 0.005 pieces per m² found in 2020 and 2019 respectively. This area is also home to dolphins and migratory birds who are both very susceptible to harm from fishing line and other debris.



**NUMBER OF
EVENTS HELD**

1



**NUMBER OF
VOLUNTEERS**

45



VOLUNTEER HOURS

67.5



Volunteers with debris collected from the Dawesville Cut.



126.5

WEIGHT IN
KILOGRAMS



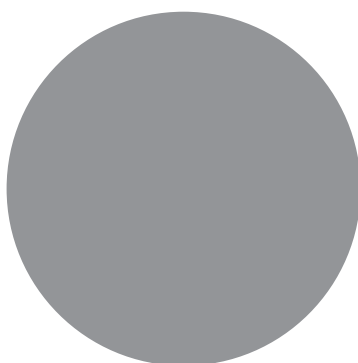
DEBRIS
DENSITY

0.026 pieces per m²

LAND SEA
SOURCE INDEX

100:0

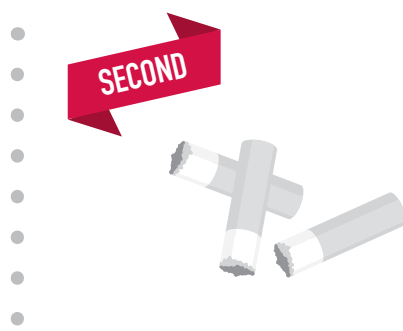
■ Land ■ Sea



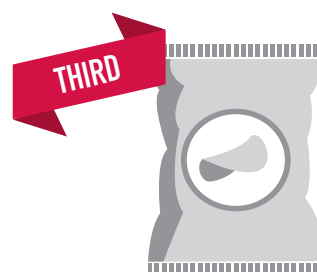
TOP ITEMS



Fishing line
(recreation)



Cigarette butts &
filters



Plastic packaging
food (wrap, packets,
containers)

Top: Volunteers cleaning up the south side of Dawesville Cut.

Right: Rope collected on the south side of Dawesville Cut by the Mandurah Cruises team.

SOUTH WEST REGION – QUARRY BAY

Quarry Bay has been cleaned each year since 2004 by former Tangaroa Blue Database Manager, Wally Smith. Sites in this area are the longest running datasets in the AMDI Database. Wally and other volunteers have reported finding nurdles (small plastic pellets used to create bigger plastic items) and microplastics washing up at this site since 2007. To investigate this further, samples are being taken monthly for laboratory analysis.

This site was cleaned over three WABCU events in 2021, with debris density at 0.096 pieces per m², slightly higher than in 2020 (0.053 pieces per m²). Reflecting the high levels of plastics bits and pieces (hard and solid) and rope & net scraps washing in from offshore the Land Sea Source Index (LSSI) suggested that just 4% of debris at this site had a local origin.



**NUMBER OF
EVENTS HELD**

3



**NUMBER OF
VOLUNTEERS**

3



VOLUNTEER HOURS

6





3

**WEIGHT IN
KILOGRAMS**



**DEBRIS
DENSITY**

0.096 pieces per m²

**LAND SEA
SOURCE INDEX**

4:96

■ Land ■ Sea



TOP ITEMS



Plastic bits & pieces
(hard & solid)



Rope & net scraps
(<1m)



Lids & tops, pump
spray, flow restrictor
& similar

Top: Plastic bits and pieces collected at Quarry Bay (Credit: Casey Woodward – Tangaroa Blue Foundation).

Right: Nurdles collected at Quarry Bay (Credit: Casey Woodward – Tangaroa Blue Foundation).

SOUTH COAST - PEACEFUL BAY

Peaceful Bay was part of the WABCU program for the first time in 2021, cleaned by the Walpole Community Resource Centre and project partner, Keep Australia Beautiful WA. This beautiful beach is a popular swimming and snorkelling spot for tourists and locals.

The site was quite clean with only 0.002 pieces of debris found per m². Plastic bits & pieces hard & solid were the most commonly found item, and 62% of items were estimated to come from an offshore origin.



**NUMBER OF
EVENTS HELD**

1



**NUMBER OF
VOLUNTEERS**

6



VOLUNTEER HOURS

12





4

**WEIGHT IN
KILOGRAMS**



**DEBRIS
DENSITY**

0.002 pieces per m²

**LAND SEA
SOURCE INDEX**

38:62

■ Land ■ Sea



TOP ITEMS



Plastic bits & pieces
hard & solid



Plastic film remnants
(bits of plastic bag,
wrap etc)



Miscellaneous paper,
labels & tickets

Top: Nurdles collected at Peaceful Bay (Credit - Walpole Community Resource Centre)

Right: Debris collected at Peaceful Bay (Credit - Walpole Community Resource Centre)

RANGELANDS SOUTH – KANIDAL BEACH

Kanidal Beach has been cleaned weekly by the volunteers at the Eyre Bird Observatory returning from their regular bird surveys for over 40 years.

Despite it being a very remote stretch of beach, very high amounts of rope and net scraps are found during each clean-up, thought to be washing in from offshore commercial fishing activities. This is reflected in the Land Sea Source Index (LSSI) estimating that 99% of debris found was of an offshore origin. The debris density was relatively low at 0.002 pieces per m², however it is important to remember that this site is cleaned each week and many long lengths of rope are found each time.



**NUMBER OF
EVENTS HELD**

1



**NUMBER OF
VOLUNTEERS**

10



VOLUNTEER HOURS

100





120

WEIGHT IN
KILOGRAMS



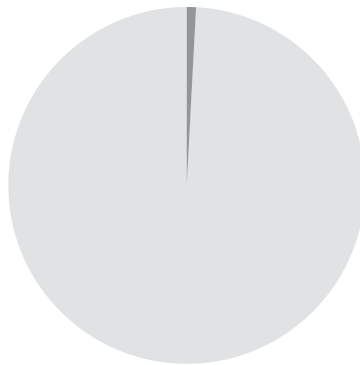
DEBRIS
DENSITY

0.002 pieces per m²

LAND SEA
SOURCE INDEX

1:99

Land Sea



TOP ITEMS



Rope & net scraps
(<1m)



Plastic bits & pieces
(hard & solid)



Rope

Rope and other debris collected at Kanidal Beach by Eyre Bird Observatory volunteers
(Credit: Eyre Bird Observatory).

CONTRIBUTING ORGANISATIONS

Tangaroa Blue Foundation would like to thank Keep Australia Beautiful WA, Tallwood Custom Built Homes, Baywest Blinds and Shutters, 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:

| | |
|--|---|
| Alcoa | Medical Students' Association of Notre Dame (MSAND) |
| AUSMAP | Mullaloo Beach Community Group |
| Bankwest | Murdoch University Divers Club |
| Batavia Coastcare | Ocean Remedy |
| Binningup Coastcare & Environment Group | Pemberton Discovery Tours |
| Brick and Stone Creations | Port Coogee Community Association |
| Cambridge Coastcare | Prevelly Penguins |
| Care For Hedland Association | Pullman Bunker Bay |
| City of Bunbury | Quinns Rocks Environmental Group |
| City of Busselton | Saltwater Clean-Ups |
| City of Cockburn | Salty Frogs Beach Clean-Up |
| City of Swan | Sea Shepherd Australia |
| Coastal Waste Warriors | South West Eco Discoveries |
| Coral Bay Conservation Group | Sub Sea 7 |
| Cornerstone Christian College | Swan Christian College |
| COW School Holiday Programme | The Wholesome Sailors |
| Dolphin Discovery Centre | TrackCare WA |
| Eyre Bird Observatory | Tronox |
| Friends of Hillarys and Kallaroo Foreshore | Undalup Association |
| Friends of North Ocean Reef | Underwater Explorers Club |
| Gage Roads Brewing Co | Walpole Community Resource Centre |
| Golden Bay Progress Association | Wedge Island Protection Association |
| Island Care Christmas Island | West Busselton Primary School |
| Christmas Island Adventurers. | Willy Wagtails Girl Guides |
| Margaret River Scouts | |

Thank you to all of the volunteers and organisations that contributed to the 2021 WA Beach Clean-up, including our partners Keep Australia Beautiful (KAB) WA, Tallwood Custom Built Homes and Baywest Blinds and Shutters.



www.tangaroablue.org

