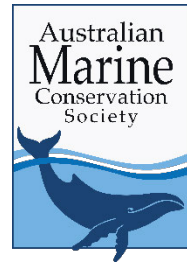


Committee Secretary
Standing Committee on Climate Change, Energy, Environment and Water
PO Box 6021
Canberra ACT 2600

CCEEW@aph.gov.au



22 December 2022

Submission on the House of Representatives Inquiry into plastic pollution in Australia's oceans and waterways

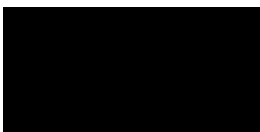
The Australian Marine Conservation Society (AMCS) appreciates the opportunity to make a submission on the House of Representatives inquiry into ocean plastic pollution. In particular, we welcome the chance to provide feedback on the progress and impact of national policies and approaches to reducing plastics in Australia.

As Australia's only charity dedicated solely to ocean conservation, we have over 57 years of experience working with scientists, researchers and ocean lovers to advance the protection of Australia's marine species and ecosystems. AMCS has been proud to play a leading role in advocating for science-based solutions to ocean plastic pollution over many years. We are pleased to see the establishment of this inquiry, and the attention of the House Standing Committee on Climate Change, Energy, Environment and Water on these matters.

We hope that this submission assists the committee to make a considered investigation into the impact of Australia's policies on plastic pollution, with strong recommendations for improving the national policy framework.

Please don't hesitate to contact me if we can provide any further information in relation to this submission or the impacts of waste on the marine environment. On behalf of AMCS, I would appreciate the opportunity to present further testimony to future committee hearings on these matters.

Yours sincerely,



Shane Cucow

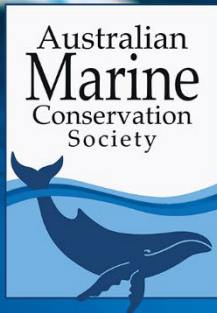
Plastics Campaign Manager
Australian Marine Conservation Society



Australian Marine Conservation Society

www.marineconservation.org.au

PO Box 5815, West End QLD 4101 p 07 3846 6777 e amcs@amcs.org.au



Australian Marine Conservation Society Submission

Inquiry into plastic pollution in Australia's oceans and waterways

The Australian Marine Conservation Society (AMCS) is the leading environmental organisation devoted solely to caring for Australia's oceans and their wildlife. AMCS has over 300,000 members and supporters in Australia who we represent and work with on key marine issues facing the nation. We work with science and conservation centres to develop policy solutions that use best available science to deliver healthier outcomes for our oceans. One of our core focus areas is addressing the waste crisis that is leading to rising debris and plastic pollution in the marine environment.

Ocean plastic pollution is a rapidly accelerating crisis both domestically and internationally. First recognised as an issue in the 1990s, decades of inaction and an unwillingness to regulate have allowed the crisis to spiral out of control. Current estimates show that up to 145,000 tonnes of Australia's own plastic is now leaking into the natural environment annually. Globally, plastic production is increasing exponentially with the amount of plastic being produced projected to double by 2040, and the amount of plastic in the world's oceans projected to triple within the next 20 years.

The impact on ocean wildlife and marine ecosystems is devastating. Estimates suggest up to 100,000 marine animals and 1 million seabirds are killed by plastic globally every year, with turtles, whales and seabirds some of the most commonly affected species.

Coral reef ecosystems are also being damaged by plastics, with studies indicating a high risk of coral disease or damage from plastic pollution. Impacts of plastic on wildlife and fish stocks have far reaching impacts for tourism, fisheries and human health.

In recent years, Australia has made considerable progress in starting to address the plastic pollution crisis, with long overdue investment in building waste and recycling infrastructure. State and territory governments have worked with the Australian Government to deliver bans on single-use plastics and container deposit schemes, proven policies that are shown to directly address many of the most common plastics found in the natural environment.

Despite this, Australia's recycling rates have stagnated at just 13%, and the nation is not on track to deliver the 2025 National Packaging Targets. Voluntary approaches to product stewardship and an unwillingness to regulate plastic reduction targets have allowed industry to avoid dealing with the environmental cost of their plastic use.

As our submission lays out, a shift towards mandatory product stewardship, with national harmonisation of infrastructure and ambitious policies to reduce plastic waste are urgently required. Only through ambitious action can Australia fulfil its responsibility to prevent the disastrous ecological consequences of ocean plastic pollution.

Table of Contents

| | |
|--|----|
| Environmental impacts of plastic pollution | 3 |
| Impact of plastic pollution on marine wildlife | 3 |
| Entanglement | 3 |
| Ingestion | 4 |
| Contamination | 6 |
| Impact of plastic pollution on marine ecosystems | 7 |
| Sources of plastic pollution | 7 |
| Single-use plastics | 7 |
| Abandoned, lost or discarded fishing gear | 8 |
| Effectiveness of Australia's plastics management framework | 9 |
| National Plastics Plan | 9 |
| National Waste Policy Action Plan | 10 |
| Product Stewardship Measures | 11 |
| Performance of the UPM NEPM and the Australian Packaging Covenant | 11 |
| The Need for an Enforceable Circular Economy Framework | 12 |
| Examining Market Based Mechanisms for Plastic Reduction | 13 |
| Mandatory Extended Producer Responsibility Schemes | 13 |
| Tax Policy Instruments | 15 |
| RECOMMENDATIONS | 16 |
| Effectiveness of Australia's ghost gear interventions | 18 |
| RECOMMENDATIONS | 19 |
| Effectiveness of the Australian Government's engagement with states and territories | 20 |
| Waste Infrastructure | 20 |
| Bans on Single-Use Plastics | 21 |
| Container Deposit Schemes | 24 |
| RECOMMENDATIONS | 25 |
| Effectiveness of the Australian Government's engagement with Industry and NGOs | 26 |
| Industry Engagement | 26 |
| NGO Engagement | 26 |
| RECOMMENDATIONS | 27 |
| Effectiveness of community education campaigns | 28 |
| RECOMMENDATIONS | 29 |
| Global initiatives to reduce plastic pollution | 30 |
| RECOMMENDATIONS | 30 |

Environmental impacts of plastic pollution

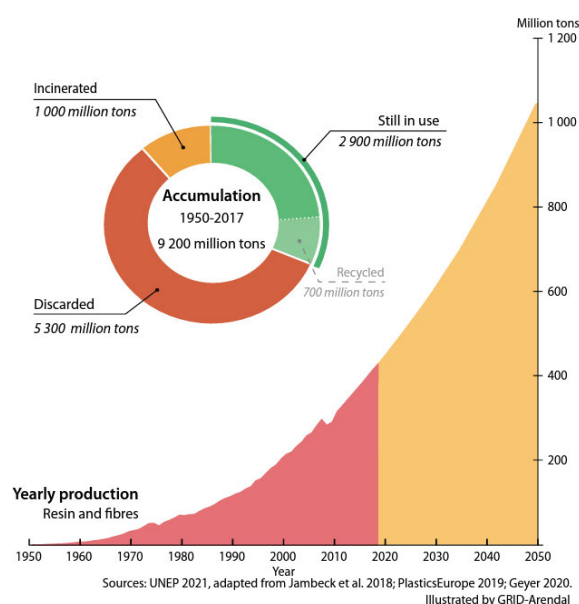
The United Nations has identified ocean plastic pollution to be a global problem, and indeed ocean plastic pollution has been identified as an issue of concern in Australia since the 1990s. Plastic pollution has been found in every part of the marine ecosystem, from coastlines and river mouths, to coral reefs, Antarctic sea ice, and the depths of the deepest part of the ocean in the Mariana Trench.

Current estimates indicate that 11 million metric tons of plastic waste enter the world's oceans every year¹, with 145,000 tonnes of Australia's own plastic leaking into the natural environment annually.²

In simple terms, the World Economic Forum estimates that the equivalent of one rubbish truck worth of plastic rubbish is dumped into our oceans every minute, and there will be more plastic by mass than fish in the sea by 2050.³

Alarmingly, the production of plastic has rocketed in the last two decades, with as much plastic being produced between 2003 and 2016 as in all the preceding years combined.⁴ This production continues to grow exponentially and as a result global plastic production is projected to double by 2040 at current rates, with overall levels of plastic pollution in the ocean expected to triple by 2040 if further action isn't taken.⁵

Figure 1: Global plastic production, accumulation and future trends (UNEP 2021)



While Australia is not the largest contributor to global plastic pollution, our contribution is disproportionate to our size. A recent report by the Minderoo Foundation found that Australia generates more single-use plastic waste per person than any other country except Singapore, generating an estimated 59kg of plastic waste per person annually – compared with a global average of 15kg per person.⁶

Impact of plastic pollution on marine wildlife

Plastics are the most widespread, most harmful and most persistent form of marine litter, accounting for at least 85% of total marine waste.⁷ Today almost every species group in the ocean has encountered plastic pollution, with scientists observing negative effects in almost 90% of assessed species.⁸

Plastics are known to poison, injure or kill a wide range of animals including whales, seals, turtles, birds and fish, as well as invertebrates such as bivalves, plankton, worms and corals.⁹ Global estimates of the death toll from plastic pollution have shown that millions of seabirds are killed by plastic each year, and over 100,000 marine animals¹⁰, although these numbers are now expected to be higher than previously reported.

Plastics harm ocean wildlife in three ways: entanglement in debris, direct injury due to ingestion of plastics, and secondary contamination as a result of plastic ingestion.

Entanglement

Entanglement in debris is the most likely cause of death for seabirds, turtles and marine mammals, with fishing gear, balloons and plastic bags rated the biggest entanglement threat.¹¹ These items can wrap themselves around marine animals, causing strangulation, wounds, restricted movement, and death from drowning, starvation or injuries.^{12 13}

Marine animals of all sizes can become entangled in marine debris, including large cetaceans such as whales and dolphins who routinely become entangled in lost fishing gear. Birds are known to

regularly become entangled in plastics such as abandoned balloon strings or discarded fishing line, and may use marine debris for their nests which can entrap parents and hatchlings.

Ingestion

Ingestion of plastics by marine animals can cause painful internal injuries and life threatening internal blockages that lead to starvation and malnutrition. Marine animals of all kinds ingest plastics – from apex predators down to the plankton at the base of the food chain.¹⁴ Commonly littered single-use plastic items such as bags & utensils are rated as the biggest ingestion.¹⁵

Ingestion of plastics can occur when an organism mistakes plastic pieces for prey, due to its shape, colour, or scent.¹⁶ Plastic ingestion may also occur through secondary ingestion, consuming prey that contain ingested plastics,¹⁷ or when filter feeders such as whales suck in water full of plastics.

Over half of the world's turtles and more than 90% of seabirds are estimated to have ingested plastics.^{18 19} Many emaciated whales and dolphins found stranded are also found to have ingested macroplastics²⁰, with plastic ingestion strongly correlated with instances of whale and other cetacean stranding across the world.²¹

The most lethal plastics for ingestion are soft plastics (such as plastic food packaging), due to their ability to wrap around other items in the stomach and cause internal blockages that either directly obstruct digestive pathways or cause a false sense of satiation, leading to starvation. Balloons are particularly lethal due to their stretchy nature, and have been shown to be 32 times more likely to kill than hard plastics when ingested.²²

Feature 1: Whales and Cetaceans

At its most recent meeting, the International Whaling Commission (IWC) passed a Resolution on Marine Plastic Pollution acknowledging plastic pollution as a priority concern for cetaceans.²³

Over two thirds of cetacean species (61 of the 90 currently recognised species) are known to be affected by marine litter and plastic and the number of affected species appears to be growing rapidly, doubling in the last two decades.²⁴

More than 34% of cetacean species have had at least one documented case of entanglement, almost all involving abandoned, lost or otherwise discarded fishing gear.²⁵ Such incidents can cause extreme stress, and prolonged entanglement can restrict movement and ability to feed. Right whale body measurements collected over a 20-year period demonstrate a link between entanglements in fishing gear with shorter whales and a steady decrease in right whale body lengths since 1981.²⁶

Plastic ingestion is also a common cause of illness or death. Cetaceans are at higher risk of plastic ingestion due to the way in which many cetaceans feed, sucking in large amounts of water to consume plankton or fish. As a result, it is common for whales to consume large volumes of floating plastic. In 2019, a beached sperm whale was found washed up on a Victorian beach with a stomach full of plastic, which had blocked its stomach outflow.²⁷

Baleen whales (such as the southern right whale and humpback whale) predominantly feed at depths of 50–250 m, coinciding with the highest measured microplastic concentrations in the pelagic ecosystem. Per day, a krill-obligate blue whale may ingest 10 million pieces of microplastic, while a fish-feeding humpback whale likely ingests 200,000 pieces of microplastic.²⁸

Feature 2: Seabirds

Nearly 60 percent of all seabird species have plastic in their gut, with scientists estimating that 90 percent of all seabirds alive today have eaten plastic of some kind.²⁹

In particular shearwaters, petrels, and albatrosses are more prone to plastic ingestion than all other orders of seabirds, staying out at sea for long periods of time and unintentionally ingesting plastics when scooping up prey from the ocean's surface. In particular Flesh-footed Shearwaters have been documented to ingest considerable quantities, with studies estimating that in the past decade alone, the population may have declined by up to 50% in part due to the ingestion of plastics.³⁰

Recent studies of Flesh-footed Shearwaters on Heron Island by scientists at Adrift Lab have indicated that the scope and severity of the health impacts of plastic pollution may be grossly underestimated, after studies examined the impact of microplastics on organs and tissues. The research showed that birds with ingested plastics had a higher inflammatory response, greater deterioration of the stomach lining, higher tissue damage scores across multiple organs, and a greater density of embedded micro- and nano-plastics in the proventriculus, spleen, and kidneys.³¹ This exposure is associated with considerable tissue damage, as well as evidence of inflammation, fibrosis, and loss of organ structures in the kidney and spleen.

Feature 3: Sea Turtles

Three of Australia's six species of turtle are endangered, and the rest are vulnerable, with the leatherback, loggerhead and olive ridley turtle each listed as endangered under the EPBC Act. As one of the top species affected by plastic pollution, there is a risk that increased plastic levels in the ocean may push these species past the tipping point for extinction.

Approximately 52 percent of turtles world-wide have eaten plastic or other human marine debris³², often mistaking soft plastics such as food packaging and balloons for prey such as jellyfish. Australian research has indicated that a turtle has a 22% chance of dying from eating just one piece of plastic.³³

In Australia the evidence of these impacts have become increasingly apparent. Turtle rehabilitation centres regularly receive turtles with floater syndrome or malnutrition as a result of plastic ingestion. Incidents of young turtle hatchlings washing up on Australian beaches, sick and dying with stomachs full of plastic, has started to become an annual occurrence.^{34 35} A study of sea turtles found off the Eastern and Western Australia coast has indicated that juvenile turtles are ingesting potentially hundreds of pieces of plastic, with one baby turtle found in the Indian Ocean ingesting 343 pieces of plastic, while another located in the Pacific Ocean had swallowed 144 pieces.³⁶

In addition to a physical resemblance to food, plastics in the ocean trap microbes and algae, which then break down and release food-like odour, a phenomenon known as biofouling. Research indicates that sea turtles respond to odours from biofouled plastic debris with the same behaviour that is elicited by food odours, providing a possible explanation for why sea turtles ingest a disproportionate amount of marine plastic when compared to other plastics.³⁷

Many turtle species like leatherbacks, loggerheads and green sea turtles have specialised backwards facing spikes in their throats called papillae, which allow them to expel sea water while keeping food in their stomachs. These spikes trap plastics in the stomachs of turtles, increasing the chances of internal blockages.

Abandoned, lost or discarded fishing gear is also a high risk to turtle species in Australia, with between 4,866 and 14,600 turtles estimated to be caught in ghost nets annually in the Gulf of Carpentaria.³⁸

Contamination

In addition to direct blockages or internal injuries, poisoning and contamination as a result of plastic consumption is increasingly implicated in the declining health of marine species. Recent research has raised concerns about the impacts of microplastics and the chemicals associated with plastic – either chemicals used in the production of the plastic, or chemicals that bond with plastic in the natural environment.

Ingestion of microplastics has been associated with changes in gene and protein expression, inflammation, disruption of feeding behaviour, decreases in growth, changes in brain development, and reduced filtration and respiration rates.³⁹ Marine organisms of any size (from plankton to whales) that ingest microplastics bio-accumulate chemical pollutants which may lead to other issues such as liver toxicity.⁴⁰ These impacts are associated with lower rates of reproductive success and reduced survival.

A recent study into the effects of chemical leachates from microplastic nurdles showed that sea urchin embryos develop significant malformations of the skeleton, neural and immune cells that can lead to death. They also showed 'radialisation' – meaning they lacked proper symmetrical structure, and were instead largely formless and therefore unable to survive. Larvae exposed to 10% PVC pollution developed their gut outside their body, while the 5% and 1% levels also led to fatal abnormalities.⁴¹

Feature 4: Plastics Contamination in the Food Chain

While there is a significant gap in research when it comes to the impacts of micro- and nano-plastics on human health, there is an increasing body of evidence indicating that plastics are present in commonly consumed seafood.

Ingestion of microplastics by mussels and oysters has been demonstrated in a range of global studies. Low to medium levels of microplastics have been found in mussels sampled from both popular and remote beaches across South Australia, with microplastics indicated to have originated from single-use plastics, textiles and the fishing industry.⁴² With mussels consumed whole, it is certain that these plastics are being ingested by humans.

Research into the plastics found in seafood is still in its early days, with evidence of microplastics found predominantly in gastrointestinal tracts emerging. One comparative study of fish in Australia and Fiji found that in Australia fish had double the amount of plastic on average, with 61.6% of Australian fish showing evidence of plastic in gastrointestinal tracts, while in Fiji, 35.3% of fish had plastic.⁴³ The types of plastic differed between countries, with fibres comprising 83.6% of microplastic pieces in fish from Australia, whereas 50% of microplastic found in fish from Fiji was film.

There are emerging signs that secondary microplastic ingestion can lead to negative health impacts for fish species higher in the food chain. In one study, exposure of the water flea *Daphnia magna* to nanoplastics reduced its survival dramatically, in some cases causing mortality of up to 100% within the studied population. When these water fleas were then fed to fish, the nanoplastics were found to cross the blood-brain barrier and caused behavioural changes including lower feeding and movement rates.⁴⁴

Impact of plastic pollution on marine ecosystems

In addition to the direct impacts of plastic pollution on wildlife, a growing body of research is showing concerning impacts on broader ecosystems such as coral reefs and mangroves. With these ecosystems already deteriorating as a result of issues such as rising ocean temperatures and water contamination, further damage as a result of increased plastic in the marine environment is likely to exacerbate the decline of these critical ecosystems.

Plastic pollution deprives corals, sponges and bottom dwelling animals of light, food and oxygen, making sediment oxygen deficient, and reducing the numbers of organisms in the sediment.⁴⁵ The reduction in light and oxygen can give pathogens a foothold, causing further detrimental effects on marine organisms.

Smothering, disease and breakages as a result of plastic pollution has also been implicated in damage to coral reefs. A study of the effects of plastic on 124,000 reef-building corals from 159 reefs in the Asia Pacific Region (including Palm Islands, Whitsunday Islands and Keppel Islands) found the likelihood of disease increases from 4% to 89% when corals are in contact with plastic.⁴⁶ The study estimated that 11.1 billion plastic items were entangled in the region's coral reefs in 2010, an amount that has likely increased significantly over the last decade.

Some of the world's highest litter densities have been recorded in mangrove forests, with higher pollution levels correlating with lower tree health.⁴⁷ In the Gulf of Carpentaria marine debris concentrations have increased despite considerable efforts to remove debris by indigenous rangers, with much of the plastic entangled in mangroves that have already experienced significant dieback.⁴⁸

Sources of plastic pollution

Plastics enter our oceans through a wide range of pathways. The main sources of plastics in the ocean are understood to be poorly managed waste collection and landfills (including illegal dumping), treated and untreated wastewater outflows, wear and tear on plastic products

including textiles and vehicle tyres, run-off from land, plastics in agriculture that blow or wash away, and direct inputs from maritime industries.⁴⁹

In Australia estuaries have been highlighted as a primary conduit of marine debris into the ocean, particularly due to increasing urbanisation and population density in these areas. Plastic and other debris from urban areas is readily transported into storm-water drains and natural creeks which flow into the marine environment.⁵⁰

Analysis of global clean up data by the CSIRO has shown that global hotspots span all inhabited continents and that all nations contribute to the global problem, with more marine debris hotspots occurring in landlocked areas.⁵¹ Notably, the Gold Coast was identified as the fourth highest pollution hotspot for seafloor debris, with an estimated 1,422 pieces of marine debris per km².

Evidence suggests that the vast majority of plastic found in Australian waters and on our coastlines originates from Australia, with higher concentrations of plastics and debris found near major population centres. Of marine debris found on our coastlines, approximately three quarters of the rubbish is plastic.⁵²

Single-use plastics

In 2015, half of all plastic waste globally was from packaging alone; while according to a 2018 estimate, single-use plastics accounted for between 60-95% of global marine plastic pollution.⁵³ Of items found on the seafloor, plastic bottles, food wrappers, plastic bags and plastic cutlery are among the most commonly found items.⁵⁴

Data compiled by Clean Up Australia has consistently shown that plastic packaging is one of the most significant contributors to Australia's ocean plastic pollution, with soft plastics representing over 40% of all plastic packaging found in Australian litter cleanups, and food packaging, non-food packaging, beverage containers and beverage rubbish making up the majority of remaining plastic collected.⁵⁵

On a global scale, flexible packaging (bags, films, pouches, etc.) and multilayer and multi-material plastics (sachets, diapers, beverage cartons, etc.) account for a disproportionate share of plastic

pollution compared with their production, making up 47% and 25% of plastics leakage respectively.⁵⁶ This is likely due to the ease with which these plastics blow or wash away into drains and waterways.

Abandoned, lost or discarded fishing gear

According to scientific evidence presented to the United Nations Environment Program (UNEP), abandoned, lost and discarded fishing gear (ghost gear) is estimated to make up approximately 10% of all plastic in the ocean.⁵⁷

Research by CSIRO and the University of Tasmania has estimated that enough fishing line to wrap around the Earth 18 times is lost in the world's oceans every year. The study estimates that nearly 2% of commercial fishing gear is lost or discarded every year, which includes 14 billion longline hooks, 25 million pots and traps and almost 740,000 km of fishing longlines.⁵⁸

The prevailing currents and conditions in the Arafura and Timor Seas and the Torres Strait make the Gulf of Carpentaria a global ghost net and marine debris hotspot. This is an area with high

biodiversity value that contains six of the seven threatened marine turtle species. It is estimated that more than 85% of the nets found there originate from outside of Australia's Exclusive Economic Zone (EEZ), most likely originating from the nearby Arafura Sea.⁵⁹

CSIRO research has shown that, despite management efforts, the overall number of ghost nets identified in aerial surveys of the gulf increased between 2004 and 2020.⁶⁰ Surveys showed the highest number of nets per kilometre are found in the northern part of western Cape York Peninsula, including: QLD coastline passing Vrilya Point, Cotterell Creek, Doughboy River, MacDonald River, Horn Island, Peak Point/Punsand, Jardine River, Weipa, Mapoon and Boyd Point and Aurukun, Norman Creek; and in the NT, south of the Gove Peninsula around Cape Barrow and Numbulwar.

Feedback given to AMCS by indigenous rangers in the Gulf has suggested that while nets have historically been the primary source of concern, general plastic debris is increasing rapidly, becoming a major source of concern.

Effectiveness of Australia's plastics management framework

The plastic pollution crisis has been created as a direct result of a linear economy, where products that are created from the planet's resources are largely destined for landfill or incineration. This unsustainable pathway has allowed companies to create vast quantities of products that have no viable recovery options, wasting resources and creating a global planetary crisis.

It is promising that Australia's governments have begun to acknowledge this crisis, with a growing recognition that an urgent transition towards a circular economy is required.

Under a circular economy:

- waste and pollution is eliminated;
- products and materials stay in circulation through reuse, recycling or composting; and
- efforts are undertaken to regenerate nature, so that humans can live sustainably on the planet.

Over the last decade, Australia's steps to address the plastic pollution crisis have predominantly focused on downstream and midstream measures, such as attempting to clean up and recover plastic in the natural environment, or investments in upgrading and expanding recycling infrastructure. While some efforts have been made to motivate companies to improve the sustainability and recovery of their products and packaging, these efforts have been largely voluntary and failed to achieve results.

Australia's plastic recovery rates have flatlined at 13% with no improvement since 2016,⁶¹ and plastic pollution has increased exponentially placing us on the verge of an ecological crisis.

In order to arrest rising ocean plastic pollution, Australia must shift its focus to upstream measures that require products and packing to be designed for circularity.

We will not recycle our way out of the plastic pollution crisis: we need a systemic transformation to achieve the transition to a circular economy.

– Inger Andersen, UNEP Executive Director

National Plastics Plan

The 2021 National Plastics Plan was a welcome step forward by the previous government, setting a national strategy for Australia's shift towards taking responsibility for our plastic waste. However, when compared to plastics strategies of other nations, the plan is limited and relies too heavily on voluntary measures, many of which have not been implemented.

The centrepiece of the strategy, a ban on the export of plastic waste, was a reactive measure in response to decisions by other nations to limit or cease imports of plastic waste from Australia.

While some states and territories have acted, commitments to eliminate problem plastics nationally have not been delivered, including oxo-degradable plastics and expanded polystyrene loose fill packaging (to be delivered by July 2022), and PVC packaging labels (by December 2022).

The plan also cites the 2025 National Packaging Targets agreed with industry through the Australian Packaging Covenant Organisation (APCO). These targets are voluntary, with no framework for enforcement.

Australia's 2025 National Packaging Targets⁶²

- 100% of packaging is reusable, recyclable or compostable
- 70% of plastic packaging goes on to be recycled or composted
- 50% average recycled content within all packaging types
- 20% average recycled content within plastic packaging
- Problematic and unnecessary single-use plastic packaging phased out

According to APCO data, Australia is not on track to meet the National Packaging Targets for plastic packaging, and is going backwards on some measures.⁶³

- Only 16% of plastic packaging was recycled in the 2019–20 financial year, down from 18% the previous year.
- Only 60% of plastic packaging was found to be easily recyclable.
- Post-consumer recycled content accounted for just 3% of plastic packaging on the market.
- Only 4% of soft plastics were recycled.

Even with the substantive levels of investment committed to recycling infrastructure, the APCO analysis suggested that Australia will be able to achieve only 36% plastic recycling rate at best by 2025.

The National Plastics Plan also cited previously announced funding such as \$14.8 million for the Ghost Nets Initiative, which seeks to track and recover ghost nets in the Gulf of Carpentaria; and \$16 million for the Pacific Ocean Litter Project (POLP), allocated to help the Secretariat of the Pacific Regional Environment Programme (SPREP) and Pacific island nations with the Marine Litter Action Plan, with a specific focus on reducing the sources of single-use plastics in the marine environment. The impact of these investments is not yet clear.

National Waste Policy Action Plan

The National Waste Policy Action Plan 2019 (NWPAP) was developed to implement the 2018 National Waste Policy, and agreed by Australia's environment ministers and ALGA in November 2019.

Included under the NWPAP national targets were set for reforming Australia's management of waste:

- **Target 1:** Ban the export of waste plastic, paper, glass and tyres, commencing in the second half of 2020.
- **Target 2:** Reduce total waste generated in Australia by 10% per person by 2030.

- **Target 3:** 80% average resource recovery rate from all waste streams following the waste hierarchy by 2030.
- **Target 4:** Significantly increase the use of recycled content by governments and industry.
- **Target 5:** Phase out problematic and unnecessary plastics by 2025.
- **Target 6:** Halve the amount of organic waste sent to landfill by 2030
- **Target 7:** Make comprehensive, economy-wide and timely data publicly available to support better consumer, investment and policy decisions

Australia is not currently on track to meet the national target of reducing waste generated per person by 10% per person by 2030, with waste per person increasing by 3% since 2017.⁶⁴

These targets are not sufficiently specific to drive a reduction in plastic pollution. For example, Target 2 (reduce waste by 10%) does not include a specific target for plastic waste reduction. Further, Target 5 (plastic phase out) has been limited by an absence of a nationally agreed list of plastics to be phased out, resulting in long delays in implementation as state, territory and industry actors adopt inconsistent approaches to plastic phase outs.

According to an audit of the NWPAP by the Australian National Audit Office (ANAO) published in September 2022, significant shortcomings in the NWPAP and its implementation have limited progress.⁶⁵ Shortcomings include:

- the department is unable to demonstrate it is managing risk to the implementation of the deliverables under the action plan;
- scope and deliverables for each action were not established or agreed, impacting the implementation and coordination of actions and making it difficult to demonstrate progress; and
- reported issues are not being considered or addressed by the governance body.

Despite these shortcomings, AMCS is of the view that the NWPAP has incentivised an increase in policies and investment directed towards resolving Australia's waste crisis. In particular, the implementation of the National Waste Account, supported by the publication of a National Waste Report every two years, has provided transparent data on Australia's waste management and the levels of plastic recovery by jurisdiction. Such datasets could be improved with more detailed data on plastic leakage to the environment, and analysis of the levels of reusable, recyclable and compostable plastics placed on the market.

Product Stewardship Measures

The Australian Packaging Covenant has been the main national instrument to reduce the environmental impacts of consumer packaging in Australia since 1999, and was last updated in 2017. It forms an agreement between the Australian Packaging Covenant Organisation (APCO), which represents industry participants in the packaging supply chain; and commonwealth, state and territory governments.

The Covenant is established as part of a co-regulatory arrangement set out under the National Environment Protection (Used Packaging Materials) Measure 2011 (UPM NEPM). These arrangements are supposed to minimise the environmental impacts of packaging materials by requiring certain companies to improve design, recyclability, and product stewardship of their packaging.

The Covenant applies to businesses in a supply chain that are consumers of packaging or packaged products with an annual turnover of \$5 million or more. These businesses are required to choose between becoming a signatory to the Covenant, and contributing to collective national efforts in managing waste; or meeting compliance obligations under the NEPM, which are implemented by the laws and other arrangements of participating states and territories where a business sells or distributes its products.

Performance of the UPM NEPM and the Australian Packaging Covenant

In September 2021 a review of the UPM NEPM commissioned by the Department of Agriculture,

Water and the Environment identified that the scheme had not been sufficiently implemented, monitored or enforced.⁶⁶

Of note, the report identified that:

- key elements of the UPM NEPM have not been implemented or operationalised effectively, creating a lack of clarity for brand owners, enabling free-riders, and reducing confidence in the scheme;
- there are challenges measuring the effectiveness of the co-regulatory arrangement without clear KPIs, and data is either not available or not consistently collected and reported; and
- it is unclear which brand owners are liable under the arrangement and obligations are not consistently understood or applied.

One of the critical failures of the scheme identified is inconsistency between national and state or territory arrangements, with brand owners able to use inconsistencies to evade their obligations, and states and territories not consistently collecting and reporting critical information relating to the performance of brand owners.

Stakeholders variously described that the arrangement was "seriously undermined" by the fact that there are "no ramifications" and that the lack of a regulatory 'stick' to encourage compliance incentivised the avoidance of participation; "only an onerous alternative will persuade free riders to accept the 'carrot' represented by the Covenant".

p 32 Review of the coregulatory arrangement under the National Environment Protection (Used Packaging Materials) Measure 2011: Final Report. Commonwealth of Australia.

The report noted that a holistic approach to used packaging is required that is nationally consistent, and which focuses on product stewardship, collective impact and a circular economy. It recommends that a new national agreement be established, as a basis of a reformed used packaging scheme. It further recommends the goal of such a scheme be revised in line with circular economy principles, such as re-designing

packaging to improve sustainability, re-using or repurposing packaging materials, and increasing the utilisation of recycled content.

The Need for an Enforceable Circular Economy Framework

It is clear that despite efforts to reduce waste, improvements in Australia's plastics management have been marginal at best. Plastics recycling rates have flatlined, while plastic leakage into the environment has increased. Reviews of the National Waste Policy Action Plan and the Australian Packaging Covenant framework have shown that voluntary measures have failed to achieve the upstream changes that are needed.

It is difficult to envision a feasible scenario in which Australia can achieve a 70% recovery rate for plastics, without taking serious action to curtail the production of virgin and single-use plastics, and transitioning to a circular economy focused on reuse, repair and recycling.

AMCS welcomes the Australian Government's recent announcement of a Ministerial Advisory Group on the Circular Economy, as a promising sign of the government's commitment to addressing these shortfalls.

The urgent need to curtail plastics production and shift to a circular economy has also been recognised at previous parliamentary inquiries.

The June 2018 report from the Senate Inquiry into the Waste and Recycling Industry stated:

The committee is of the view that the Australian Government must act urgently to transition away from a linear economy to a circular economy which prioritises the collection, recovery and re-use of products, including within Australia. This transition must include a suite of regulatory and policy changes aimed at influencing behaviour, as well as investments in infrastructure and technology.⁶⁷

Among other measures, the Senate committee further recommended that:

- the Australian, state and territory governments agree to a phase out of petroleum-based single-use plastics by 2023;

- product stewardship schemes established under the Product Stewardship Act 2011 be mandatory schemes; and
- the Australian Government extend producer responsibility under product stewardship schemes to ensure better environmental and social outcomes through improved design.

The European Union has made significant progress in implementing a strong circular economy strategy, incorporating experience from a number of member nations that are recognised as leaders in plastics recovery.

We encourage the Australian government to examine the EU circular economy action plan as a framework for establishing an overarching circular economy strategy for Australia.

This strategy could incorporate a revised set of measures that replace the National Waste Strategy, UPM NEPM, Packaging Covenant and National Plastics Plan.

AMCS notes the recent announcement of the Australian Government's Nature Positive Plan, a proposal for the reform of Australia's environmental laws in response to the Samuel review of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

Included in this plan are proposals for an Environmental Protection Agency (EPA), a new independent statutory authority which would assume oversight of the Waste and Recycling Act along with other environmental laws.

The new authority's responsibilities in relation to waste and recycling are not specified in the proposal, and as such further information is needed on what role this body will play in the future management of plastics in Australia.

AMCS encourages the committee to seek further information on the proposed role of the EPA in relation to waste, recycling and product stewardship.

Examining Market Based Mechanisms for Plastic Reduction

One of the most significant barriers to improving recovery of plastics is the relative cheapness of virgin plastic over recycled and reusable forms of plastic. As long as producers are able to push the cost of waste management onto taxpayers, market economics will continue to support ongoing use of virgin single-use plastic packaging.

In consideration of a package of measures to strengthen Australia's approach to a circular economy, AMCS encourages consideration of two mechanisms that have been implemented internationally with positive effect.

Mandatory Extended Producer Responsibility Schemes

Extended Producer Responsibility (EPR) is a policy approach in which a producer's responsibility for a product is extended to the post-consumer stage of the product's lifecycle.

In individual producer responsibility (IPR) systems, producers take responsibility for their own products, whereas in collective producer responsibility systems (CPR) producers of the same product type collaborate and pay an EPR fee to a Producer Responsibility Organisation (PRO) – in essence requiring the polluter to pay for the cost of recovery and mitigation of environmental harm.

More than 400 EPR schemes are in place worldwide, up from about 30 in 1990,⁶⁸ with significant progress across APEC in recent years.⁶⁹ EPR schemes have been implemented in a diverse set of product types, including electronics, vehicles, batteries, tyres, and packaging.

EPR schemes have been endorsed as a necessary measure by over 100 major businesses, including: Beiersdorf, Borealis, Berry Global, Danone, Diageo, DS Smith, Ferrero, Friesland Campina, H&M, Henkel, Inditex, Indorama Ventures, L'Oréal, Mars, Mondi, Nestlé, PepsiCo, Pick n Pay, Reckitt, Schwarz Group, Tetra Pak, The Coca-Cola Company, Unilever, Veolia, and Walmart.⁷⁰

Studies into international product stewardship and EPR schemes have shown that such schemes should be collective and mandatory to be effective in achieving environmental goals.

A 2022 report by the World Bank examining the role of EPR schemes for packaging in circular economies⁷¹ highlighted that:

- Under a voluntary system, only a few companies participate in voluntary measures, which result in sustainability focused companies facing competitive disadvantages.
- It is not possible to establish a nationwide collection system covering all packaging waste based on voluntary measures, with activities usually concentrated in urban areas, while rural areas are not included due to associated high costs.
- The results of voluntary schemes are very limited, usually to a few types of packaging waste that are profitable and/or easy to collect and forward to recycling.
- A voluntary initiative is not a reliable element for sustainable waste management as it cannot be demanded/claimed. This means that projects are often discontinued after the project has finished or the funding period has lapsed.
- Under a mandatory EPR scheme, since all companies bringing packaged goods onto the market are obliged to pay for the EPR system, the system does not distort competition. The rules apply equally to all obligated companies.

These observations correlate strongly with Australia's historically voluntary approach to packaging stewardship, where participation has been inconsistent, collection systems not consistently available, and progress limited to the lowest hanging fruit.

Feature 6: Lessons from Germany

The German packaging regulations were first implemented as a mandatory EPR system in December 1991. This created a take-back obligation for producers on various types of packaging, including sales packaging, repackaging material (used for grouping of products) and transport packaging.

In order to fulfil the obligations of the producers and retailers to take-back sales packaging from consumers, producer responsibility organisations (PRO) were established. The fees paid by producers, initially established per package according to its size (regardless of the material), soon evolved into a fee per kilo of the specific material, glass being the cheapest and plastics the most expensive.

Over its 30+ years of EPR history, Germany has regularly amended its packaging regulation to make it more ambitious, clearer and more difficult to escape. Updates in legislation in 2019 to improve the performance of the scheme introduced new measures, including increases in recycling targets and new requirements for producers to:

- join a compliance scheme (PRO) or another collective "branch solution";
- register with a new packaging authority "Central Agency" before placing any packaged goods on the German market; and
- report the amount and type of packaging materials they put on the German market to the central agency and to their PRO.

The implementation of a public registry to collect information on the materials and products placed on the market (to assign responsibility for future waste) and the collection and recycling performance achieved, has made it possible to track success and prevent free-riding.

From Pautrat, C., Frisch, S. & Zych, A. (2022). How to implement EPR for packaging? Comparison of different country experiences. Rethinking Plastics Project, European Union.

The case for producer responsibility

The process of collection, sorting and recycling of packaging costs more than the revenues made from selling the recycled materials. That is true for practically all packaging types and in most geographies today.

While the economics can be improved significantly through better packaging design, technological advancements, and economies of scale, mechanisms that ensure funding for scaling and operating collection, sorting, and recycling of all types of packaging will be necessary for many years to come. Without such mechanisms, it is unlikely that packaging recycling will ever meaningfully scale across all packaging types and geographies, meaning over 100 million tonnes of packaging will continue to end up in landfills, incinerators, or the environment every year.

To stop packaging pollution and create a circular economy for packaging, systems for collection, sorting, and recycling need to be established and operated around the world. However, the fact that this process is not profitable (i.e. comes at a net cost) is a fundamental barrier to mobilise the necessary investments. Therefore, it is crucial to put in place mechanisms that provide the funding to cover the net cost and make the economics work. Furthermore, it is important that these mechanisms do so in a structural and sustainable way, in order to attract and de-risk the required investments in long-lived assets, such as sorting and recycling facilities.

*Excerpt from Ellen Macarthur Foundation report **Extended Producer Responsibility: a necessary part of the solution to packaging waste and pollution.***

Tax Policy Instruments

While EPR schemes are a useful tool to motivate packaging producers to take responsibility for the environmental impact of their products, they are not sufficient to reduce the use of plastic packaging and virgin plastics on their own. Evidence suggests that EPR schemes work best when combined with other policy levers, such as taxing the use of virgin plastics, banning hazardous substances or problematic single-use plastics, container return schemes, and recycled content targets.⁷²

A tax policy instrument aims to correct economic incentives for environmentally harmful product design choices, by incorporating external costs in decision-making about product design.

In a tax system, the public sector determines the tax rate and receives the revenues, whereas in a collective EPR system the fee contributes to Product Responsibility Organisation budgets for end-of-life management of products. Given Australia's governments bear the majority of the costs for plastic waste management, it would be appropriate that producers contribute a fair share of that cost.

Countries with taxes and charges on packaging include the United Kingdom, Belgium, Croatia, Estonia, Hungary, Latvia, Norway, Poland and The Netherlands.⁷³ Some apply taxes and fees on specific plastic products, such as the Belgian and the Latvian taxes on disposable plastic kitchenware. Other states tax plastic as a material, such as the German weight-based fees for plastics being part of a product.

Feature 7: UK Plastic Packaging Tax

The Plastic Packaging Tax (PPT) came into force in the UK on 1 April 2022. It applies at a rate of £200/tonne on plastic packaging with less than 30% recycled plastic, manufactured or imported into the UK (including packaging on goods which are imported).

The UK Government estimates that the use of recycled plastic in plastic packaging could increase by around 40% as a result of the tax.⁷⁴

An assessment of the impacts of the tax by the UK government shows that even if all the tax is passed on to individual consumers, the cost to consumers will be small as plastic packaging usually makes up a very small amount of the total cost of goods, with customer experience expected to stay broadly the same.

Feature 8: EU Packaging Levy

As of 1 January 2021, a contribution based on the non-recycled plastic packaging waste was introduced as a new revenue source to the 2021-2027 EU budget.

Called the "plastics own resource", Member States are required to pay a national contribution based on the amount of non-recycled plastic packaging waste. This is expected to encourage Member States to reduce packaging waste and stimulate Europe's transition towards a circular economy by implementing the European Plastics Strategy. At the same time, it leaves Member States the ability to define the most suitable policies to reduce plastic packaging waste pollution in their country.

A uniform rate of €0.80 per kilogram will be applied to the weight of plastic packaging waste that is not recycled, with a mechanism to avoid excessive contributions from less wealthy Member States. This contribution is calculated on data already reported by member states on plastic packaging waste generation and recycling. The data is publicly available on the Eurostat website.

Each Member State must either cover these costs via the national budget or pass these through to industry, for example through:

- Implementation of a new 'Plastics Tax' on the non-recycled plastics.
- Integration with existing policy or taxes.
- An additional fee system that would add to existing measures (such as CO2 taxation, Extended Producer Responsibility (EPR), Deposit Return Scheme and other packaging related fees/taxes).
- Other fiscal measures like reduced subsidies or tax and fee exemptions used in that country.

As well as food packaging, the levy also applies to packaging from textiles, fertilisers and agricultural products, construction and cosmetics and pharmaceutical products.

States such as Spain, Germany and Italy have moved to implement a plastic packaging levy following the directive.

RECOMMENDATIONS

- 1. AMCS recommends the Australian Government develop an overarching Circular Economy Strategy.** Modelled on the EU circular economy framework, the strategy could incorporate revisions or consolidation of the National Waste Strategy and Action Plan, National Environment Protection (Used Packaging Materials) Measure, and National Plastics Plan, as well as other federal, state and territory policies related to waste reduction.
- 2. AMCS recommends a Circular Economy (Plastics) Act be implemented as a matter of priority.** This act should incorporate or replace the Waste and Recycling Act, and add measures such as mandatory product stewardship of plastic packaging, measures to limit or control virgin plastics production, national harmonisation of bans on single-use plastics, as well as standardisation and review of container deposit schemes.
- 3. AMCS recommends the Australian Government introduce a mandatory product stewardship scheme for plastic packaging, with mandatory targets.** This should include ambitious national targets for reducing virgin plastics use, reducing overall plastic consumption, increasing plastics recovery rates, and increasing recycled content in plastic packaging. It should also include manufacturer responsibilities for product design, collection, processing and any costs that may be incurred.
- 4. AMCS recommends the establishment of a packaging authority to monitor and enforce the product stewardship of plastic packaging.** Similar to the German scheme, producers should be required to register with the authority before placing any packaged goods on the Australian

market, and report the amount and type of packaging materials they put on the market to the authority, allowing tracking of progress and preventing free riders. As per government proposals to establish an independent Environmental Protection Authority with oversight of the Waste and Recycling Act, this could be a responsibility of such a body.

5. **AMCS recommends the Australian Government implement a market based mechanism that targets plastic production.** Modelled on the EU or UK examples, such a mechanism could be a levy on virgin plastics (to stimulate demand for recycled material), and/or a levy on the use of plastic packaging to achieve an overall reduction in waste plastic.
6. **AMCS recommends that the newly proposed Data Division to be established within the Department of Climate Change, Energy, the Environment and Water be tasked with the oversight of data on Australia's plastic pollution and waste management.** Building on the National Waste Reports, detailed data should continue to be made available biennially, and include data on plastic recovery (by polymer); levels of virgin plastics vs recycled plastics on the market; proportions of reusable, recyclable and compostable plastic packaging on the market; and plastic leakage to the environment. It should also include full state/territory breakdowns to enable accurate analysis of state and territory policies.

Effectiveness of Australia's ghost gear interventions

In May 2021 the Australian Government committed \$14.8 million over 4 years towards addressing the issue of ghost gear and plastic pollution in the Gulf of Carpentaria. Of that funding \$5 million was to be invested in new technology to better detect, collect and dispose of ghost nets, up to \$7 million was to fund work to be conducted with Indigenous ranger groups to collect data on the source of ghost nets and coordinate retrievals and clean ups, and the remainder was to be invested enabling further research, coordination and proactive measures.

While this funding has been welcome it has been slow to roll out, with grant rounds only recently made available for research and clean up work in the gulf. In feedback to the Australian Marine Conservation Society, indigenous ranger groups have expressed frustration at a lack of support from government to deliver the resources and manpower needed to retrieve ghost nets and plastic debris from very remote areas where conditions are harsh and nets are hard to access or buried deep in sand and mangroves, making retrieval difficult.

In most cases, there are also limited or no domestic waste collection services, sorting and processing facilities or recycling schemes to deal with the collected waste. This is primarily due to the high transport costs and inability to achieve the economies of scale needed to make these types of services and programs economical.

As with all plastics, funding for clean up is at best a band aid solution and priority must be given to addressing the problem at the source by implementing improved gear management practices in domestic and international fisheries. With up to 85% of nets in the Gulf of Carpentaria understood to be coming from outside Australian waters, proactive engagement with our regional neighbours is also critical.

In a positive sign of progress, substantial changes in fisheries management practices by Indonesian neighbours have been implemented in recent years, such as a prohibition of purse seine and trawl nets, and a crackdown on illegal and unreported fishing. However, at the same time there has been an increase in gillnets, which have

been identified as the most lethal and problematic type of fishing gear for ocean wildlife.⁷⁵

In the previous term of government, priority was given to monitoring and clean up activities over work to address ghost gear at the source, with cuts to foreign aid budgets impacting our ability to exercise influence in the region.

Going forward, Australia's leadership with our regional neighbours will be critical to reducing the flow of nets and debris into our northern waters.

At the same time, Australia must ensure our own management of fishing gear is up to the global standards we advocate for. To date there is little public data on the implementation of best practice gear management by Australian fisheries regulators, which stymies efforts to act on the proportion of ghost gear that is attributed to our domestic activities.

Feature 9: Recent European Union measures to reduce ghost gear

Under Directive (EU) 2019/904 of the European Parliament and of the Council of 5 June 2019 on the reduction of the impact of certain plastic products on the environment, measures to reduce the harm from ghost gear were implemented.

These measures include:

- Marking requirements for fishing gear. (*Regulation (EC) No 1224/2009*)
- Requirements for Member States to implement extended producer responsibility schemes for fishing gear, that require producers of fishing gear to pay to costs of collection, transport and treatment.
- Requirements for Member States with marine waters to set national minimum annual recycling collection rates for waste fishing gear containing plastic.
- Requirements for Member States to report on the recovery of fishing gear containing plastic, with a view to the future establishment of binding quantitative European Union collection targets.

RECOMMENDATIONS

- 7. AMCS recommends that this committee's members consult directly with indigenous rangers in the Gulf of Carpentaria, who are at the coal face of some of the worst plastic pollution in Australia.** Acknowledging the challenges faced by traditional owners in travelling to Canberra and engaging in consultation processes that are not designed for traditional knowledge exchange, we suggest that this consultation should occur on country where rangers can directly show the committee members the scale of the problem and the challenges faced by rangers in addressing the issue.
- 8. AMCS recommends the Australia Government join the Global Ghost Gear Initiative.** The Global Ghost Gear Initiative (GGGI) is a cross stakeholder alliance of fishing industry, private sector, corporates, NGOs, academia and governments focused on solving the problem of lost and abandoned fishing gear, working together across all sectors to develop pathways for reform and support partnerships that reduce the loss of fishing gear worldwide. 20 Governments are now members of the GGGI, including the United States of America, United Kingdom, and New Zealand.
- 9. AMCS recommends the Australian Government work through regional partnerships such as the Arafura and Timor Sea Ecosystem Action Program (ATSEA) to develop and implement a regional marine debris and ghost net action plan.** Collaboration with these neighbours will be critical to stopping plastics at the source. AMCS understands some work is already under way in this regard, including discussions on establishing a regional monitoring network in partnership with Indonesia, Timor-Leste and Papua New Guinea.

 - 9.1. AMCS also recommends the Australian Government assist indigenous rangers in the Gulf of Carpentaria to attend meetings with regional neighbours to discuss the impact of lost gear in the Arafura Sea on their traditional lands.**
- 10. AMCS recommends the Australian Government implement measures to ensure Australian fisheries meet best practice gear management practices, with public reporting on the gear loss from Australian fisheries.** Unless Australia can demonstrate a high standard of domestic gear management practices it will be difficult to secure commitments from other nation states to implement the same. Such a framework should be based on international frameworks such as the UN Food and Agriculture Organisation's Voluntary Guidelines on the Marking of Fishing Gear. Transparency will improve our understanding of the impacts of gear loss in Australia, and increase public confidence in the sustainability of domestic fisheries.
- 11. AMCS recommends the Australian Government increase investment in tracking, clean up and disposal infrastructure for ghost net management in the Gulf of Carpentaria.** A needs analysis and feasibility study commissioned for Parks Australia provides guidance on key priorities for investment, such as the need for a landing barge to transport equipment or beach cleaning vehicles for ranger groups who lack infrastructure, and support for a gulf wide cleaning blitz involving governments, ranger groups, NGOs, industry and communities with support from Defence and fishing industries.⁷⁶

Effectiveness of the Australian Government's engagement with states and territories

Waste Infrastructure

AMCS welcomes the significant level of co-investment in recycling infrastructure delivered under the Recycling Modernisation Fund, through which the Australian Government has committed \$250 million, to be matched by state/territory governments and industry. However, as noted earlier in this submission, projections indicate this will not be sufficient to achieve national goals for 70% of plastic packaging recovery.

Additionally, AMCS is concerned by varying levels of access to services available to residents in some areas. (See Figure 2).

Areas such as Exmouth, home to Australia's world heritage Ningaloo Reef, still do not have access to recycling collection, as well as many remote communities in the Northern Territory.

This lack of access to recycling infrastructure in regional and remote areas is the key barrier to increasing recycling rates in those jurisdictions, with 2019–20 data showing that the NT, QLD and WA have the worst plastic packaging recovery rates in Australia.⁷⁷

Biodegradable and compostable plastics are an emerging area of concern when it comes to waste management.

As the majority of states and territories move to implement bans on single-use plastics, along with an increased focus on sustainability by consumers, many businesses have moved to adopt plastics labelled as biodegradable or compostable, believing these to be a more sustainable alternative.

However, several issues prevent appropriate waste management of biodegradable and compostable plastics, including:

- **Lack of appropriate waste management infrastructure:** Most compostable plastics on the market are commercially compostable, which means they require

industrial composters to be able to break down quickly. Currently, only 31% of households have access to kerbside compost collection, and many jurisdictions such as Queensland do not permit compostable plastics to be included in compost collection.

- **Unenforced standards for biodegradable and compostable plastics:** While Australia has strong standards for compostable plastics (AS 5810–2010 Home Composting and AS 4736–2006 Commercial Composting) they are currently voluntary. As a result very few products claiming to be biodegradable or compostable on the Australian market are certified to the Australian standard. As a result, the majority of industrial composting facilities reject all compostable plastics as they cannot ascertain their compliance with Australia's strong requirements for low contamination rates in soil from compost.⁷⁸

Almost all compostable and biodegradable plastics are only able to be disposed of to landfill, where they break down anaerobically (in the absence of oxygen). This process releases methane, a greenhouse gas that is at least 26 times more potent than carbon dioxide.⁷⁹

When littered, blown away or washed into the ocean, biodegradable and compostable plastics will still take many years to decompose, posing an ongoing threat to marine wildlife.

More leadership is needed at a federal level to enforce composting standards and to coordinate harmonisation of services, with further investment needed to prioritise access to recycling and industrial composting services for regional and remote communities.

Figure 2: Local government waste services by region type (National Waste Report 2022)

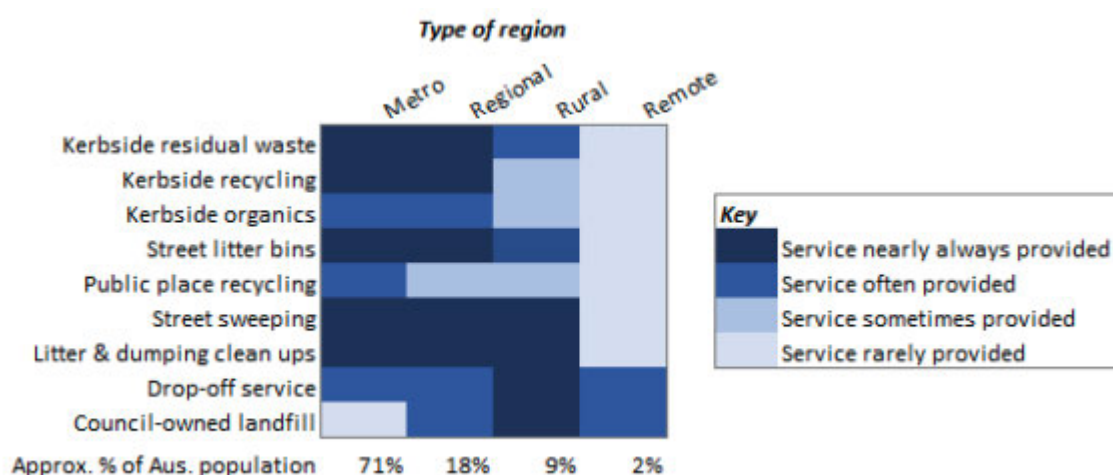


Figure 3: Access to kerbside organic waste services by proportion of the jurisdictional population, 2020–21 (National Waste Report 2022)



FOGO: Food Organics and Garden Organics **GO:** Garden Organics

When littered, blown away or washed into the ocean, biodegradable and compostable plastics will still take many years to decompose, posing an ongoing threat to marine wildlife.

More leadership is needed at a federal level to enforce composting standards and to coordinate harmonisation of services, with further investment needed to prioritise access to recycling and industrial composting services for regional and remote communities.

Bans on Single-Use Plastics

One of the biggest areas of success in Australia's approach to managing plastic pollution has been the rollout of bans on problematic and unnecessary single-use plastics among the states and territories. This is one of the most powerful instruments policy makers have been able to deploy to reduce plastic pollution, effectively preventing the production of the hardest to recycle and most commonly littered plastics.

These bans on single-use plastics have enjoyed widespread public support, with government consultations consistently showing public support at levels above 90%.^{80 81 82}

Since 2021, five states and territories have implemented laws or regulations to ban single-use plastics. Victoria will join these states when its ban commences in February 2023. The Northern Territory and Tasmania have committed to ban single-use plastics by 2025, although the Tasmanian State Government is yet to release a proposed list of items to be banned. (See Figure 4)

The 2022 National Waste Report estimates that state and territory bans on single-use plastics could see 65,000 tonnes of single-use plastic waste prevented in Australia over 10 years.⁸³

While the bans on single-use plastics have been welcomed by the Australian public, there are significant inconsistencies between states and territories, with different items banned in each jurisdiction. This has caused widespread confusion for consumers and significant challenges for businesses who operate across jurisdictions.

Additionally, the definitions of single-use plastics and allowed alternatives differs between jurisdictions, with some jurisdictions allowing compostable plastic alternatives despite the lack of appropriate waste management infrastructure.

To reduce confusion and give certainty to businesses, there is an urgent need to harmonise the bans on single-use plastics and set nationally agreed, enforceable definitions of single-use, reusable and recyclable products.

Such a harmonisation should include an explicit roadmap for single-use items to be banned nationally, either laid out in national legislation or agreed through forums such as the Environment Ministers Meeting.

In considering this list of plastics, AMCS urges the Australian Government to consider adopting the roadmap released by the South Australian Government this year (Figure 5), and exploring an additional list of single-use plastics to be phased out in sectors such as agriculture and business to business packaging. Such a list should be subject to an annual review, adding further single-use plastics as suitable alternatives become available.

Figure 4: Australian State / Territory Commitments to Ban Single-Use Plastics - Priority Plastics for Protecting Ocean Wildlife (AMCS)



Australian State / Territory Commitments

Ban on Single-Use Plastics



| Last Updated: 4 November 2022 | ACT | NSW | NT | QLD | SA | TAS | VIC | WA |
|-------------------------------------|-----------|-----|-----------|-----------|-----------|-----|-----------|-----------|
| Lightweight plastic bags | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| Straws | ✓ | ✓ | ✓ 2025 | ✓ | ✓ | | ✓ 2023 | ✓ |
| Drink stirrers | ✓ | ✓ | ✓ 2025 | ✓ | ✓ | | ✓ 2023 | ✓ |
| Cutlery | ✓ | ✓ | ✓ 2025 | ✓ | ✓ | | ✓ 2023 | ✓ |
| Polystyrene food + drink containers | ✓ | ✓ | ✓ 2025 | ✓ | ✓ | | ✓ 2023 | ✓ |
| Plates + bowls | ✓ 2023 | ✓ | ✓ 2025 | ✓ | ✓ 2023 | | ✓ 2023 | ✓ |
| Cotton bud sticks | ✓ | ✓ | | ✓ 2023 | ✓ 2023 | | ✓ 2023 | ✓ 2023 |
| Microbeads | ✓ 2023 | ✓ | ✓ 2025 | ✓ 2023 | | | | ✓ 2023 |
| Heavyweight plastic bags | ✓ 2023 | | ✓ 2025 | ✓ 2023 | ✓ 2024 | | | ✓ |
| Fruit + veggie produce bags | | | | | ✓ 2024 | | | ✓ 2023 |
| Plastic cups + lids | | | | | ✓ 2024 | | | ✓ |
| Coffee cups containing plastic | | | | | ✓ 2024 | | | ✓ 2023 |
| Helium balloons | | | ✓ 2025 | | | | | |
| Plastic takeaway containers | ✓ 2023 | | | | ✓ 2024 | | | ✓ 2023 |

KEY: ✓ = Banned ✓ = Ban yet to commence ✓ = Proposed (subject to consultation)

Notes: Australia's Environment Ministers have identified eight priority plastics for industry to phase out nationally by 2025, although this is understood to be voluntary. These are lightweight plastic bags; plastic products misleadingly termed as 'degradable'; plastic straws; plastic utensils and stirrers; expanded polystyrene (EPS) consumer food containers; EPS consumer goods packaging (loose fill and moulded); and microbeads in personal health care products. The Commonwealth Government has also committed to oversee a phase out of PVC packaging labels by December 2022. In addition to the plastics listed above, some jurisdictions are also banning other plastics such as balloon sticks, balloon ties, and pre-packaged cutlery/straws (i.e. on juice boxes). Helium balloon releases have also been formally banned in QLD, VIC & WA.

marineconservation.org.au

Figure 5: South Australian Roadmap for Banning Single-Use Plastics

| | |
|------------------|---|
| Already banned | <ul style="list-style-type: none"> • plastic straws, • plastic drink stirrers, • plastic cutlery, • expanded polystyrene cups, bowls, plates and clamshell containers, • oxo-degradable plastics. |
| 1 September 2023 | <ul style="list-style-type: none"> • plastic-stemmed cotton buds, • plastic pizza savers, • single-use plastic plates and bowls. |
| 1 September 2024 | <ul style="list-style-type: none"> • plastic bags (produce barrier bags and thicker 'boutique' style bags), • other expanded polystyrene (EPS) consumer food and beverage containers, • plastic balloon sticks, • plastic balloon ties, • plastic confetti, • plastic bread tags, • single-use plastic cold cups and plastic lids, • single-use plastic coffee cups and plastic lids, • plastic beverage plugs, • single-use plastic food containers. |
| 1 September 2025 | <ul style="list-style-type: none"> • plastic fruit stickers, • plastic soy sauce fish, • pre-packaged and attached products (i.e. straws, spoons and forks attached to pre-packaged food/beverages). |

Container Deposit Schemes

The nationwide rollout of container deposit schemes has been another successful state and territory policy outcome. Currently, six of Australia's eight states and territories have active schemes, with just Victoria and Tasmania outstanding (due to commence in 2023).

However challenges still exist, with variance between jurisdictions in which containers are able to be collected, and varying levels of access to return points.

There is also wide variance in the return rates achieved under state and territory schemes. High performers such as South Australia are achieving return rates of 77.5%⁸⁴, whereas other states such as Queensland have only achieved 63%.⁸⁵

Since their launch, container deposit schemes have enjoyed widespread support amongst Australians, with high support for expanding these popular schemes to include more containers. According to polling conducted by OmniPoll in

December 2022, 93% of Australians support the expansion of container deposit schemes to include more containers such as wine and spirit bottles, with 73% strongly supporting the idea.⁸⁶ Only 2% opposed expansion of the scheme.

With all states and territories to have an active container deposit scheme by the end of 2023, there is now an opportunity to harmonise container refund schemes.

Such harmonisation has the potential to increase return rates by reducing confusion for consumers and simplifying processes for beverage companies. The Australian Government has an opportunity to provide a leadership role in establishing a process for scheme standardisation.

To help achieve a higher return rate, we encourage the Australian Government to establish a process for regularly reviewing the refund amount, through agreement at forums such as the Meeting of Environment Ministers. Financial incentives are shown to be correlated with behavioural outcomes, and every year that

container return rates stagnate represents more plastic lost in waterways.

In addition to single-use beverage containers, consideration should be given to expanding the schemes to include reusable and refillable beverage containers. In countries such as Germany and Austria, the inclusion of reusable

bottles has extended the life of their packaging allowing it to be sanitised and used again multiple times, negating the need for costly recycling and remanufacturing. This has included a higher refund amount for these items. Introducing this element would power a shift towards reusable containers, an essential component of the transition to a circular economy.

RECOMMENDATIONS

- 12. AMCS recommends the Australian Government establish a process for harmonising state/territory bans on single-use plastics with an ambitious roadmap for expanding the bans.** This could be delivered through the previously mentioned proposal for a Circular Economy (Plastics) Act, or through agreement of the Environment Ministers Meeting.
- 13. AMCS recommends the Australian Government take a leadership role in harmonising container deposit schemes and reviewing the refund amount.** As with harmonising bans on single-use plastics, this could be delivered through legislation or state/territory agreement.
- 14. AMCS recommends setting mandated standards at a national level for reusability, recyclability and compostability of plastics.** Confusion in definitions between state and territory governments and voluntary standards for compostability and biodegradability have allowed greenwashing to become rampant. Action should include mandating the AS 5810–2010 Home Composting and AS 4736–2006 Commercial Composting standards for any plastics claiming to be biodegradable or compostable.
- 15. AMCS recommends the Australian Government review the progress of the Recycling Modernisation Fund and renew funding for a further four years.** In renewing the scheme, consideration should be given to raising the level of investment, improving access for regional and remote communities, and ensuring access to organics collection that includes Australian certified compostable packaging.

Effectiveness of the Australian Government's engagement with Industry and NGOs

Industry Engagement

To date, Australia's focus on plastic pollution has been at the waste management end of the waste hierarchy, with few requirements for industry to reduce plastic production. While Australia has included proactive National Packaging Targets in the 2021 National Plastics Plan, little progress has been made on increasing plastic recycling rates or increasing the proportion of recycled content in plastic packaging due to lax requirements on industry.

An over reliance on voluntary measures has allowed companies to set a slow pace of progress. While more than half (53%) of major food and beverage companies have made a commitment to ensure some or all of their plastic packaging is reusable, recyclable or compostable, only 7% have reported concrete actions.⁸⁷ Only a quarter of major food & beverage companies are addressing key issues such as packaging design, increasing recyclability, reducing single-use plastics, or managing the end-of-life processes for their products.

While the ANZPAC Plastics Pact has been a vital forum for industry collaboration and produced good guidance for business plastics reduction, actual reductions in plastic packaging have been minimal. Many large companies are engaged in problematic practices to divert attention from their true plastic footprint, using practices such as lightweighting (reducing the thickness of plastic packaging) to give a false sense of plastic reduction or placing an overemphasis on small pilots that are not scaled into changes across their product lines.⁸⁸

According to 2022 progress data from the Ellen Macarthur Foundation Global Commitment, the largest global framework for business collaboration and plastic reduction, on net the world's companies are failing to achieve voluntary

targets. While the use of recycled plastics has increased slightly, most signatory companies will fail to meet commitments to achieve 100% of all packaging being reusable, recyclable or compostable by 2025 (the current rate is 65%).

Overall the volume of plastic packaging has increased, not decreased; reusable packaging is declining; and the use of virgin plastics has increased - with global giants PepsiCo, Coca-Cola and Mars key contributors.⁸⁹

NGO Engagement

AMCS has welcomed past opportunities to brief the government in regards to the impact of marine debris on Australian wildlife, and policies to reduce ocean plastic pollution.

However, such engagement has varied significantly between departments, and many issues highlighted by environmental non-government organisations (eNGOs) have not been addressed in national strategies to address ocean plastic pollution, such as the failure of voluntary approaches to plastic reduction.

The development of the National Plastics Plan involved very little stakeholder engagement, including eNGOs. If a formal plan had been proposed with a public consultation period, there would have been opportunity for organisations such as AMCS to highlight historical issues that have stemmed from poorly defined standards and targets.

There is an opportunity for the Australian Government to better leverage the considerable expertise of environmental NGOs. In considering models for better engagement, AMCS encourages the Australian Government to include representatives of eNGOs in the recently announced Circular Economy Ministerial Advisory Group.

RECOMMENDATIONS

- 16. As highlighted earlier in this submission, AMCS recommends the Australian Government move to a mandatory product stewardship approach.** After decades of poor progress, and the use of virgin plastic increasing, it is clear that a consistent mandatory approach is needed to give the right signals to industry and ensure clarity in the nation's path to plastic reduction.
- 17. AMCS recommends the Australian Government include representatives of environmental NGOs in the Circular Economy Ministerial Advisory Group.** This approach is commensurate with the approaches of jurisdictions such as WA, QLD and SA who have established single-use plastics working groups with stakeholders from a variety of sectors to advise on government policy.

Effectiveness of community education campaigns

In Australia awareness of ocean plastic pollution among the population is quite high, with ocean plastics consistently rated one of the top environmental issues for Australians. Public campaigns organised by environmental NGOs such as Plastic Free Places, Plastic Free July and Take 3 For The Sea have been successful at raising awareness of actions that can be taken by individuals to reduce their plastic footprint and help reduce litter.

Education at the council level is also crucial to improving public participation in recycling and waste avoidance, although levels of investment and attention to plastic reduction vary significantly between local government areas.

Analysis by CSIRO has shown that waste management investment as a total proportion of council budget has been shown to have a significant correlation with decrease in debris, with councils allocating 8% of their total budget to waste management shown to deliver the best results.⁹⁰ Implementing a combination of recycling, litter prevention and illegal dumping programs at a council level was found to be the best at reducing waste on a coastline – by targeting three of the most significant drivers of waste.

In addition to consistent levels of funding at the council level, clean up campaigns must be targeted at source. The CSIRO study noted clean ups tend to only happen in dirty areas, with councils targeting areas that have high waste loads. They have immediate aesthetic results, however they routinely target areas where the waste accumulates – not where the waste enters the coastal environment.

Considerable attention has been given to education on recycling by the Australian Government in recent years, including an investment of \$8.2 million to establish a trademarked ReMade in Australia scheme to promote Australia's remanufacturing industries and increase consumer confidence in the value of recycling and ReMade products. An additional \$2 million was invested in the Recycle Mate app through the Australian Government's Environment Restoration Fund.

However, with just 13% of plastic recycled in Australia AMCS is concerned that these investments are set up for failure.

The recent collapse of REDcycle and the subsequent damage to public confidence in recycling has demonstrated the high risk of investing heavily in marketing recycling as a solution, without capacity in the system to manage a high level of input.

Priority should be given to ensuring consistent access to recycling across all jurisdictions and eliminating the production of unrecyclable products, so that Australians can have real confidence in recycling as a solution.

Many years of greenwashing by companies have also led to high levels of confusion about bioplastics, biodegradable plastics and compostable plastics, with many consumers believing that any plant-based plastic will degrade quickly if littered in the environment or in landfill. Following the implementation of mandatory national standards for biodegradable plastics and once facilities exist at scale to manage these products, further education to improve public understanding of the appropriate disposal options will be required.

RECOMMENDATIONS

- 18. AMCS recommends that investment priority should be given to ensuring consistent levels of recycling access, as opposed to investment in marketing of recycling as a solution.** Consumer confidence in the recycling system is currently fragile and cannot be restored until Australia's recycling and waste management infrastructure is capable of achieving high recovery rates.
- 19. AMCS recommends future education and pilot programs focus on the uptake of reusable packaging options by industry.** The uptake of reusable packaging is a critical element of the transition towards a circular economy, and to achieve the scale needed it is important that this be adopted by supermarkets and other sectors with large packaging footprint.
- 20. AMCS recommends funding be allocated for campaigns that build public awareness in regards to the appropriate management of plant-based and biodegradable plastic products.** Such education must be paired with strong national standards for such products, and investment in the infrastructure required to manage them.

Global initiatives to reduce plastic pollution

While many global initiatives and agreements have sought to address plastic pollution and abandoned, lost or discarded fishing gear, including the International Convention for the Prevention of Pollution from Ships (1973) and the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter; they are mostly voluntary and have historically focused on maritime sources of pollution.

There is an urgent need for a unified global approach to addressing plastic pollution, that includes binding, specific, and measurable targets to reduce plastic pollution and phase out virgin plastics.

Global negotiations are currently under way on a new global agreement to end plastic pollution,

through the UN Environment Assembly. AMCS welcomes the Australian Government's recent announcement that it has joined the High Ambition Coalition to End Plastic Pollution, a group of close to 50 nations that have committed to advocate for legally binding global rules and measures in such a treaty, as well as other key measures such as a global funding instrument to support poorer nations in managing plastic waste and reducing pollution.

As negotiations progress over the next two years, Australia's leadership will be critical in securing an ambitious treaty that delivers real outcomes. Australia should play a strong role in supporting outcomes for our pacific neighbours, who often disproportionately bear the weight of plastic pollution washing up on their coasts, or lack the space and infrastructure to manage plastic waste.

RECOMMENDATIONS

- 21. AMCS urges the Australian Government not to wait for the full implementation of a global agreement before enacting further policies to reduce plastic pollution.** Measures such as national product standards, mandatory targets for local plastics production, and tax based instruments can be implemented now, with targets and measures updated following the delivery of an international agreement.
- 22. AMCS urges the Australian Government to advocate for legally binding global targets to reduce plastic pollution and reduce virgin plastics production through the International Negotiation Committee process.** Given the rapid acceleration of global plastics use and its leakage into the environment, and historically low rates of recycling, AMCS is of the view that these are the most critical measures for ensuring accountability in such an agreement.
- 23. AMCS recommends the Australian Government sponsor the attendance of traditional owners from land groups in the Gulf of Carpentaria at International Negotiating Committee meetings on an international agreement to end plastic pollution.** UNEA resolution 5/14 acknowledges the critical role indigenous peoples must have in tackling the plastic pollution crisis, and it calls on the INC to consider, among other things, "[t]he best available science, traditional knowledge, knowledge of indigenous peoples and local knowledge systems."

References

- ¹ The Pew Charitable Trusts and SYSTEMIQ. (2019). *Breaking the Plastic Wave*.
- ² O'Farrell, K., Harney, F., & Chakma, P. (2021). *Australian Plastics Flows and Fates Study 2019–20 – National Report*. Prepared for the Department of Agriculture, Water and the Environment.
- ³ World Economic Forum. (2016). *The New Plastics Economy: Rethinking the future of plastics*.
- ⁴ WWF Germany. (2022). *Impacts of plastic pollution in the oceans on marine species, biodiversity and ecosystems*.
- ⁵ The Pew Charitable Trusts and SYSTEMIQ. (2019). *Breaking the Plastic Wave*.
- ⁶ Charles, D., Kimman, Li., & Saran, N. (2021). *Plastic Waste Makers Index: Revealing the source of the single-use plastics crisis*. Minderoo Foundation.
- ⁷ United Nations Environment Programme. (2021). *From Pollution to Solution: A global assessment of marine litter and plastic pollution. Synthesis*. Nairobi.
- ⁸ WWF Germany. (2022). *Impacts of plastic pollution in the oceans on marine species, biodiversity and ecosystems*.
- ⁹ United Nations Environment Programme. (2021). *From Pollution to Solution: A global assessment of marine litter and plastic pollution. Synthesis*. Nairobi.
- ¹⁰ UNESCO. (2017). *Facts and figures on marine pollution*.
- ¹¹ Wilcox, C. et al. (2016). *Using expert elicitation to estimate the impacts of plastic pollution on marine wildlife*. In Marine Policy (65).
- ¹² United Nations Environment Programme. (2021). *From Pollution to Solution: A global assessment of marine litter and plastic pollution. Synthesis*. Nairobi.
- ¹³ WWF Germany. (2022). *Impacts of plastic pollution in the oceans on marine species, biodiversity and ecosystems*.
- ¹⁴ WWF Germany. (2022). *Impacts of plastic pollution in the oceans on marine species, biodiversity and ecosystems*.
- ¹⁵ Wilcox, C. et al. (2016). *Using expert elicitation to estimate the impacts of plastic pollution on marine wildlife*. In Marine Policy (65).
- ¹⁶ Savoca et al. (2016). *Marine plastic debris emits a keystone infochemical for olfactory foraging seabirds*.
- ¹⁷ Hammer, S. et al. (2016). *Plastic debris in great skua (*Stercorarius skua*) pellets corresponds to seabird prey species*.
- ¹⁸ Wilcox, C., van Seville, E., & Hardesty, D. (2015). *Threat of plastic pollution to seabirds is global, pervasive, and increasing*. Proceedings of the National Academy of Sciences of the United States of America.
- ¹⁹ Schuyler, Q. A. et al. (2015). *Risk analysis reveals global hotspots for marine debris ingestion by sea turtles*. Global Change Biology.
- ²⁰ WWF Germany. (2022). *Impacts of plastic pollution in the oceans on marine species, biodiversity and ecosystems*.
- ²¹ Eisfeld-Pierantonio, S., Pierantonio, N and Simmonds, M. (2019). *The plastic cetaceans – strandings linked to plastic ingestion around the world*.
- ²² Roman, L., Hardesty, B.D., Hindell, M.A. et al. (2019). *A quantitative analysis linking seabird mortality and marine debris ingestion*. Sci Rep 9, 3202 (2019).
- ²³ IWC. (2022). *Resolution 2022-1: Resolution on Marine Plastic Pollution*.
- ²⁴ Eisfeld-Pierantonio, S. M., Pierantonio, N., & Simmonds, M. P. (2022). *The impact of marine debris on cetaceans with consideration of plastics generated by the COVID-19 pandemic*. Environmental Pollution, 118967.
- ²⁵ Fossi, M. et al. (2018). *Impacts of Marine Litter on Cetaceans. A focus on plastic pollution*. Chapter 6 in Marine Mammal Ecotoxicology.

-
- ²⁶ Stewart, J.D. et al. (2021). *Decreasing Body Lengths in North Atlantic Right Whales*. In *Current Biology* 31(14), pp. 3174–3179
- ²⁷ The Age. (7 June 2018). *Pregnant whale dies from ingested rubbish*.
- ²⁸ Kahane-Rapport et al. (November 2022). *Field measurements reveal exposure risk to microplastic ingestion by filter-feeding megafauna*. *Nat Commun* 13, 6327 (2022).
- ²⁹ Wilcox, C., van Seville, E., & Hardesty, D. (2015). *Threat of plastic pollution to seabirds is global, pervasive, and increasing*. Proceedings of the National Academy of Sciences of the United States of America.
- ³⁰ Grant, L. G. et al. (May 2021). *Seabird breeding islands as sinks for marine plastic debris*.
- ³¹ Rivers-Auty et al. (October 2022). *The one-two punch of plastic exposure: Macro- and micro-plastics induce multi-organ damage in seabirds*.
- ³² Schuyler, Q. A. et al. (2015). *Risk analysis reveals global hotspots for marine debris ingestion by sea turtles*. *Global Change Biology*.
- ³³ Wilcox, C. et al. (2018). *A quantitative analysis linking sea turtle mortality and plastic debris ingestion*. In *Scientific Reports*.
- ³⁴ ABC News. (17 February 2021). *Dead, sick baby turtles wash up on central Queensland beaches after eating plastic*.
- ³⁵ The Guardian. (30 July 2022). *Tiny turtle pooped 'pure plastic' for six days after rescue from Sydney beach*.
- ³⁶ Duncan, E. M. (August 2021). *Plastic Pollution and Small Juvenile Marine Turtles: A Potential Evolutionary Trap*.
- ³⁷ Pfaller, J. B. (2020). *Odors from marine plastic debris elicit foraging behavior in sea turtles*.
- ³⁸ Wilcox, C. et al. (2014). *Understanding the sources and effects of abandoned, lost, and discarded fishing gear on marine turtles in northern Australia*. In *Conservation Biology*.
- ³⁹ United Nations Environment Programme. (2021). *From Pollution to Solution: A global assessment of marine litter and plastic pollution. Synthesis*. Nairobi.
- ⁴⁰ Rochman, C.M. et al. (2013). *Ingested plastic transfers hazardous chemicals to fish and induces hepatic stress*. In *Sci. Rep.* 3 (1) (2013) 1–7.
- ⁴¹ Paganos, P. et al. (December 2022). *Plastic leachate-induced toxicity during sea urchin embryonic development: Insights into the molecular pathways affected by PVC*.
- ⁴² Klein, J. et al. (July 2022). *Microplastics in intertidal water of South Australia and the mussel *Mytilus* spp.; the contrasting effect of population on concentration*.
- ⁴³ Wootton, N. et al. (June 2021). *A Comparison of Microplastic in Fish From Australia and Fiji*.
- ⁴⁴ Mattsson, K. et al. (2017). *Brain damage and behavioural disorders in fish induced by plastic nanoparticles delivered through the food chain*. *Sci Rep* 7 (1), 11452
- ⁴⁵ WWF Germany. (2022). *Impacts of plastic pollution in the oceans on marine species, biodiversity and ecosystems*.
- ⁴⁶ Lamb, J. B. et al. (2018). *Plastic waste associated with disease on coral reefs*. *Science* 359 (6374), 460–462
- ⁴⁷ WWF Germany. (2022). *Impacts of plastic pollution in the oceans on marine species, biodiversity and ecosystems*.
- ⁴⁸ Hardesty, B. D. et al. (December 2021). *Abandoned, lost and discarded fishing gear 'ghost nets' are increasing through time in Northern Australia*.
- ⁴⁹ Geyer, R. (2020). *Production, use and fate of synthetic polymers in plastic waste and recycling*. In *Plastic Waste and Recycling: Environmental Impact, Societal Issues, Prevention, and Solutions*. Letcher, T.M. (ed.). Cambridge, MA: Academic Press.13–32.
- ⁵⁰ Smith, A. D. (September 2015). *Submission to the Inquiry into the threat of marine plastic pollution in Australia and Australian waters*.
- ⁵¹ Hardesty, B.D. et al. (2021). *Socioeconomics effects on global hotspots of common debris items on land and the seafloor*. *Global Environmental Change*.

⁵² Hardesty, B.D. et al. (2016). *Estimating quantities and sources of marine debris at a continental scale*. Frontiers in Ecology and Environment.

⁵³ WWF Germany. (2022). *Impacts of plastic pollution in the oceans on marine species, biodiversity and ecosystems*.

⁵⁴ Hardesty, B.D. et al. (2021). *Socioeconomics effects on global hotspots of common debris items on land and the seafloor*. Global Environmental Change.

⁵⁵ Clean Up Australia. (2020). *Rubbish Report 2020*.

⁵⁶ The Pew Charitable Trusts and SYSTEMIQ. (2019). *Breaking the Plastic Wave*.

⁵⁷ Macfadyen G, Huntington T, Cappell R. (2009). *Abandoned, lost or otherwise discarded fishing gear*. UNEP Regional Seas Reports and Studies, No.185; FAO Fisheries and Aquaculture Technical Paper No. 523. United Nations Environment Programme (UNEP) / Food and Agriculture Organization of the United Nations (FAO), Rome.

⁵⁸ Richardson, K. et al. (2022). *Global estimates of fishing gear lost to the ocean each year*. CSIRO, Australia.

⁵⁹ Edyvane, K. S., & Penny, S. S. (2017). *Trends in derelict fishing nets and fishing activity in northern Australia: implications for trans-boundary fisheries management in the shared Arafura and Timor Seas*. Fisheries research, 188, 23–37.

⁶⁰ Hardesty, B.D., Roman, L., & Wilcox, C. (2021). *Ghost nets in the Gulf of Carpentaria, Australia, 2004–2020*. CSIRO, Australia.

⁶¹ Blue Environment. (December 2022). *National Waste Report 2022*. Prepared for the Department of Climate Change, Energy, the Environment and Water.

⁶² DAWE. (2021). *National Plastics Plan 2021*.

⁶³ APCO. (November 2021). *APCO Collective Impact Report*.

⁶⁴ Blue Environment. (December 2022). *National Waste Report 2022*. Prepared for the Department of Climate Change, Energy, the Environment and Water.

⁶⁵ ANAO. (September 2022). *Auditor-General Report No. 4 2022–23: Australian Government Implementation of the National Waste Policy Action Plan*. Commonwealth of Australia.

⁶⁶ Matthews Pegg Consulting. (September 2021). *Review of the coregulatory arrangement under the National Environment Protection (Used Packaging Materials) Measure 2011: Final Report*. Commonwealth of Australia.

⁶⁷ Commonwealth of Australia. (June 2018). *Never waste a crisis: the waste and recycling industry in Australia*. Report of the Senate Environment and Communications References Committee.

⁶⁸ Laubinger et al. (2021). *Modulated fees for Extended Producer Responsibility Schemes*. OECD Environment Working Papers No. 184

⁶⁹ World Bank. (January 2022). *The Role of Extended Producer Responsibility Schemes for Packaging towards Circular Economies in APEC*.

⁷⁰ Ellen Macarthur Foundation. (2021). *Extended Producer Responsibility: a necessary part of the solution to packaging waste and pollution*. <https://ellenmacarthurfoundation.org/>

⁷¹ World Bank. (January 2022). *The Role of Extended Producer Responsibility Schemes for Packaging towards Circular Economies in APEC*.

⁷² Laubinger et al. (2021). *Modulated fees for Extended Producer Responsibility Schemes*. OECD Environment Working Papers No. 184 <https://dx.doi.org/10.1787/2a42f54b-en>

⁷³ Fundacio ENT, and Zero Waste Europe. (2018). *Research paper on a European tax on plastics*.

⁷⁴ HM Revenue & Customs. (July 2021). *Policy paper: Introduction of Plastic Packaging Tax from April 2022*.

⁷⁵ Global Ghost Gear Initiative. (2021). *Best Practice Framework for the Management of Fishing Gear: June 2021 Update*.

⁷⁶ TierraMar and SMaRT@UNSW. (2021). *Ghost Nets. Needs Analysis and Feasibility Study for Northern Australia, Final Report*. TierraMar, Sutherland, New South Wales, Australia.

⁷⁷ APCO. (2022). *Australian Packaging Consumption and Recovery Data 2019–20*

⁷⁸ APCO. (2021). *National Compostable Packaging Strategy*.

⁷⁹ Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education. (2011). *Australian National Greenhouse Accounts*. National Inventory Report 2011 (Volume 3).

⁸⁰ Queensland Government. (2020). *Single-use plastic products ban: Full consultation report*. Prepared by Office of Resource Recovery, Department of Environment and Science.

⁸¹ Green Industries SA. (2022). *TURNING THE TIDE 2021. The future of single-use plastic in South Australia: Consultation Response Document*.

⁸² NSW Department of Planning and Environment. (2021). *Single-use plastics ban in NSW*. Accessed 19 Dec 2022 at <https://www.dpie.nsw.gov.au/our-work/environment-energy-and-science/plastics-action-plan/phasing-out-single-use-plastics-in-nsw>

⁸³ Blue Environment. (December 2022). *National Waste Report 2022*. Prepared for the Department of Climate Change, Energy, the Environment and Water.

⁸⁴ SA EPA. (2022). *Container deposits*. Accessed 19 Dec 2022 at https://www.epa.sa.gov.au/environmental_info/waste_recycling/container_deposit

⁸⁵ Container Exchange. (2022). *Annual Report 2021-2022*

⁸⁶ OmniPoll. (December 2022). *Container deposit scheme survey*. Prepared for Total Environment Centre.

⁸⁷ Phelan, A. et al. (2021). *Plastic pollution and packaging: Corporate commitments and actions from the food and beverage sector*. In Journal of Cleaner Production 331 (2022).

⁸⁸ Diana et al. (18 November 2022). *Voluntary commitments made by the world's largest companies focus on recycling and packaging over other actions to address the plastics crisis*.

⁸⁹ Ellen Macarthur Foundation. (2022). *The Global Commitment 2022 Progress Report*. <http://ellenmacarthurfoundation.org/>

⁹⁰ Willis, K. et al. (2017). *How successful are waste abatement campaigns and government policies at reducing plastic waste in the marine environment?* CSIRO.