



**Senate Standing Committees on Environment and
Communications**

**Inquiry into the threats posed by marine plastic pollution in
Australia**

Submission from the National Environmental Law Association

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5 October 2015

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1. Introduction

1.1 About NELA

The National Environmental Law Association (NELA) is Australia's leading environmental law organisation with a membership base of professionals in environment and resources law and related disciplines.

NELA's vision is that ecological sustainability is a guiding principle in regulating energy and resources, utilities, pollution control, protecting biodiversity and cultural values, and land use planning and infrastructure. We seek to protect the environment by shaping the law through information sharing, analysis and debate.

1.2 The basis of this submission

The 2009 Threat Abatement Plan (TAP) for the impacts of marine debris on vertebrate marine life (the TAP) prepared pursuant to the *Environment Protection and Biodiversity Conservation Act 1999* (C'th) (the EPBC Act) provides a useful starting point for considering measures necessary to respond to threats posed by marine plastic pollution (MPP). The 2009–14 TAP Review provides an update on progress made to date and both documents serve to identify many appropriate next steps.

Most of our recommendations derive from the TAP, but with additional attention to the issue marine plastic pollution (MPP) from Australian land-based sources and microplastic pollution.

2. Summary of Recommendations

1. National discussion about responding to threats posed by marine plastic pollution (MPP) should include both macroplastic and microplastic pollution, with MPP being seen as a discrete issue sharing a number of features in common with marine debris or litter.
2. The growing prevalence of MPP requires specific attention at the national level of government.
3. Ensuring the adequacy of our legal and policy framework for managing threats posed by increasing levels of MPP is a matter of some urgency.
4. Beyond the framework of the EPBC Act, the Australian Government should play the central role in developing a national strategy for the prevention, removal, mitigation and monitoring of the spread of MPP in our coastal and marine environment to cover all sources of MPP be it vessel-based or land-based or from foreign sources or domestic sources.
5. An effective framework for addressing the specific issues related to MPP would consider each of the following:
 - (a) Australian domestic sources of MPP
 - Vessel-sourced MPP – from Australian waters
 - Land-based MPP – domestic
 - (b) Foreign sources of MPP
 - Vessel-sourced MPP – from foreign waters
 - Land-based MPP - foreign
 - (c) Microplastics.

The submission makes an additional 36 recommendations based specifically on the review of the Threat Abatement Plan, listed in the text.

3. Definitions

MPP is a subset of the category of pollution that is known as marine debris¹ or marine litter.² It includes macroplastics and microplastics. Macroplastics includes things like plastic shopping bags, water bottles, fishing lines, bottle tops, thongs and plastic containers. Microplastics, which are particles of plastic variably defined as 1 or 5mm or smaller in size, are either the result of the breakdown of macroplastics or originate as microplastics. The polyethylene beads in some facewashes and other cosmetic products, and the fibres in fleecy clothing which come loose during laundering, and which enter waterways through domestic drainage systems, are examples of microplastics.

Whilst marine debris and marine litter includes macroplastic pollution, the lack of visibility of microplastics means that they are less readily regarded as marine debris or litter. Given the link between macroplastics and microplastics, MPP could be regarded as a discrete category of marine pollution.

Recommendation

1. National discussion about responding to threats posed by marine plastic pollution (MPP) should include both macroplastic and microplastic pollution, with MPP being seen as a discrete issue sharing a number of features in common with marine debris or litter.

4. The threat posed by MPP

MPP poses many of the same threats as marine debris or marine litter generally:

- it impacts on marine organisms and ecosystems by causing death or harm to marine life through ingestion or entanglement, restricting or inhibiting their ability to move, breathe or feed. For example, one study found that 40,000 fur seals are killed each year by entanglement in debris (Derraik 2002).
- as plastic debris can float, it can serve as a transport medium for invasive species and pose a hazard to navigation.
- due to its artificiality and persistence, it can create visual pollution that desecrates the marine and coastal environment, with impacts on the amenity of coastal areas for coastal communities and visitors as well as economic consequences for the tourist industry.
- plastic can be bioactive, as a source of toxic chemicals such as polychlorinated biphenyls (PCBs), endocrine-active substances, and chemicals similar to dichlorodiphenyltrichloroethane (DDT) within marine food webs.³ These chemicals are known to compromise immunity and cause infertility in animals, even at very low levels.⁴ Also, plastic is able to sorb toxic chemicals which can be released when the plastic is ingested.⁵

The *Environment Protection Biodiversity Conservation Act 1999* (the EPBC Act) recognises that the impacts from marine debris pose significant threats in Australia to a number of threatened or endangered marine species. It is likely that many other species are also being impacted by marine

¹ The United States' National Oceanic and Atmospheric Administration (NOAA) defines marine debris as "any persistent solid material that is manufactured or processed and directly or indirectly, intentionally or unintentionally, disposed of or abandoned into the marine environment...". National Oceanic and Atmospheric Administration: 'What is Marine Debris?' <http://oceanservice.noaa.gov/facts/marinedebris.html>

² The United Nations Environment Program (UNEP) defines marine litter as: "any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment. Marine litter consists of items that have been made or used by people and deliberately discarded into the sea or rivers or on beaches; brought indirectly to the sea with rivers, sewage, storm water or winds; accidentally lost, including material lost at sea in bad weather (fishing gear, cargo); or deliberately left by people on beaches and shores." UNEP, *Marine Litter an Analytical Overview 2005* http://www.unep.org/regionalseas/marinelitter/publications/docs/anl_oview.pdf

³ Department of the Environment, Water, Heritage and the Arts, *Threat abatement plan for the impacts of marine debris on vertebrate marine life* (2009) 1.

⁴ Ibid

⁵ Alla Katsnelson, 'Microplastics present pollution puzzle' (2015) 112(18) *Proceedings of the National Academy of Sciences of the United States of America* 5547.

debris.

The known impacts of marine debris are increasing, as the volume of human refuse making its way into the marine environment continues to grow.⁶ In Australia, plastic was found in approximately 75% of the debris along the coastline in a recent study.⁷

Plastic also presents some significant and unique problems due to the fact that the molecular format of plastic does not remain inert in the way that glass or metal does, and neither does it break down – it simply divides into smaller and smaller pieces. Also, plastic can travel immense distances on ocean currents. It has been found in such remote places as the junction of the Indian, Pacific and Atlantic Oceans and in Antarctica.⁸

Even more unique problems are caused by microplastics. Microplastics are small enough to be ingested by invertebrates and can pass up the food chain, causing harm through long term bioaccumulation in organisms, either through the accumulation of particles themselves in the gut of fish or other larger organisms, causing blockages or reducing space for digestion of food, or through the mechanisms described above.⁹ The possible impacts of this bioaccumulation on humans who eat seafood have not yet been proven or disproven.¹⁰

Because of the persistence of MPP, and the unique problems posed by it, this particular type of pollution presents a great and growing threat to our coastal and marine ecosystems, human health, our economy, and the amenity of our coastal and marine environment.

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) applies to the mitigation of marine debris.¹¹ Marine debris is a key threatening process (KTP) for a number of threatened and endangered species. The 2009 Threat Abatement Plan for the impacts of marine debris on vertebrate marine life, (the TAP)¹² and the TAP Review Report¹³ (the TAP Review) provide a comprehensive list of actions that can be taken by governments at all levels and other stakeholders to mitigate the MPP threat. While the KTP relates to marine debris more broadly,¹⁴ its focus on ingestion and entanglement of marine debris is particularly relevant for macroplastic pollution and the listed species it aims to protect. MPP is a broader issue however.

Beyond the EPBC Act, the Australian Government has been instrumental in the adoption of the Australian Packaging Covenant, an agreement between government, industry and community groups to find and fund solutions to address packaging sustainability issues such as reducing litter and increasing recycling, including in relation to plastic packaging. The Covenant produces two reports each year regarding the production of waste and level of recycling, one of which is devoted to plastic. This annual reporting allows the effectiveness of the Covenant to be tracked. The Covenant does appear to be having some success, seeing a gradual increase in the total number of tonnes of plastic recycled from

⁶ Britta Denise Hardesty, Chris Wilcox, TJ Lawson, Matt Lansdell and Tonya van der Velde, *Understanding the effects of marine debris on wildlife* (CSIRO 2014) 4.

⁷ Ibid 3.

⁸ Australian Antarctic Division of the Australian Department of the Environment, *Marine pollution* (24 August 2012) <<http://www.antarctica.gov.au/environment/pollution-and-waste/pollution>>.

⁹ Ibid.

¹⁰ Nate Seltenrich, 'New Link in the Food Chain? Marine Plastic Pollution and Seafood Safety' (2015) 123(2) *Environmental Health Perspectives* A34, A40.

¹¹ Department of the Environment, Marine Debris – What is Australia Doing? <https://www.environment.gov.au/marine/marine-pollution/marine-debris>

¹² Department of the Environment, Threat Abatement Plan for the impacts of marine debris on vertebrate marine life, May 2009 <https://www.environment.gov.au/system/files/resources/d945695b-a3b9-4010-91b4-914efcdbae2f/files/marine-debris-threat-abatement-plan.pdf>

¹³ Department of the Environment, Threat Abatement Plan for the impacts of marine debris on vertebrate marine life Review 2009-2014 <https://www.environment.gov.au/system/files/resources/d945695b-a3b9-4010-91b4-914efcdbae2f/files/tap-review-marine-debris.pdf>

¹⁴ Marine debris resulting from the legal disposal of garbage at sea is excluded from the key threatening process. Under the *International Convention for the Prevention of Pollution from Ships*, overboard disposal of food, paper, glass, metal and crockery (but not plastics) is permitted from vessels more than 12 nautical miles from land. For more information, see the Australian Maritime Safety Authority's [MARPOL page](#) (link is external)

year to year.¹⁵ Organisations signing up for the Covenant do so voluntarily but upon becoming a signatory they are bound by certain obligations, failure to adhere to which theoretically results in the organisation being referred to the relevant government for review and a possible fine.

It is worth noting that while the required mirror legislation has been enacted in each jurisdiction in Australia, the associated regulations under which signatories can be fined for non-compliance with their obligations have not yet been implemented. Implementing such regulations and enforcing them could significantly increase the effectiveness of this Covenant, as well as any expanded or complementary scheme intended to address plastic life cycles more generally. Such a scheme might be comparatively easily implemented under the existing *National Environment Protection Council Act 1994* (Cth) which currently appears to be rather under-utilised.

Recommendation

2. The growing prevalence of MPP requires specific attention at the national level of government.
3. Ensuring the adequacy of our legal and policy framework for managing threats posed by increasing levels of MPP is a matter of some urgency.
4. Beyond the framework of the EPBC Act, the Australian Government should play the central role in developing a national strategy for the prevention, removal, mitigation and monitoring of the spread of MPP in our coastal and marine environment to cover all sources of MPP be it vessel-based or land-based or from foreign sources or domestic sources

5. Sources and types of MPP in our marine and coastal environment

Marine plastic pollution (MPP) comes from vessel-based and land-based sources.¹⁶ It can originate from:

- marine vessels that discard fishing nets, trash and other similar waste directly to the sea;¹⁷
- poorly managed landfills and systems for solid waste management on land
- defective stormwater drainage systems and littering activity that enable domestic waste, litter, packaging etc and industrial waste to make its way from land to the sea.

Much of this pollution land based and more highly concentrated around major cities.¹⁸ However, a 2003 report found that on the northern Australian coast, up to 90% of marine debris originates at sea, mainly from fishing operations, with around 79% coming from non-Australian sources.¹⁹ This indicates that at a national level, mitigation effort needs to be respond to whether the pollution source is in Australia or overseas.

Plastic bags are a significant contributor to MPP. In 2009, plastic made up 29% of all rubbish found on Clean Up Australia Day and of this plastic rubbish, 17.6% were plastic bags.²⁰ However, clearly they are not the only source of land-based MPP.

¹⁵ Daniel A'Vard, Peter Allan, 2013-14 National Plastics Recycling Survey Final Report (November 2014) Australian Packaging Covenant 2.

¹⁶ United Nations Environment Program (UNEP), *Marine Litter, an analytical overview* (2005) 5.

¹⁷ Ibid.

¹⁸ Hardesty *et al*, above n 4, 2.

¹⁹ UNEP, above n 12, 27. A study by Reisser *et al* which analysed the likely sources of marine debris, observed that in general, the west coast and very north eastern tip of Australia appear to receive material from international sources, while the east coast of the continent appears to primarily receive materials from domestic sources. As noted in Department of the Environment, *Threat Abatement Plan for the Impacts of Marine Debris on Vertebrate Marine Life Review 2009–2014*, <https://www.environment.gov.au/system/files/resources/d945695b-a3b9-4010-91b4-914efcdbae2f/files/tap-review-marine-debris.pdf>, 24.

²⁰ Clean Up Australia, *What is the problem?* (undated) <<http://www.cleanup.org.au/au/Campaigns/plastic-bag-facts.html#sthash.DSfBgCe4.dpuf>>.

In relation to microplastics, the Google pollution map provided by Pellet Watch²¹ shows that at locations along Australia's eastern coast, sites have been identified as 'extremely polluted' with PCBs, DDT and PAH (meaning that levels of over 500ng/g were detected). These indications of high levels of MPP along Australia's eastern coast are supported by initial results from the Sydney Harbour Research Program which has found microplastics in each of the 27 sites surveyed by the program along the length of Sydney Harbour, at rates far higher than those found at similar sites overseas.²² Taken together, these results indicate that microplastics are present in Australian waters, at least along the eastern coast of the country, at very high levels.

A useful framework for considering the specific issues related to MPP would be to separately consider each of the following:

- Australian domestic sources of MPP
 - vessel-sourced MPP – from Australian waters
 - land-based MPP – domestic
- Foreign sources of MPP
 - vessel-sourced MPP – from foreign waters
 - land-based MPP – foreign
- Microplastics.

This framework takes into account the need for both vertical and horizontal coordination that can be facilitated by the Australian Government. Domestic sources of MPP frequently require a concerted effort to coordinate activities undertaken by different levels of government (Australian, state and territory governments and local government). Foreign sources of MPP are likely to also require cooperation between national level agencies such as the Department of Foreign Affairs, the Ministry for the Environment, the Australian Fisheries Management Authority, the Australian Maritime Safety Authority, Border Protection Command, the Department of Agriculture, and the Great Barrier Reef Marine Park Authority (GBRMPA).

Recommendation

5. An effective framework for addressing the specific issues related to MPP would consider each of the following:
- (a) Australian domestic sources of MPP
 - Vessel-sourced MPP – from Australian waters
 - Land-based MPP – domestic
 - (b) Foreign sources of MPP
 - Vessel-sourced MPP – from foreign waters
 - Land-based MPP - foreign
 - (c) Microplastics

²¹ International Pellet Watch, *Google Pollution Map* (2015) <<http://www.pelletwatch.org/gmap/>>.

²² Oliver Milman, 'Sydney harbour's plastic pollution at 'alarming' levels, scientists find', *The Guardian*, 25 August 2014, <http://www.theguardian.com/profile/oliver-milman>.

6. Issues arising from the TAP Review

NELA has reviewed the findings of the TAP Review for the purpose of discerning relevance for policy making on MPP. The following are the NELA's observations and recommendations regarding the findings of the TAP Review in relation to each of the action items in the marine debris TAP. The TAP Review's findings and commentary by the NELA on those findings is provided in [Appendix A](#).

6.1 General observations

There is nothing in the TAP Review to indicate that there has been a concerted effort by the Commonwealth to coordinate the Australian, state and territory, and local governments in the management and control of marine debris. This is part of a larger problem concerning a lack of coordination in cross-jurisdictional management of our marine environment.

6.2 Data collection, surveys and national mapping, pathways, sources and sinks

TAP Action item 2.1

According to the TAP Review, the CSIRO has developed a large project to quantify the amount and distribution of debris in Australia's coastal environment which accommodates both at-sea and terrestrial sampling, along with volunteer clean up data. The TeachWild program uses CSIRO's standardised survey method in beach cleanup activities conducted nationally by citizen science volunteers (primarily school groups). In addition, across northern Australia, indigenous rangers groups collect data on marine debris observed during sea country patrols. Tangaroa Blue is another program that has developed resources to assist volunteer groups in standardised data collection.

The efforts described in the TAP Review are still a long way from the aspirations of TAP action item 2.1, which aims for:

nationally consistent, statistically rigorous data collection protocols and survey methods to enable national mapping of the spatial distribution and concentration of marine debris over time (Action 2.1)

The Australian Government should make a more concerted effort to collaborate with state and territory governments and other relevant stakeholders in this regard. Whilst work has been done by CSIRO, the TAP Review does not indicate the extent of collaboration with state and territory governments.

Recommendations

6. The development of nationally-consistent, statistically-rigorous data collection protocols and survey methods to enable national mapping of the spatial distribution and concentration of marine debris over time with specific reference to MPP is fundamental and should be fast-tracked.
7. Whilst investigation of the impacts of MPP, particularly microplastics, is something that will require research over a longer timeframe, steps are needed now to establish research programs.

TAP Action 2.3

A national network of a limited number of permanent marine debris monitoring sites (Action 2.3)

The TAP Review's consideration of this action item again shows the need for a national approach and will require collaboration with state and territory governments. This national network has not been established although, according to the TAP Review, there are a number of coastal sites that could be used as long term monitoring sites, some of which have existing historical data, including the Gulf of Carpentaria ranger groups mentioned elsewhere.

The sites that could be used that have been identified in the TAP Review are an obvious starting point. A number of suggestions have been made in the TAP Review as to how to progress this action item and the Australian Government should support the CSIRO in this regard, including using sea birds for monitoring.

Recommendation

8. A national network of a limited number of permanent marine debris monitoring sites should be a priority for the Australian Government and should be expanded to cover monitoring of MPP (both macroplastic and microplastic) using the sites mentioned in the TAP review as starting points.

TAP action 3.1

Long- term monitoring, investigation, recording and management of data on vertebrate marine life harmed and killed by the physical and chemical impacts of marine debris. (Action 3.1)

Patterns identified regarding the ingestion rates of seabirds indicate that more concerted action is needed to limit the numbers of vertebrate marine life harmed and killed by the physical and chemical impacts of marine debris. NELA notes that most of the implementation of this item has been carried out at the Australian Government level. The TAP Review provided little evidence of collaboration between State, territory and Australian Governments.

Recommendation

9. More attention is needed to long-term monitoring, investigation, recording and management of data on vertebrate marine life harmed and killed by the physical and chemical impacts of marine debris, in particular MPP, including collaboration between the Commonwealth and state and territory levels of government.

TAP Action 2.4

DEWHA to support a study on the wind and sea circulation patterns in the Asia-Pacific region as a basis for better understanding the pathways and potential sources and sinks of harmful marine debris of foreign origins in Australian waters. (Action 2.4)

This action item requires 'a study' on wind and sea circulation patterns in the Asia-Pacific region and concerns marine debris of foreign origins. From the TAP Review, it seems that such a study has not been carried out. However, research done by CSIRO with University of WA and in collaboration with GhostNets Australia is helpful in identifying the sources of marine debris in Australia.

The TAP Review refers to a number of existing analyses. These analyses should be reviewed to see what else is required, if anything. This indicates that at a national level, effort can be divided between different approaches geographically. The Australian Government is in a key position to coordinate such an approach.

Recommendation

10. The Australian Government should review the results of existing analysis of the wind and sea circulation patterns in the Asia Pacific region as a basis for better understanding the pathways and potential sources and sinks of MPP of foreign origins in Australian waters, and should support further studies where required.

6.3 Australian domestic sources of MPP: Vessel-sourced MPP from Australian waters

It appears from the TAP Review that the recommended review of existing arrangements for the control of marine debris on all vessels smaller than 400 gross tonnes has not been carried out. The TAP Action 1.1 recommended:

Australian Government in consultation with the states and territories to facilitate the review of existing arrangements relevant to the control of marine debris on vessels smaller than 400 gross tonnes (including fishing vessels) (Action 1.1).

Recommendation

11. The review of existing arrangements for the control of marine debris on all vessels smaller than 400 gross tonnes as recommended in the TAP should be undertaken in the near future with a focus on MPP.

TAP Action 1.2

Some work facilitated by AMSA has been carried out according to the TAP Review. However, no mention is made of implementation by the state or territory government or appropriate local bodies of the recommendation:

State, territory and Australian Governments and appropriate local bodies to facilitate studies of port facilities and boating hubs for the disposal of fishing gear, including assessment of availability, use, capacity and cost (Action 1.2)

Studies carried out by AMSA are in the form of a gap analysis of voluntary waste reception facilities but it is not clear what this means. More information should be made available about the four prosecutions referred to in the TAP Review. More clarity is needed about the studies conducted to date and the prosecutions.

Recommendation

12. The Australian Government should support studies by state and territory governments and appropriate local bodies of port facilities and boating hubs for the disposal of fishing gear.

TAP Action 1.3

State and territory governments to consider reviewing legislation to ensure that details of waste reception facilities for ships are included in port environment plans. (Action 1.3)

Whilst this action item relates to consideration by the state and territory governments, the Australian Government could take a role to facilitate this. It appears that such consideration has not been given by the state and territory governments to the TAP recommendation.

Recommendation

13. The Australian Government should urge state and territory governments to complete a review of legislation to ensure that details of waste reception facilities for ships are included in port environment plans.

TAP Action 1.6

DEWHA, in collaboration with DFAT and AMSA, to facilitate through domestic and international fora, taking into account policies and programs of IMO, studies of the barriers and incentives to the use of existing port waste reception infrastructure in Australia and the Asia-Pacific region.

This action item concerns barriers and incentives to the use of existing port waste reception infrastructure in Australia and the Asia-Pacific region. It tackles the problems of vessel-sourced waste from Australian and foreign waters and provides an example of how understanding implementation can be hindered by tackling two issues (marine debris from vessels in Australian waters and marine debris from foreign waters) under one action item.

Studies of the barriers and incentives to the use of port waste reception infrastructure in Australia are complete and, according to the TAP Review, implementation comes down to cost. AMSA's gap analysis reports have regularly recommended that a port authority consider the feasibility of engaging a contractor to service ships for a fixed fee or a per volume fee but, as stated in the TAP Review, they do not have authority to compel port authorities to do this.

Only when Australia has made progress in this regard will we be able to exercise leadership in the Asia-Pacific region. However, in addition, Australia could assist by supporting a review of options for appropriate treatment/disposal of vessel-based waste in Pacific Island Countries.

Recommendation

14. Australian and state/territory governments should determine whether port authorities should be required to engage a contractor to service ships (for a fixed fee or a per volume fee), with the Australian Government taking the lead in investigating how such a service could be implemented around Australia.

TAP Action 1.8

State, territory and Australian Governments, in collaboration with industry, to identify and implement appropriate measures for incorporating waste reporting and management requirements (reporting and return of rubbish, damaged gear, etc. to port for disposal) into fishery management arrangements as appropriate. (Action 1.8)

Waste reporting and management requirements are likely to be central to Australia's effort to reduce

MPP from ships in our waters. The TAP Review indicates that only patchy progress has been made in regard to incorporating waste reporting and management requirements into fishery management arrangements.

In relation to rubbish, it seems that whilst garbage record books are required for ships more than 400 gross tonnage, assertions that ships less than 400 gross tonnage have disposed of their waste at port reception facilities may not be verifiable.

Regarding damaged gear lost at sea, the Australian Government (in the Southern Ocean and the South East Marine Reserve), New South Wales, Victoria and the Northern Territory have provisions for reporting of lost fishing gear. Commercial fishing vessels operating under class approval in Habitat Protection and Multiple Use Zones in the South-east Commonwealth Marine Reserves Network are required to report all gear or equipment that is lost at sea and which is likely to cause environmental harm, within 24 hours. Commercial fishers in the Southern Ocean, under the management of the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR) are required to report gear loss.

Recommendation

15. Further attention is required by the Australian Government to ensure that all vessels operating in Australian waters are required to report lost fishing gear and this requirement becomes a standard operating procedure.

TAP Action 1.9

State, territory and Australian Governments, in collaboration with the fishing industry, to promote best practice waste management strategies on board fisheries vessels, including the uptake of existing codes of conduct, and identify any need for the development of new codes of conduct. (Action 1.9)

Whilst WA has made some progress towards promoting best practice waste management strategies on board fisheries vessels, implementation of this action item requires implementation by the Australian and all state and territory governments. Any item that will become waste and could potentially be lost at sea should be removed before departure. It is particularly important to avoid plastic straps or bait bands and other waste being taken on board at all, even whilst vessels are moored.

Recommendation

16. The Australian Government should work with each state and territory government, in collaboration with the fishing industry, to promote best practice waste management strategies on board fishing vessels, including the uptake and/or amendment to existing codes of conduct, with the goal of ensuring that plastic items are not lost at sea either whilst vessels are moored or otherwise.

TAP Action 1.11

DEWHA to support feasibility studies of market/consumer/peer-based incentives to encourage responsible handling and disposal of waste fishing gear, for example:

- *accreditation of sustainable practice in fisheries with specific reference to gear manufacture, use and handling*
- *'stewardship' arrangements for manufacturers and users of fishing gear. (Action 1.11)*

The NELA notes that no activity has occurred to support feasibility studies of market/consumer/peer-based incentives to encourage responsible handling and disposal of waste fishing gear.

Recommendation

17. The Australian Government should support feasibility studies of market/consumer/peer-based incentives to encourage responsible handling and disposal of waste fishing gear based on accreditation systems and stewardship arrangements.

6.4 Australian domestic sources of MPP: land-based sources of MPP

TAP Action 1.12

State, territory and local governments and other relevant bodies to consider providing increased funding for the introduction of improved solid pollutant (particularly litter) control strategies in waterways. (Action 1.12)

This action item does not mention the Australian Government. However, the TAP Review has mentioned that the CSIRO conducted a national survey of marine debris along the coast of the Australian continent and found that most marine debris in the Australian region is domestic. Furthermore, debris in the marine environment appears to increase with the local population, suggesting local sources outweigh input from the high seas. Therefore, more consideration needs to be given to domestic land-based sources of MPP and the collaboration required between State, territory and local governments and other relevant bodies.

NELA notes that illegal dumping is likely to be a significant driver of plastic inputs to Australian waters from the analysis that suggests that areas that have a high population in the region, but relatively isolated coast tend to have high amounts of debris. Progress is being made in Victoria with the action plan entitled 'A Cleaner Yarra River and Port Phillip Bay'.

NELA notes that the CSIRO has found that outreach programs had a much higher impact than the provision of infrastructure in terms of reducing waste washing up on council coastlines and that, in particular major benefits were gained from education programs and anti-illegal dumping campaigns.²³ CSIRO have proposed that it would be possible to evaluate the cost effectiveness of local, regional and state initiatives to improve solid pollutant (particularly litter) control strategies in waterways and design an effective and low cost model policy that could be adopted by local and regional government.

Recommendation

²³ Britta Denise Hardesty, Chris Wilcox, TJ Lawson, Matt Lansdell and Tonya van der Velde, CSIRO, *Understanding the effects of marine debris on wildlife* (2014) 3.

TAP Action 1.13

18. Reducing land-based sources of marine pollution requires more attention. The Australian Government should give more consideration to domestic land-based sources of MPP and how it can assist the collaboration between State, territory and local governments and other relevant bodies to reduce levels of MPP entering the marine environment from land-based sources. This could include evaluating the cost effectiveness of a range of local, regional and state initiatives to improve solid pollutant (particularly litter) control strategies in waterways and designing a model effective low cost approach that could be widely adopted across Australia.

State and territory governments to facilitate an analysis of the effectiveness of current litter public awareness and education campaigns to identify gaps and areas for improvement. (Action 1.13)

NELA notes this recommendation relates to facilitation by state and territory governments of an analysis of the effectiveness of current public awareness and education campaigns about litter; however, there is still a role for the Australian Government in helping to initiate this analysis. The 'Keep Australia Beautiful' campaign has gauged the effectiveness of current litter campaigns and how to develop better partnerships. CSIRO's analysis suggests that the focus should be on education campaigns, and in particular campaigns against illegal dumping rather than on cleanup campaigns.

CSIRO's analysis also indicates that incentive schemes are very effective at reducing the loss of waste into the environment. South Australia's container deposit scheme, for example, has reduced the number of beverage containers, which are the dominant plastic item in the environment, by a factor of three.²⁴

Recommendation

19. State and territory litter education and incentives initiatives and programs listed in the review should be carefully considered for their applicability for MPP, education and awareness regarding MPP, and apparent effectiveness in reducing MPP.

TAP Action 1.14

State, territory and Australian Governments, in collaboration with appropriate non-government organisations, to develop options for establishing a more consistent and long-term national approach to litter abatement education, particularly for marine based activities. (Action 1.14)

The goal of this action is to develop options for establishing a more consistent and long-term national approach to litter abatement education.

This action concerns both land-based sources and vessel-based sources, with an emphasis on marine-based activities. However, more activity seems to have been carried out in relation to land-based sources of marine debris. It provides an example of why the NELA recommends that these sources should be considered separately. The 'appropriate non-government organisations' are likely to be different for each source of waste. Litter abatement education in marine based activities is very different from litter abatement education in the population as a whole.

²⁴ Britta Denise Hardesty, Chris Wilcox, TJ Lawson, Matt Lansdell and Tonya van der Velde, CSIRO, *Understanding the effects of marine debris on wildlife* (2014) 3.

The TeachWild program seems to have been effective and on this basis could be further expanded. Schools-based programs are important for the long-term but more needs to be done to educate adults about the connection between littering on land and MPP. This is so, especially in light of the CSIRO's analysis of coastal debris in the Australian marine zone that suggests most debris is from land-based activities particularly near populated centres.

Recommendation

20. The Australian Government to support adult awareness raising campaigns about the connection between littering on land and MPP.

TAP Action 2.2

State, territory and Australian Governments to continue to provide support for community-based coastal and waterway clean-up and monitoring activities. (Action 2.2)

This action relates to management as well as monitoring. Notably, the TAP review focuses on what the Australian Government is doing and does not indicate awareness of, or collaboration with, actions being taken at the state and territory level. The activities of GhostNet are again mentioned as are activities of the Green Army programme (but without detail).

Much of the review material concerns monitoring i.e., the dataset on Biologically Important Areas (developed as part of the Marine Bioregional Planning process) and the CSIRO marine debris project that involved citizen scientist participation, volunteer friendly survey protocols, and a user friendly database.

In relation to clean-up activities, there is reference to a funding commitment of \$700,000 directed to protecting populations of dugong and turtle in Far North Queensland and the Torres Strait from the impacts of marine debris, but no detail on what has been actually achieved.

Recommendation

21. Developing a national approach to clean-up should be kept distinct from monitoring and information and greater collaboration is required between the Australian and state and territory governments in relation to both.

TAP Action 3.4

DEWHA to identify measures to promote the uptake and application of biodegradable and oxodegradable plastic in marine-based industries and environments where it is found to be effective. (Action 3.4)

The NELA notes that the Law Council of Australia's submission discusses this issue and the NELA agrees with the points raised in that submission. The NELA, in addition, make the following recommendations:

Recommendation

22. The Australian Government should be instrumental in securing nationally applicable measures to promote the uptake and application of biodegradable and oxodegradable plastic wherever it is used. This would include a ban on non-biodegradable, single-use plastic bags.
23. However, a national approach should not be limited to the uptake and application of biodegradable and oxodegradable plastic, but should begin with a reduction in the use of plastic generally wherever possible with the ultimate goal being zero sum plastic production/waste. This could be done by regulating the use of biodegradable and oxodegradable plastic; and recycling plastic wherever the use of biodegradable and oxodegradable plastics is not possible.
24. An interim measure would include national requirements for the design of consumer items that will be difficult for marine turtles and other marine species to ingest.

6.5 Foreign sources of MPP: Vessel-sourced MPP from foreign waters

TAP Action 2.4

Better understanding the pathways and potential sources and sinks of harmful marine debris of foreign origins (Action 2.4)

The TAP Review shows that, in some areas, we have sufficient data on marine debris. The figures on the estimated number of turtles captured by ghost nets is concerning and require ongoing efforts to reduce the number of 8690 ghost net records in Northern Australia. Collaboration with the Indonesian government could provide quick wins in comparison with longer term efforts that require more data and more time.

The TAP required 'a study' on wind and sea circulation patterns in the Asia-Pacific region as they would affect marine debris of foreign origins. The TAP Review indicates that whilst such a study has not been carried out, research done by CSIRO with University of WA and in collaboration with GhostNets Australia is helpful in identifying the sources of marine debris in Australia. The TAP Review refers to a number of existing analyses.

Recommendation

25. Existing analyses of the pathways and potential sources and sinks of harmful marine debris of foreign origins should be reviewed to identify what else is required to better understand pathways and potential sources and sinks of harmful marine debris of foreign origins.
26. The Australian government should continue to advance efforts to collaborate with Indonesian Ministry of Marine Affairs and Fisheries to reduce the large number of ghostnets in Northern Australia.

TAP Action 1.5

DEWHA, in collaboration with the Department of Foreign Affairs and Trade (DFAT) and AMSA, to facilitate through international fora, taking into account policies and programs of the International Maritime Organization (IMO), studies of the ability of international ports in the Asia-Pacific region to handle vessel-sourced waste, particularly derelict

fishing gear, including assessment of availability, capacity and cost. (Action 1.5)

From the TAP Review, it appears that AMSA has focused on working with South Pacific Regional Environment Program (SPREP) on the implementation of the MARPOL Convention.

Recommendation

27. Whilst AMSA has focused on working with the South Pacific Regional Environment Program (SPREP) on the implementation of the MARPOL Convention, attention needs to be given to the sources of marine debris from Southeast Asia, particularly Indonesia. One avenue through which this might be achieved is the East Asian Regional Seas Programme, which Australia has previously been a participant in.
28. The problem of MPP is suitable to be raised in regional forums and to become the focus for international aid provided to Indonesia and neighbouring countries.

TAP Action 1.7

Australian Government agencies in collaboration with state and territory governments to identify appropriate responses and responsibilities for recovery of hazardous debris at sea, notably large derelict fishing nets. (Action 1.7)

Large derelict fishing nets can be sourced to foreign fishing vessels and requires identification followed by recovery efforts. The TAP Review has highlighted deficiencies in coordination at the Australian Government level. No mention has been made of steps taken to coordinate between Australian Government agencies and state and territory governments.

CSIRO and GhostNets Australia have found that the vast majority of ghost nets pass relatively close to the port of Weipa, there are potential significant cost savings in recovery efforts, if nets are identified at sea to the northwest of Weipa and then retrieved as they pass close to the port.

The TAP Review has highlighted serious difficulties in coordinating the relevant Australian Government agencies in the retrieval of these large derelict fishing nets (ghost nets), namely: the Australian Fisheries Management Authority, the Australian Maritime Safety Authority, Border Protection Command, the Department of Agriculture, the Great Barrier Reef Marine Park Authority (GBRMPA) and the Department of the Environment.

As stated in the TAP Review in relation to Action item 3.2, recent results on entanglement include a rough estimate of the catch rates of turtles by ghost nets drifting ashore in northern Australia. Based on analysis of 8690 ghost net records in Northern Australia, Wilcox et al. (2014) gives a preliminary estimate for the number of turtles captured by these nets (over an unknown period of time) of between approximately 5,000 and 15,000 turtles.

Recommendation

29. Ineffective coordination of the relevant national agencies in the retrieval of large derelict fishing nets (ghost nets) must be resolved as a matter of urgency. In addition, coordination between national level agencies and relevant state government agencies, such as in the Weipa Port area, urgently needs to be developed

TAP Action 1.10

DEWHA to support an analysis of financial incentives to encourage return of waste generated at sea to land for appropriate disposal, for example:

- *fishing gear inventories by port and vessel supported by deposits and bounty initiatives*
- *introduction of regulations relevant to insurance on lost gear and/or insurance levies to support removal of derelict gear*
- *repair, re-use and recycling initiatives. (Action 1.10)*

Analysis of financial incentives for the recovery of waste from foreign vessels is likely to be important. As the TAP Review stated, CSIRO has held workshops with Indonesian fishermen on financial incentives to encourage return of waste generated at sea to land for appropriate disposal and has preliminary results suggesting that nets have an economic value and are worth recovering. This appears to be a subject area that warrants continuation.

Recommendation

30. There is a need for technical support to help Indonesian fishermen aggregate location data on derelict nets. This should be followed up by the Australian government along with other suggestions such as fishing gear labelling and an inventory to support a reporting system and a low interest loan program.

TAP Action 1.18

Australian Government to encourage and assist relevant nations to sign, ratify and enforce Annex V of MARPOL (Action 1.18)

Whilst the activities listed as being undertaken through SPREP are important, efforts also need to focus on MPP source countries from Southeast Asia. This may require working with Indonesia on steps to be taken to improve implementation of Annex V of MARPOL. Notably, Indonesia is a member of the International Maritime Organisation Council.

Recommendation

31. Australian should work more closely with MPP source countries from Southeast Asia., This may require working with Indonesia on steps to be taken to improve their implementation of Annex V of MARPOL at the regional level.

6.6 Foreign sources of MPP: land-based MPP from foreign waters

TAP Action 1.16

DEWHA and relevant agencies to examine introducing awareness-raising and outreach programs aimed at relevant groups contributing to marine debris in the Asia-Pacific region (Action 1.15)

DEWHA, in collaboration with DFAT, to identify opportunities for exchange visits between coastal (especially Indigenous) communities experiencing the impacts of marine debris and groups in other nations where large proportions of harmful marine debris originates (Action 1.16)

NELA notes that the lack of an entry in relation to these action items appears to show that there has been no implementation activity.

Recommendation

32. The Australian government through DFAT should do more to raise awareness within the Asia-Pacific region on threats posed by MPP and design outreach programs on the prevention and control of MPP amongst our neighbours

TAP Action 1.17

DEWHA, in collaboration with DFAT, to strengthen relations with regional neighbours on marine debris through relevant fora, and develop collaborative project proposals to address the sources and impacts of harmful marine debris. (Action 1.17)

Whilst Action 1.17 does not specify the form of marine debris, implementation to date has focused on the particular issue of derelict fishing gear from Indonesia. In addition, there have been exchange visits and study tours on community-based marine planning and management in East Timor, Rote Island in eastern Indonesia and Indigenous communities in Australia's north.

Recommendation

33. More national effort is needed to study the sources and quantities of foreign land-based MPP found in our northern waters and along our coastline (see LCA response to Action 2.4).
34. Efforts to promote the benefits of community-based marine planning and management in neighbouring countries, should highlight the control of marine pollution from land-based sources including MPP.

6.7 Microplastic MPP

TAP Action 3.3

DEWHA to support research on the nature of degradation pathways of synthetic debris in the marine environment (including biodegradable and oxodegradable plastics), the extent that degradation products are contaminated by other potentially toxic compounds, and the potential toxicity of debris types on marine species. For example: DEWHA to support monitoring of the incidence of hatching failure due to eggshell thinning (linked with the Recovery plan for albatrosses and giant petrels [Environment Australia, 2001b]). (Action 3.3)

This is the only action item that touches on the issues posed by the growing prevalence of microplastics in our marine and coastal environment. It requires support for research on:

- the nature of degradation pathways of synthetic debris in the marine environment (including biodegradable and oxodegradable plastics)
- the extent that degradation products are contaminated by other potentially toxic compounds, and potential toxicity of debris types on marine species.

The TAP Review states that the Department of the Environment has not yet provided specific research support on these issues.

Because of their small size, microplastics may pose a far greater threat to ecosystems and human health than macroplastics: their size increases their ability to travel on ocean currents, sink through the layers of ocean, and be consumed by larger numbers of organisms and so have greater reach across the marine environment.

The Australian Government has not given support to a comprehensive review of existing knowledge in relation to the sources, location, density and likely harm caused by microplastics. Information is available from international sources, such as the International Whaling Commission's assessment of the

toxicity of microplastics and polycyclic aromatic hydrocarbons (PAHs) in cetaceans²⁵. However, there is a need to identify gaps in this knowledge.

Some sources of microplastic pollution have already been identified. For example, it is known that microplastics can enter the marine environment directly from waste water containing plastic beads used in cosmetics and fibres from synthetic fleeces,²⁶ loosened during laundering.²⁷ Action could be taken to prevent this occurring by legislating phase outs of products which contain or produce either of these things.²⁸

The issue of microfibers that enter the marine environment can be treated as a separate area of investigation. The public policy measures to address this problem are likely to be additional to policy measures to address plastic beads and could include labelling requirements and obligations to include filters where waste water streams potentially carry microfibers from fleece products to the marine environment.

Recommendation

35. Policy making to address threats posed by microplastic marine pollution should be treated as a distinct sub-topic within policy on marine plastic pollution that needs a coordinated response. The Australian Government is well placed to lead this national effort and to collaborate with state and territory governments.

36. As a first step, the Department of Environment should ensure that research mentioned in the TAP is either carried out or existing research findings are systematically collated and reviewed, namely, research on:

- the nature of degradation pathways of synthetic debris in the marine environment (including biodegradable and oxodegradable plastics)
- the extent that degradation products are contaminated by other potentially toxic compounds, and
- potential toxicity of debris types on marine species.

37. In addition, the Australian Government should coordinate the collation and review of (both national and international) research on microplastic pollution in the marine environment with a goal of identifying how to fill gaps in knowledge necessary to inform policy making.

38. Given that it is known that certain products, such as cosmetics, contain plastic beads that will possibly find their way into the marine and coastal environment, the Australian Government should investigate public policy measures such as: awareness campaigns; compulsory product content labelling; legislatively providing for the substitution and phasing-out of this microbeads where manufactured locally; and restrictions on the import of products containing such content.

39. In relation to microfibres, other measures may be required in addition to labelling requirements, such as standardised washing machine filters to catch microfibers from entering wastewater streams and the marine environment.

²⁵ International Whaling Commission, *Understanding the threat from microplastics and PAHs - Pollution 2020* (17 March 2014) <<https://iwc.int/understanding-the-threat-to-cetaceans-from-micropl>>.

²⁶ University of New South Wales School of Biological, Earth and Environmental Sciences, *Microplastic threat to Sydney Harbour* (25 August 2014) <<http://bees.unsw.edu.au/microplastic-threat-sydney-harbour>>.

²⁷ Mark Anthony Browne, Phillip Crump, Stewart J. Niven, Emma Teuten, Andrew Tonkin, Tamara Galloway, and Richard Thompson, 'Accumulation of Microplastic on Shorelines Worldwide: Sources and Sinks' (2011) 45(21) *Environmental Science and Technology* 9175.

