

# Plastic shopping bags Options paper

Practical actions for plastic shopping bags

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## Definitions

There are a number of different types of plastic shopping bags available. The below lists common types of shopping bags, and these terms are used throughout this paper.

Plastic shopping bag	<p>Plastic bag with handles to carry items.</p> <p>A carry bag, the body of which comprises polymers in whole or in part, provided by the retailer at point of sale for the carrying or transporting of items.</p>
HDPE bag	<p>High density polyethylene (HDPE) bag, often less than 35 microns thick.</p> <p>Commonly referred to as supermarket style bag, singlet bag, single use plastic bag, lightweight plastic shopping bag. Often provided at supermarkets or convenience stores, or for takeaway food.</p>
Boutique bag	<p>Low density polyethylene (LDPE) bags.</p> <p>Commonly referred to as heavy plastic bags or boutique bags. Often branded and provided by department, apparel and electronics stores.</p>
Green bag	<p>Re-usable 'green' bags.</p> <p>Durable bags designed for multiple re-uses (particularly for supermarket shopping), made of non-woven or woven polypropylene in cross thatched pattern.</p>
Lightweight bags	<p>Biodegradable, oxo-degradable or compostable bags.</p> <p>Often lightweight and used in replacement of HDPE lightweight plastic bags.</p>
Barrier bags	<p>Smaller bags with no handles used for containing fresh produce (e.g. meat and vegetables) and ready to eat food, and as nappy bags.</p>

## 1. Executive summary

This Plastic Shopping Bags Options Paper has been prepared to present the impacts of plastic shopping bag use in Australia and NSW and to propose various options to reduce the impacts. The intention of this paper is that multiple actions would be chosen for further investigation and implemented concurrently. This ensures the best outcomes for the environment and community while balancing government, council and retailer impacts.

In summary:

- Plastic shopping bags are used extensively across the retail sector as they are light, easy to use, strong, moisture resistant and relatively cheap. However, a number of problems arise from the use of plastic shopping bags. In this paper, these problems are identified as litter, consumption and recycling contamination.
- There is a significant body of scientific evidence on the environmental impacts of plastics, including plastic bags, on the marine environment. Plastic shopping bags are highly visible and mobile in the environment, creating entanglement and ingestion impacts to marine life.
- A number of countries and regions have implemented measures to reduce the use of plastic shopping bags, including bans or levies on plastic shopping bags. These actions are often combined with educational and other complementary programs.
- In order to reduce plastic bag use, the Australian Retailers Association introduced a voluntary Plastic Shopping Bag Code of Practice, which operated between 2003 and 2005. The Code included education and commitments to make 'green bags' widely available in stores. The Code resulted in a reported 45% reduction in plastic shopping bags issued by supermarkets.
- Since the end of the Plastic Shopping Bag Code of Practice, it appears that the trend of reduction in plastic shopping bag usage has reversed. There remains significant community concern regarding the impact of plastic shopping bags, and a number of Commonwealth Government reviews about plastic shopping bags have been completed. South Australia, Northern Territory, Australian Capital Territory and Tasmania have all legislated bans of plastic shopping bags (excluding 'biodegradable' bags) in the past six years
- Recent scientific research demonstrates that biodegradable plastic shopping bags have similar impacts on the environment and wildlife as other plastic shopping bags
- Any replacement for plastic shopping bags, including paper, cotton and green bags, each have their own environmental impacts. This includes material use, water and energy consumption, marine impacts, greenhouse gas emissions and litter.
- There are numerous options, both traditional and innovative, to address the problems and impacts of plastic shopping bags. Additional research, assessment and scoping is required before a final determination can be made on the feasibility of any option.

Prior to proceeding with further investigation of options for either NSW or national implementation, the following is required:

- broad stakeholder engagement to assess the impacts and feasibility of the option(s), to further learn from other Australian jurisdiction's experience, identify any information gaps and address any potential perverse outcomes
- regulatory impact statements to assess benefits, costs and impacts on stakeholders
- for any regulatory action, legal advice will be required on whether the relevant jurisdiction has the power to implement the laws.

As with all regulatory decisions, choosing an action or group of actions depends on which objective or problem the Government is seeking to address. The intention of this paper is that multiple actions would be implemented concurrently to ensure the best environmental and community outcomes, while balancing the impacts on governments, industry and retailers.

The table below presents the options for action so that one regulatory option could be combined with relevant incentives or barriers and as many educational programs as appropriate.

<p><b>Options to address all objectives (litter, consumption and recycling contamination)</b></p> <ul style="list-style-type: none"> <li>• Status quo</li> <li>• Ban on bags</li> <li>• Education</li> <li>• Environmental warnings or labeling</li> </ul>
<p><b>Litter specific options</b></p> <ul style="list-style-type: none"> <li>• Environmental warnings and plastic bag litter cost recovery</li> <li>• Recycling incentive schemes</li> <li>• Bin design and litter infrastructure funding</li> </ul>
<p><b>Consumption specific options</b></p> <ul style="list-style-type: none"> <li>• Environmental warnings</li> <li>• Product stewardship program</li> </ul>
<p><b>Recycling contamination specific options</b></p> <ul style="list-style-type: none"> <li>• Expand kerbside recycling for plastic shopping bags</li> <li>• Public and retailer bins for recycling plastic shopping bags</li> </ul>

## 2. Introduction

Plastic bags in all their forms are ubiquitous, provide useful packing benefits and offer a convenient transport solution for many Australians. Plastic shopping bags are an established part of the Australian retail experience. Plastic shopping bags are given away for free in large numbers and are generally designed to be single use. In comparison, re-usable alternatives such as green bags, generally come at a cost to the consumer.

In Australia, based on 2007 data, approximately 3.9 billion single use light weight plastic shopping bags are used annually<sup>1</sup>. In 2003, 86% of Australians said they recycle or reuse plastic bags, primarily re-using them as bin liners around their homes.<sup>2</sup> Given population, consumption and the end of the Australian Retailers Plastic Bag Code of Practice,<sup>3</sup> plastic shopping bag consumption appears to be steadily increasing.

In New South Wales, it is estimated that two billion plastic bags are consumed each year, with only 14% being recycled<sup>4</sup>. The average useful life of a plastic bag is 12 minutes before it is discarded, either for disposal at landfill (1.72 billion bags) or as litter.

Achim Steiner, the Executive Director of the United Nations Environment Program (UNEP), who advises United Nations member states like Australia, stated in 2009 that:

‘Single use plastic bags which choke marine life, should be banned or phased out rapidly everywhere. There is simply zero justification for manufacturing them anymore, anywhere’.

The impacts of plastic shopping bags are a significant concern to many people. The NSW Government recognises these concerns and the growing evidence on the impacts that plastic bags can have in the environment. As a result, the NSW Government brought the issue before the Meeting of Environment Ministers in February 2015 to argue for a national response. The outcome of the meeting was that NSW is to lead an investigation into options for addressing the impacts of plastic bags. This paper presents the preliminary investigation of the NSW Environment Protection Authority (EPA) and outlines a diverse range of policy options for minimising the impact of plastic bags in the environment.

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<sup>1</sup> Cain, R., Oke, M. Hyder (2008) Plastic Retail Carry Bag Use, 2006 and 2007 Consumption Hyder Consulting, Environment Protection and Heritage Council. Page 1 Estimate that the total number of single use plastic shopping bags (HDPE) consumed in Australia in 2007 was 3.9 billion and approximately 10% of these were oxo-degradable HDPE bags.

<sup>2</sup> ABS 2003, Environmental issues: people's views and practices, 4602.0, Australian Bureau of Statistics (ABS), Canberra.

<sup>3</sup> Australian Retailers Association (2005) *Code of Practice for the Management of Plastic Bags Final Report*. A voluntary Code of Practice was agreed to by major retailers in 2002 in order to reduce plastic bag use by 50%. The Code operated from 2003-2005 and resulted in a reduction of plastic bag use by 34%. <http://www.retail.org.au/ArticleDetails/tabid/232/ArticleID/24/Plastic-Bag-Code.aspx>

<sup>4</sup> Australian Government Department of the Environment website, <http://www.environment.gov.au/node/21324>, accessed 20 October 2014

### 3. Background

This section sets out the problems with the use of plastic bags, including those identified by the community about the impacts of plastic bags.

In this paper, we identify three major problems with the use of plastic bags:

- 1. Litter**  
Contribution to litter and the resulting impact on society and on the environment.
- 2. Consumption**  
The unnecessary consumption of plastic bags and associated waste generation.
- 3. Recycling contamination**  
Contamination of recycling streams and recyclable materials by plastic bags.

In economic terms plastic shopping bags in the environment represent a negative externality because the full costs of plastic shopping bags, including resources, environmental, recycling contamination, litter and landfill costs, are not carried by the person that disposes or litters the bags. Solutions are needed to address this market failure.

The nature of these problems, the objectives to achieve in taking action, and the potential options to address these problems are outlined in this paper.

#### Litter

The high mobility of plastic bag litter means that plastic bags and plastic fragments can be carried by wind or water into our waterways and marine environments. Due to this mobility, and the length of time it takes to degrade, plastic bags are highly visible in the environment. This is observable in marine environments where plastic bags contribute to long-term impacts on marine animals, ecosystems and food chains (including ingestion, entanglement and strangulation).

Plastic bags and fragments can persist in the environment. Whole plastic bags add to the macro litter problem in the environment. A plastic bag may also start to break down to smaller pieces if exposed to sunlight, air, physical movement or water. The rate of degradation depends on the environmental conditions, bag thickness, bag type, and the final location, i.e. in soil, freshwater, marine environment or snagged on trees or fences.<sup>5</sup> When plastic bags break down into smaller pieces, they contribute to the accumulation of microplastics in the environment.

#### Australian litter scenario

Australia wide, lightweight plastic shopping bags make up around 1.6% of litter based on the number of items.<sup>6</sup> It was estimated in 2002 that 50 to 80 million plastic bags were littered each year, and 10 to 20 million are collected through clean-up activities, with 40 to 60 million

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<sup>5</sup> Verghese, K., The Sustainable Packaging Alliance Limited, 2009 Environmental impacts of shopping bags Report for Woolworths Limited

<sup>6</sup> Keep Australia Beautiful National Litter Index 2013/2014, <http://kab.org.au/wp-content/uploads/2012/05/9980-KAB-NLI-Report-2013-14-for-web.pdf>

plastic bags permanently entering the environment each year.<sup>7</sup> The 2008 annual estimate for littered plastic bags was revised down to approximately 30 to 50 million plastic bags.<sup>8</sup>

Plastic waste accounts for up to 80% of all litter found in marine habitats,<sup>17</sup> and several studies show that marine debris are similar at the surface and at the seafloor (e.g. plastic bags, bottles and fishing gear).<sup>9</sup>

Litter entering the marine environments of Australia has been well documented. Research found the density of plastic in Australian waters is up to 40,000 pieces per square kilometre.<sup>10</sup> As plastic litter increases so does the risk of impacts to wildlife and ecosystems.

## NSW litter scenario

In NSW, litter is identified as an environmental issue and a community concern. The NSW triennial social research 'Who Cares about the Environment?' shows that litter and waste is included in the seven topics people feel is the most important environmental issue needing government action in NSW.<sup>11</sup>

The Keep Australia Beautiful *National Litter Index 2013/2014* ranks plastic as the third most littered item, and third by volume of litter. Plastics as a whole represent the greatest proportion of the volume of litter in the NSW and the national litter stream.<sup>12</sup> In 2006, the Keep Australia Beautiful *National Litter Index* ranked plastic bags as number eighteen of twenty of the most littered items counted in NSW.

## Environmental impacts of plastics

### Marine litter

Plastic at the beach and in marine environments pose risks to animals through ingestion and entanglement.<sup>13</sup> There is limited information about plastic bag specific impacts but evidence shows that entanglement in and ingestion of plastic has significant impacts on marine life.

#### a. Entanglement

Entanglement of seabirds and marine life in plastic debris is a serious issue impacting survival and can lead to asphyxiation and death.<sup>14</sup> Entanglement restricts movement impacting feeding and breeding of marine life, as well as causing injury and scar tissue

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<sup>7</sup> Nolan ITU/Hyder Consulting 2002 and 2007. Page 8. This equates to approximately 20% or less of the bags utilised in outdoor away-from home locations being littered, with a further 1/3 of the total litter stream coming from inadvertent litter sources through waste management activities, as data on the litter occurrence around landfills would infer. It is assumed that the vast majority of these bags would be HDPE bags.

<sup>8</sup> Hyder Consulting Pty Ltd, 2008 Plastic Retail Carry Bag Use 2006 and 2007 consumption. Page 26. This figure is based on two independent methodologies which generated estimates of a similar scale, which appears to indicate that the estimates are of an accurate scale.

<sup>9</sup> Galgani et al., 1995; Moore and Jones, 2000; Nagelkerken et al. 2001. In Ocean Conservancy Website; <http://www.oceanconservancy.org/> accessed 7 September 2015

<sup>10</sup> Reisser J, Shaw J, Wilcox C, Hardesty BD, Proietti M, et al. 2013, 'Marine Plastic Pollution in Waters around Australia: Characteristics, Concentrations, and Pathways', PLoS ONE, Vol. 8, Issue 11. Mean sea surface plastic concentration was around 4256.4 pieces per square kilometre.

<sup>11</sup> Office of the Environment and Heritage, 2012 2009 and 2006 Who Cares about the Environment?

<sup>12</sup> Keep Australia Beautiful National Litter Index 2013/2014, 2012/13

<sup>13</sup> Hardesty, B., Wilcox, C., Lawson, T.J., Lansdell, M., and van der Velde, T. CSIRO 2014 Understanding the effects of marine debris on wildlife.

<sup>14</sup> A. Carr. 1987. Impact of non-degradable marine debris on the ecology and survival outlook of sea turtles. *Marine Pollution Bulletin*, 18 (1987), pp. 352–356

impacts.<sup>15</sup> Inquisitive and playful mammals, such as seals, are at particular risk of entanglement in marine debris.<sup>16 17</sup> Such impacts are thought to play a role in declining populations of endangered and threatened species.<sup>17</sup>

## b. Ingestion

Ingestion of plastic impacts marine life feeding and can lead to malnutrition or starvation through false fullness and loss of body weight.<sup>18</sup> For birds, this can also present as blocked gizzards and an inability to feed chicks.<sup>19</sup> More broadly, the ingestion of plastic can damage internal organs, impact organ function (such as enzyme secretion) and lead to internal injury, block the intestinal tract and lead to death.<sup>20</sup>

The digestion of ingested plastic can lead to the absorption of plastic materials, such as plasticisers, polychlorinated biphenyls (PCBs) and persistent organic pollutants (POPs) that have adsorbed to the plastic in the environment. These chemicals have been shown to impact fauna endocrine functions, which has a wide range of impacts such as, lowered steroid hormone levels, delayed ovulation and reproductive failures, as well as impacts to metabolism and tissue functions.

It has been shown that the ingestion of plastic can also have impacts on the long- distance migration of sea birds.<sup>21</sup> There is thirty years of research evidence of turtles eating plastic shopping bags.<sup>22 23</sup> Plastic bags in the water look like one of turtle's natural food sources, jellyfish.<sup>16 24 25</sup> Young sea turtles are particularly at risk of eating plastic shopping bags and as a result impacting species populations.<sup>14 22 25</sup>

Twenty-six species of whales<sup>26</sup> and manatees have also been documented with injuries and death from blocked intestinal tracks and stomachs full of plastic packaging.<sup>15 27</sup> An Australian

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<sup>15</sup> D.W. Laist. 1987. Overview of the biological effects of lost and discarded plastic debris in the marine environment. *Marine Pollution Bulletin*, 18 (1987), pp. 319–326.

<sup>16</sup> R.H. Mattlin, M.W. Cawthorn 1986. Marine debris – an international problem. *New Zealand Environment*, 51 (1986), pp. 3–6.

<sup>17</sup> Derraik, J. G. The pollution of the marine environment by plastic debris: a review. *Marine Pollution Bulletin*. 2002, 44 (9)

<sup>18</sup> P.G. Ryan 1988. Effects of ingested plastic on seabird feeding: evidence from chickens. *Marine Pollution Bulletin*, 19 (1988), pp. 125–128. L.B. Spear, D.G. Ainley, C.A. Ribic. 1995 Incidence of plastic in seabirds from the Tropical Pacific, 1984–91: relation with distribution of species, sex, age, season, year and body weight. *Marine Environmental Research*, 40 (1995), pp. 123–146.

<sup>19</sup> M.Y. Azzarello, E.S. Van-Vleet. 1987. Marine birds and plastic pollution. *Marine Ecology Progress Series*, 37 (1987), pp. 295–303

<sup>20</sup> E.J. Carpenter, S.J. Anderson, G.R. Harvey, H.P. Miklas, B.B. Peck. 1972. Polystyrene spherules in coastal waters. *Science*, 178 (1972), pp. 749–750

<sup>21</sup> P.G. Connors, K.G. Smith 1982, Oceanic plastic particle pollution: suspected effect on fat deposition in red phalaropes. *Marine Pollution Bulletin*, 13 (1982), pp. 18–20

<sup>22</sup> G. Balazs. 1984. Impact of ocean debris on marine turtles: entanglement and ingestion. R.S. Shomura, H.O. Yoshida (Eds.), *Proceedings of the Workshop on the Fate and Impact of Marine Debris*, 27–29 November 1984, Honolulu, US Department of Commerce (1985), pp. 387–429 NOAA Technical Memorandum NMFS SWFC-54

<sup>23</sup> CSIRO: Britta Denise Hardesty, Chris Wilcox, TJ Lawson, Matt Lansdell and Tonya van der Velde, 2014 *'Understanding the effects of marine debris on wildlife'*.

<sup>24</sup> D. Gramentz. 1988. Involvement of loggerhead turtle with the plastic, metal, and hydrocarbon pollution in the Central Mediterranean. *Marine Pollution Bulletin*, 19 (1988), pp. 11–13.

<sup>25</sup> L. Bugoni, L. Krause, M.V. Petry. 2001. Marine debris and human impacts on sea turtles in Southern Brazil. *Marine Pollution Bulletin*, 42 (2001), pp. 1330–1334.

<sup>26</sup> R.W. Baird, S.K. Hooker. 2000. Ingestion of plastic and unusual prey by a juvenile Harbour Porpoise. *Marine Pollution Bulletin*, 40 (2000), pp. 719–720.

<sup>27</sup> C.A. Beck, N.B. Barros. 1991. The impact of debris on the Florida manatee. *Marine Pollution Bulletin*, 22 (1991), pp. 508–510.

example of these impacts can be seen in the crocodile caught at Magnetic Island in Queensland in October 2008. The crocodile died as a result of eating plastic bags, which had compacted in its stomach, meaning it was unable to digest its food. Its autopsy disclosed “25 plastic shopping and garbage bags, a plastic wine cooler bag and a rubber float in its stomach”.<sup>28</sup>

A recent review for the United Nations Convention on Biological Diversity documented over 600 species, ranging from microorganisms to whales, were affected by marine plastic waste, largely through ingestion.<sup>29</sup>

### c. Ecosystem

It has been demonstrated in a recent study of plastic bags accumulating on an intertidal shore near Dublin, Ireland, that these bags can rapidly alter marine assemblages and the ecosystem services they provide. The study also found that the alternatives marketed as ‘environmentally friendly’, such as degradable, bio-degradable and compostable bags have essentially the same impacts as traditional polyethylene plastic bags in intertidal areas, impacting ecosystem functioning and marine assemblages.<sup>30</sup>

Some marine plastics researchers have stated that degradable and other plastic shopping bag alternatives have minimal impact on reducing entanglement and ingestion as they do not quickly break down in a marine environment and still present as food to marine life.

### Trends

A recent Australian wide marine litter survey by the CSIRO found that 75% of marine litter items are plastics, and up to a third of the world’s turtles and 43% of seabirds have eaten plastics.<sup>23</sup> The same research found that 20% of wildlife entanglements are caused by plastics.<sup>21</sup>

New Australian research suggests that 90% of all seabirds alive today have eaten plastic of some kind.<sup>31</sup> Researchers predict that plastic ingestion will affect 99% of the world’s seabird species by 2050, based on current trends.<sup>32</sup> The impacts of plastic pollution are concentrated in areas that have high levels of plastic pollution and high levels of seabird diversity, such as the Tasman Sea at the boundary between the south-western Pacific and Southern Oceans, and in the south-western margin.<sup>31</sup>

## Consumption

Single use items have become more prevalent in recent years as producers and retailers respond and drive demand for convenience goods and packaging. This results in higher consumption of single use items, product acceptance and the development of social norms, such as the use of plastic shopping bags.

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<sup>28</sup> Queensland Government, Environment and Resource Management, Magnetic Island Crocodile Dies from Plastic Bag Ingestion, *Media Release*, 2 November 2008

<sup>29</sup> Secretariat of the Convention on Biological Diversity and the Scientific and Technical Advisory Panel–GEF (2012) *Impacts of Marine Debris on Biodiversity: Current Status and Potential Solutions* (Secretariat of the Convention on Biological Diversity, Montreal), CBD Technical Series No. 67.

<sup>30</sup> Green D, Boots, B., Blockley, DJ, Rocha, C. and Thompson, C. (2015) Impacts of discarded plastic bags on marine assemblages and ecosystem functioning. *Environmental science and technology* 49, 5380-5389

<sup>31</sup> Wilcox, C., Van Sebille E., and Hardesty B. CSIRO 2015 Threat of plastic pollution to seabirds is global, pervasive and increasing. *Proceedings of the National Academy of Sciences*. Page 4

<sup>32</sup> Thiel, M., Hinojosa, I., Vásquez, N. and Macaya, E. Floating marine debris in coastal waters of the SE Pacific (Chile). *Mar. Pollut. Bull.* 2003, 46 (2), 224–231 Page 225. Plastic bags by far outnumbered other items (47.6%) followed by other plastics (34.7%). Plastic lines or other fishing related debris only made up 3.6% of FMD [floating marine debris]. Page 229, in coastal waters of the SE-Pacific plastic bags were by far the most abundant items.

Single use items can play a beneficial role, but by their nature, have a very short useful life span. Anti-plastic bag campaigns often quote the lifespan of a plastic bag to be 12 minutes, which considering the resources used to create and transport plastic bags, is really short. Many Australians see plastic shopping bags as a very visible reminder of unnecessary resource use.<sup>33</sup>

In 2004 it was estimated that over 6.9 billion new plastic shopping bags were consumed in Australia, with six billion of these being HDPE and 900 million boutique bags.<sup>34</sup> The total plastic used in these two forms of plastic shopping bags equates to approximately 2% (36,850 tonnes) of total plastics produced in Australia each year. 6.67 billion, or 96%, of those plastic bags used in Australia are estimated to be disposed of to landfill.

Based on 2007 data, approximately 3.9 billion single use lightweight plastic shopping bags are used in Australia annually<sup>1</sup>. 2.96 billion (75%) of these are estimated to come from supermarkets and the others from fast food restaurants, liquor outlets, convenience stores and other retailers.<sup>2</sup> Given population, consumption and the end of the retailer's Plastic Bag Code of Practice, which was designed to reduce plastic bag use, plastic bag consumption figures are likely to have increased over time.

The recycling rate of plastics bags in NSW is only 14%.<sup>35</sup> This means the plastics are not being used efficiently, as bags are not entering the material re-use streams in line with the waste hierarchy. However, 86% of Australians said they recycle or reuse plastic bags, and of these 10% used central collection points and 88% re-use bags around their homes.<sup>2</sup>

HDPE is manufactured from ethylene, a by-product of gas and oil refining. Around 80% of HDPE bags consumed in Australia are imported from south-east Asia, where the primary source of polyethylene is oil. The primary hydrocarbon source for HDPE bags produced in Australia is natural gas.<sup>36</sup>

A 2011 United Kingdom life-cycle assessment of single use and re-usable bags demonstrated that the environmental impact from the use of all shopping bags is 'dominated by the resource use and production stages. Transport, secondary packaging and end-of-life management generally have a minimal influence on their performance'.<sup>37</sup> There is potential that transport of bags may play a more significant role in an Australian life-cycle assessment. This assessment demonstrated that the reuse of HDPE and other lightweight bags is critical to their environmental performance and that the recycling or composting of bags generally produces only a small reduction in global warming potential and abiotic depletion.

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<sup>33</sup> National Environment Protection Council, Hyder, 2008 Decision Regulatory Impact Statement – Investigation of options to reduce the impacts of plastic bags

<sup>34</sup> Smith, S. NSW Parliamentary Library Research Services. 2004. Plastic Bag Briefing Paper 5/04 NSW Parliamentary Library Research Services

<sup>35</sup> Australian Government Department of the Environment website, <http://www.environment.gov.au/node/21324>, accessed 20 October 2014.

<sup>36</sup> Zero Waste South Australia. O-Farrell.K. Hyder Consulting. 2009 LCA of shopping bag alternatives,

<sup>37</sup> Environment Agency (UK) 2011. Life cycle assessment of supermarket carrier bags: a review of bags available in 2006.

The table below demonstrates a key finding of the assessment, ‘whatever type of bag is used, the key to reducing the impacts is to reuse it as many times as possible and where reuse for shopping is not practicable, other reuse, e.g. to replace bin liners, is beneficial’.

Bag type	Number of reuses required for life cycle equivalence with a HDPE bag
Paper bag	3
LDPE bags (boutique bags)	4
Non-woven polypropylene (green bag)	11
Cotton bags	131

An Australian life-cycle impact assessment for four different types of bags is summarised in the table below using a rating of one to five.<sup>36</sup>

Bag Type	Material consumption	CO <sub>2</sub> equivalent	Energy consumption	Water use	Litter marine Impacts	Litter aesthetics
HDPE	◆◆◆	◆◆	◆◆	◆	◆◆◆◆◆	◆◆◆◆◆
LDPE	◆◆◆◆	◆◆	◆◆◆	◆	◆◆◆◆◆	◆◆◆◆◆
Paper	◆◆◆◆◆	◆◆◆◆◆	◆◆◆◆◆	◆◆◆	◆	◆◆◆
Non-woven Polypropylene (green bag)	◆	◆	◆	◆	◆◆	◆

These studies demonstrate that while paper bags may be preferable to HDPE or LDPE (boutique) bags from a litter perspective, their production leads to significant resource consumption and carbon-dioxide emissions.

## Recycling contamination

Plastic bags are recognised as one of the most common contaminants in kerbside recycling. Material recovery and recycling facilities in NSW are not currently equipped to recycle plastic bags from the kerbside recycling stream. Residents are actively encouraged to place plastic bags and other soft plastics in the general waste destined for landfill.

There are retailer drop-off points at major stores in urban areas for the recycling of soft plastics, including plastic shopping bags. Used plastic bags are collected and recycled into plastic products such as benches, plastic timber and pipes.<sup>38</sup>

There is no literature available on the detrimental effects of plastic bags in recycling infrastructure at material recovery facilities (MRFs), transfer stations and other facilities in the Australian or NSW context. However, these facilities are not designed to recycle soft plastics, suggesting plastic bags do have an impact on their operations. There is historical and ongoing anecdotal evidence from the recycling industry that plastic bags are a major issue for facilities. Plastic bags in kerbside recycling streams can damage sorting machinery and cause machines to break down. For example they wrap around drive shafts and conveyors and can cover air in-takes of engines and air extractors.

In Washington USA, the Environment Washington Research and Policy Centre has documented the detrimental effects that mixing plastic bags with commingled recyclables has on recycling operations. In a survey they conducted in 2012, 70% of Washington recycling companies wanted plastic bags out of the waste stream. Some recycling plants in Washington estimate spending 20 to 30% of their labour costs removing plastic bags from their machinery – in the order of US\$1000 per day.<sup>39</sup> Reducing the level of plastic bag contamination should improve the recovery of materials, particularly commingled recyclables such as plastics, paper and cardboard.

Plastic alternatives to traditional polyethylene bags contribute to the same machine impacts and contribute to product quality issues when recovered materials are used to make new products. For example, recycled plastic pipe can contain holes and defects if biodegradable plastics have entered the recycling stream.

The inclusion of biodegradable plastics in commercial composting may confuse consumers, resulting in increased contamination rates with non-degradable types of plastic. Plastic films can interfere with the processing of organic material by becoming entangled in shredders and other processing equipment. Even if a bag meets the Australian Standard for composting, if disposed into home based composting, it is highly possible that the bag will fail to achieve the heat or moisture levels required to trigger degradation.<sup>40</sup>

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<sup>38</sup> Information on plastic bag collection points can be found at <http://www.recyclingnearyou.com.au>

<sup>39</sup> Krehbiel, Robb. Environment Washington Research and Policy Centre, 2012. A Solution not in the Bag: Why Recycling Cannot Solve the Plastic Bag Problem in Washington.

<sup>40</sup> Hyder Consulting 2009, LCA of Shopping Bags alternatives (prepared for Zero Waste South Australia) at p6

## 4. Australian experience with plastic shopping bags

This section sets out the Australian responses to, and the community's concern regarding the impacts of plastic shopping bags.

### Commonwealth Government reviews

The analysis of the environmental impact of plastic bags and actions to reduce litter consumption and environmental impacts has been conducted a number of times in Australia. The report *Plastic shopping bags- Analysis of environmental impacts and levies* was prepared for Environment Australia, Department of Environment and Heritage in 2002,<sup>41</sup> followed by supplementary assessment reports and the 2007 consultation document *Regulatory impact statement (RIS) Investigation of options to reduce the environmental impacts of plastic bags*<sup>42</sup>.

The RIS identified that under the models assessed 'regulatory options for a phase-out [of plastic shopping bags] had economic costs which significantly outweighed the environmental benefits'.<sup>43</sup> In 2008, the Environment Protection and Heritage Council (EPHC) determined 'they would not endorse uniform regulatory action at this time to ban or place a charge on plastic bags'<sup>43</sup>

### Australian Retailers Plastic Bag Code of Practice

Major retailers agreed to a voluntary Plastic Shopping Bag Code of Practice in 2002 in order to reduce plastic shopping bag use by 50%. The Code operated from 2003–05 and led to a reported significant reduction of plastic bags issued by supermarkets at the time, however, this trend is likely reversing. Further information on this Code of Practice is contained in the Options section of this paper.

### Community concerns

In the seven years since the 2008 Federal Government decision the community has continued to have concerns about plastic shopping bags. There is increased scientific evidence of the type and breadth of environmental impacts of plastic, particularly within the marine environment. It has been estimated that plastic shopping bag consumption has increased due to population growth, pervasiveness of plastic shopping bags, the end of the Australian Retailers Plastic Bag Code of Practice and a lack of national action to address these concerns.

Australians still feel that impacts of plastic bags require action from government. In 2005 a Newspoll found that 81% of the Australian public support a ban. A 2008 Victorian survey conducted as part of a plastic bag levy trial, found that 86% of surveyed customers supported initiatives to reduce plastic bag use.<sup>44</sup> A 2015 NSW poll found that 64% of respondents support a total bag ban in supermarket and stores.<sup>45</sup>

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<sup>41</sup> Environment Australia, Nolan ITU 2002 Plastic Shopping Bags – Analysis of Levies and Environmental Impacts

<sup>42</sup> Environment Protection and Heritage Council (working party), 2008, Decision Regulatory Impact Statement (RIS): Investigation of Options to Reduce the Impacts of Plastic Bags.

<sup>43</sup> Website of the former Standing Council on Environment and Water (incorporating the National Environment Protection Council <http://www.scew.gov.au/resource/ephc-archive-product-stewardship>)

<sup>44</sup> Australian Retailers Association, KPMG (2008) Trial of government and industry charge on plastic bags – report of findings.

<sup>45</sup> [https://d3n8a8pro7vhmx.cloudfront.net/boomerangalliance/pages/121/attachments/original/1439341231/plastic\\_bag\\_poll.png?1439341231](https://d3n8a8pro7vhmx.cloudfront.net/boomerangalliance/pages/121/attachments/original/1439341231/plastic_bag_poll.png?1439341231) Accessed 19 August 2015

Many of the motives for action on plastic bags that have been outlined previously remain valid today. The issues and concerns about plastic bags include that they are:

- given away for free in large numbers
- designed as a single use or disposable product
- not essential to product integrity
- create visual and environmental litter impacts
- are persistent in the environment
- easily replaced by other transportation materials and methods
- not currently widely accepted into the kerbside recycling system
- the use and litter of plastic bags have a high level of community concern<sup>46</sup>.

In NSW the EPA, the Minister for the Environment and other members of Parliament have received numerous form letters from the campaign run by *Plastic Bag Free NSW*. This campaign calls for a ban on plastic bags within NSW. The campaign website indicates 587 emails have been sent to MPs, and 833 to the Premier.<sup>47</sup> *Plastic Bag Free NSW* was one of ten environmental organisations that delivered a petition to ban single use lightweight plastic bags in NSW. The petition was signed by 12,472 people and supported by some Government MPs. Supporters of this action include environmental groups and concerned citizens:

- Clean Up Australia
- Take 3
- Australian Seabird Rescue
- Lane Cove Sustainability Action Group
- Two Hands Project
- Save the Styx
- Tangaroa Blue Foundation
- Ecodivers
- Ocean Guardians
- Community Environmental Network
- Ocean and Coastal Care Initiative (OCCI)
- Lake Macquarie Sustainable Neighbourhood Group
- Positive Change for Marine Life
- Leichardt City Council.

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<sup>46</sup> Environment Australia, Nolan ITU 2002 Plastic Shopping Bags – Analysis of Levies and Environmental Impacts, p 3

<sup>47</sup> Clean Up Australia, Plastic Bag Free NSW, <http://plasticbagfreensw.squarespace.com/> Accessed 16/9/15

## Regulatory Initiatives

Councils within NSW have also shown support for taking action on plastic bags. Four towns in NSW have banned plastic bags in 2003 and 2004, including Huskisson, Kangaroo Valley, Mogo and Oyster Bay.

Plastic bags have been banned in four jurisdictions in Australia: South Australia, Northern Territory, Australian Capital Territory and Tasmania. The objectives cited for plastic bag regulations across jurisdictions cover a variety of aspects including;

- diverting more waste from landfill
- reduce litter and the associated adverse impacts on marine and terrestrial environment and aesthetics
- satisfy community expectations for government intervention
- address the market failure associated with plastic bag usage
- use plastic bag regulation as an awareness raiser for other environmental issues
- deter the use of plastic bags by consumers and
- promote a shift toward the use of reusable bags by customers.

The plastic bag bans in Australia are based on the South Australian (SA) ban which was the first State or Territory in Australia to implement a ban on plastic bags. The *Plastic Shopping Bags (Waste Avoidance) Act 2008* came into effect on the 4 May 2009 and is the main piece of legislation that regulates this ban.

Under the *Plastic Shopping Bags (Waste Avoidance) Act 2008*:

- a plastic shopping bag is defined as a carry bag, the body of which comprises (in whole or part) polyethylene with a thickness of less than 35 microns, and includes handles
- exemptions include biodegradable bags (compliant with Australian Standard 4736-2006), and a plastic bag that constitutes, or forms an integral part of, the packaging in which goods are sealed prior to sale
- no handle barrier bags (e.g. used for fruit and vegetables) and boutique bags such as department store bags, can still be used
- a retailer commits an offence if they provide a plastic shopping bag to a customer as a means of carrying goods purchase, or to be purchased, from a retailer.

## 5. Overseas regulation of plastic shopping bags

The impact of plastic shopping bags has received significant attention from regulators in jurisdictions outside Australia. Governments have taken action to ban the sale of lightweight shopping bags, or impose a charge or tax on the use of plastic shopping bags. Voluntary measures have also been adopted to reduce plastic shopping bag use and impacts.

This includes the following:

### North America

There is no national plastic bag ban or charge in USA or Canada. However, California has passed a bill to ban single use plastic bags from 2016, and over 100 counties or municipalities have plastic bag bans or charges.

### Europe

There have been a number of initiatives in Europe to reduce plastic bag consumption, including:

- a European Commission directive requiring member states to take action to reduce the consumption and use of plastic bags less than 50 microns thick (see further discussion in Options section of this paper)
- Denmark, Germany and Ireland have plastic bag taxes
- Italy bans distribution of plastic bags that are not from biodegradable sources
- Wales, Scotland and Northern Ireland recently introduced a minimum charge of 5 pence for almost all single use bags (including paper and biodegradable bags)
- England introduced a minimum charge of five pence for most single use plastic bags (not paper or biodegradable bags) on 5 October 2015

## 6. Scope of options

### Objectives

In section 2 of this paper, we identified litter, consumption and recycling contamination as three major problems with the use of plastic bags.

The objectives for these options are as follows:

#### Objective for Litter

To reduce the environmental impacts of plastic bag litter in NSW or Australia.

#### Objective for Consumption

Reducing consumption and increasing re-use and recovery. Additional objectives, such as increasing the use of re-useable bags or recycling of plastic bags, would further support this objective.

#### Objective for Recycling Contamination

Eliminating or reducing the amount of plastic bag contamination in kerbside recycling bins.

### Analysis of options

Sections 6 to 9 set out a range of options to address these problems. A description of each approach, the information required to complete a full assessment of the option, and case studies of similar actions in other jurisdictions are outlined. The options in this paper are presented in the context that they are all focussed on changing consumer, retailer and community behaviour.

The options are presented as follows:

- **Section 6 – Options to address all objectives (litter, consumption and recycling contamination):** This section sets out five options which are designed to address all of the objectives (litter, consumption and recycling contamination).
- **Section 7 – Litter specific options:** sets out three options which are specific to the litter objectives.
- **Section 8 – Consumption specific options:** sets out one option which is specific to the consumption objectives.
- **Section 9 – Recycling contamination options:** sets out two options which are specific to recycling contamination.

The intention of the paper is that multiple options that could be implemented concurrently should be considered. This approach ensures a better outcome as the combination of actions promotes the efficient use of government resources, is representative of the complexities of plastic bag use, addresses all identified problems, reduces social and environment impacts of plastic bags and minimises the likelihood of perverse outcomes.

Options are summarised in the executive summary of this paper, where one regulatory action could be combined with appropriate incentives or barriers and as many educational programs as appropriate.

## Impacts of options

Each option has a range of potential impacts. However, this paper does not assess each impact. Further analysis, after discussion with stakeholders would be required to assess impacts that may result from implementation of any of the options.

The following general impacts need to be considered:

- Any decrease in plastic shopping bag litter, disposal to landfill or contamination in recycling bins resulting from any of these options would have financial and resource benefit to local government, and indirectly to State and Federal Government.
- Any regulatory requirements would require compliance and enforcement agencies such as local councils and the relevant State authorities to ensure responsible parties are fulfilling their requirements.
- Government would also require resources to develop legislation, associated assessments, working groups, consultation, implementation, education and behaviour change campaigns. Government would also initially and continually have to demonstrate the effectiveness of any legislative scheme.
- Any restriction on availability of plastic shopping bags or requirements to label plastic bags may lead to:
  - financial impact on retailers, who may pass on costs to consumers
  - disproportionate impacts on small and medium sized retailers
  - reduced convenience and choice for consumers
  - disproportionate impacts on a household's primary shopper (generally women), elderly and mobility impaired individuals
  - increased purchase of bin liners
  - associated demand on resources and infrastructure to manufacture alternative carrying bags.
- Any change to kerbside recycling or bin infrastructure would require introducing new infrastructure and associated education and behaviour change campaigns.

## Limitations

This paper presents some of the available information and evidence of the environmental impacts of plastic shopping bag litter, consumption and contamination of kerbside recycling.

It is essential that development of any of the options presented in this paper includes information gathering, economic and legislative assessments, social research into behaviours and attitudes of stakeholders, and consultation with stakeholders, including retailers and community.

With all options, there needs to be an assessment of the effectiveness of these at a State and Commonwealth level. Specific objectives for action should be developed and information gaps must be filled.

Each option presented in this paper includes an indication of the further information required to complete a full assessment. Information gaps have been identified in assessment of environmental impacts is required, such as:

- current Australian and state litter data collected with transparent methodology provided to all states and territories
- information about the impacts of plastics and micro plastics on soil, land-based plants and animals, and ecosystems
- up-to-date data on Australian and state plastic bag consumption, re-use, recycling and plastic shopping bag waste to landfill
- completion of a kerbside recycling contamination assessment.

## 7. Options to address all objectives

This section outlines approaches that address all three objectives.

1. **Litter:** reducing the environmental and social impacts of plastic bag litter.
2. **Consumption:** reducing consumption of plastic bags and increasing use of reusable alternatives.
3. **Recycling contamination:** eliminating or reducing the amount of plastic bag contamination in kerbside recycling bins.

### Status quo

This option is taking no additional action. It relies on the existing measures to address the impacts of littering, unnecessary consumption and recycling contamination.

Currently the EPA and councils are taking action on littering through:

- a. the NSW Government's Waste Less, Recycle More initiative
- b. the *Hey Tosser!* litter prevention campaign
- c. introducing public reporting of littering from vehicles
- d. providing training and support for council enforcement officers or rangers
- e. conducting and commissioning research to gain insights into littering behaviour and prevention actions as well as developing NSW's first *Litter Prevention Strategy*.<sup>48</sup>

In September 2015, the Premier announced his priorities for NSW, including a commitment to reduce the volume of litter by 40% by 2020.<sup>49</sup> Initiatives under this goal could be included as status quo. Council and EPA officers would maintain current enforcement practices, such as issuing fines and notices for littering.

This option includes no additional action to address consumption and relies on the current programs, run by councils to reduce plastic bag contamination in kerbside recycling bins.

It is likely that with no action the consumption of plastic shopping bags will continue to rise, the increase of 'environmentally friendly' lightweight bag alternatives will continue (oxo-degradable, biodegradable and compostable) and the environmental impacts from plastic bags and recycling contamination will continue.

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<sup>48</sup> Waste Less, Recycle More initiative is a five year \$465.7 million package to transform waste and recycling in NSW. The initiative includes grant programs of \$20 million for litter prevention grants and \$58 million for combating illegal dumping. These programs operate over four years and are currently in the second year of running.

NSW launched the *Hey Tosser!* litter prevention campaign in 2014. This mass media campaign targets a number of littering behaviours and the key messages were developed with councils. Campaign information and materials are available in the EPA website at [www.epa.nsw.gov.au/litter/hey-tosser.htm](http://www.epa.nsw.gov.au/litter/hey-tosser.htm).

In February 2015 EPA launched a new online portal for public reporting of littering from vehicles. The EPA can issue a penalty notice for littering from a vehicle based on the information received in reports from members of the public who are 18 or over. Information about reporting littering, registration instructions and an animated clip outlining the new reporting process can be seen here [www.epa.nsw.gov.au/litter/from-vehicle.htm](http://www.epa.nsw.gov.au/litter/from-vehicle.htm).

The EPA provides training for enforcement officers (often council rangers) and provides insights into littering behaviours based on research commissioned by the EPA.

In addition to these actions, EPA is currently developing NSW's first *Litter Prevention Strategy*. This will be made available for public comment.

<sup>49</sup> Baird, M. 2015. Premier's priorities. <http://www.nsw.gov.au/making-it-happen>

Due to the growing scientific evidence we have on the impact of plastic in the environment, and increasing levels of community concern with the expectation of action, it is unlikely that no additional actions under this option will be publicly accepted.

## **Ban on bags**

Four Australian jurisdictions have already introduced bans on HDPE plastic bags: South Australia, Northern Territory, Australian Capital Territory and Tasmania.

A ban would apply to the defined plastic bag or group of bags at all retailers distributing bags. This would include supermarkets, service stations, convenience stores, takeaway food outlets and other retailers.

There are a number of options for the application of a ban on plastic shopping bags, as follows:

### **Ban on HDPE bags**

This ban option would apply to HDPE bags only. This option has been excluded from the final list of options as it would move the impacts of plastic bags from primarily HDPE bags, to the substituted bags, such as lightweight (recycled content degradable bags and compostable bags) and boutique bags. Previous experience has shown that retailers will replace HDPE bags with another alternative.

### **Ban on lightweight bags**

This ban option includes all HDPE bags and lightweight bags, such as recycled content, degradable and compostable bags. This ban option is expanded to include the 'environmentally friendly' alternatives as it has been shown that they have essentially the same impacts on plants and animals as traditional polyethylene plastic bags.<sup>50</sup>

### **Ban on all handled plastic carry bags**

The inclusion of a ban option including all handled plastic carry bags (HDPE, lightweight bags and boutique bags) reflects learning from the South Australian plastic bag ban that saw an increase in the use of boutique bag use and boutique bag litter. This ban would exclude re-usable plastic bags such as green bags.

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<sup>50</sup> Green D, Boots, B., Blockley, DJ. Rocha, C. and Thompson, c. (2015) Impacts of discarded plastic bags on marine assemblages and ecosystem functioning. *Environmental science and technology* 49, 5380-5389

## Further information required

Before a plastic bag ban can be considered an appropriate cost benefit analysis must be completed, with accurate costing of environmental impacts of plastic shopping bags.

Additional information would be required if a ban was considered:

- cost-Benefit-Analysis
- if a State ban was introduced, a Constitutional assessment is required, and requirements of the *Mutual Recognition Act 1992*, including other State and Territory approval, would need to be met
- regulatory impact statement
  - legal framework
  - economic modelling
  - predicted impacts and effectiveness
- impacts of plastic bag alternatives
- social research on the community's attitudes and consultation

### **Example: South Australia plastic bag ban**

Under the South Australian plastic shopping bag ban a plastic shopping bag is defined as a carry bag, the body of which comprises (in whole or part) polyethylene with a thickness of less than 35 microns, and includes handles.

Exemptions to this include biodegradable bags (and a plastic bag that constitutes, or forms an integral part of, the packaging in which goods are sealed prior to sale. This also means the use of no handle barrier bags (used for fruit and vegetables) and boutique bags can still be used.

If a retailer is found guilty of providing a plastic bag under the definition, a maximum penalty of the offence is \$5,000, and if a person misrepresents the composition of a supplied plastic shopping bag, the maximum penalty is \$20,000.

The plastic bag ban in South Australia has resulted in a 45% reduction in HDPE plastic shopping bags in the litter stream in South Australia\* there has been one breach of the ban in the first three years and research indicates that 80% of shoppers support the ban\*\*

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\*Keep Australia Beautiful National Litter Index 2011/2012

\*\*Aspin, M. 2012 Review of the Plastic Shopping Bags (Waste Avoidance) Act 2008.

## Education

Education campaigns can be effective when run concurrently with other tools to provide information and change behaviour. It is well known that educational or information based campaigns do not change behaviour without additional actions to remove barriers to behaviour change.<sup>51</sup> The education campaigns presented here should be considered in addition to the regulatory, economic, incentives and barrier options in this paper. These campaigns can be tailored to suit the objectives for each problem.

It should be noted that this option requires the consumer and industry to make a decision based on their environmental conscience. This does not take into account other factors that may impact choice such as physical mobility, convenience, remembering to bring a reusable or bag alternative, cost, and personal views and beliefs.

The EPA has experience and success with the design, development and implementation of multi media campaigns that target specific behavioural problems. Any campaigns should use traditional and digital media, including social media and be determined by knowledge, attitude and behavioural research.

The campaign could be targeted to locations and behaviours at the point of sale and specific locations. Councils and government agencies could promote the campaign at information days and events. It could be targeted at both consumers and retailers to achieve maximum effectiveness.

Education campaigns focused on each identified problem are outlined below.

### Education – Litter prevention

A behaviour change driven educational campaign specific to littering of plastic shopping bags under the existing and highly visible *Hey Tosser!* program could be developed. The aim of the campaign would be to reduce the number of plastic bags littered.

The campaign could include specific images of, and references to plastic shopping bags, not solely HDPE or lightweight bags, in educational material. However, as the litter data indicates there are more HDPE and lightweight bags in the NSW and Australian litter streams, the focus would be predominantly on these bags (including bags from supermarkets, small businesses, convenience stores and takeaway outlets).

### Education – Consumption

This option is an education campaign targeting consumption of plastic bags. The aim of the campaign would be to raise awareness of resources used to make and transport plastic bags, as well as the very short life span of single use products. The campaign would also promote the re-useable bags, and could encourage the re-use of plastic bags.

### Education – Recycling contamination

There is still some confusion in how households and businesses should separate plastics for recycling. By providing education to support both householders and businesses to separate plastics for recycling, this will help boost recovery rates and overall diversion of plastics (including plastic bags) from landfill. The education campaign could be carried out in conjunction with an education campaign about consumption of plastic bags.

To better inform and target any future education campaigns, it would be necessary to conduct social research on recycling practices, as attitudes to recycling and other factors

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<sup>51</sup> D McKenzie-Mohr 2014, *Fostering Sustainable Behaviour – An introduction to Community-based social marketing*, New Society Publishers

such as demographics and cultures fluctuate over time. It is important that recycling remains a priority in the community and education efforts need to be targeted and adjusted to adapt to current social trends.

To determine the extent of plastic bag contamination in commingled kerbside recycling it would be necessary to undertake further research to quantify and determine the proportion of plastic bags in commingled recyclables and food and garden organics.

### Further information required

Additional information would be required if an education campaign is developed, such as:

- understanding the number of types of bags littered in specific locations
- complete knowledge attitudes and behaviour research
- determine which platforms reach which audiences
- develop the campaign strategies, planning and production
- complete feasibility assessment, including urban versus regional benefits

#### **Example: *Hey Tosser!* litter prevention campaign**

In 2014 the NSW EPA launched the *Hey Tosser!* litter prevention campaign. The campaign was developed to discourage littering, remind community about reporting litterers and to publicise littering fines. It was designed in consultation with reference groups and from extensive social research to determine the key messages. Educational materials include advertisements (e.g. on bus shelters), posters, stickers, television advertisements, digital banners and thumbnail images on social media.

The campaign uses a range of other tools to reduce littering, including encouraging increased reporting of littering from cars, increasing the perception of regulatory action and providing significant funding to councils to address littering.

While the education component of the campaign has cost the NSW Government approximately \$2.7 million so far, the annual number of littered items in NSW since commencement has decreased by 16% in comparison with the national average reduction of 4%, (Source: Keep Australia Beautiful, National Litter Index Annual Report 2014/15).

#### **Example: Bankstown City Council's Recycle Right Campaign**

After testing different education strategies, Bankstown City Council ran a successful campaign in 2010 to reduce contamination in the kerbside commingled recyclables stream. After auditing their bins, council officers provided personalised feedback to residents in their mailboxes, identifying the materials that were incorrectly placed in the recycling bin. The feedback focused on simple messaging and the use of imagery such as sad and happy faces, depending on the household's performance. Ongoing contamination was followed up with a written pledge to be signed by the resident promising to place only recyclables in their yellow lid bin.

This was an innovative and successful initiative, with a reported 30% reduction in recyclables contamination across Bankstown City Council's local government area.

## Environmental warnings or labelling

This option is a mandatory plastic bag labelling and or product warning to inform consumers of plastic bags about the environmental impacts of plastic bags. Product labels and warnings can be an effective way to provide information to the consumer on either litter, consumption, or recycling contamination. Plastic bags would be required to have messages and images about facts and figures relating plastic bag litter and pollution.

Product warnings are well established as an effective communications strategy for mitigating health and environmental impacts of certain products or materials. For example, dangerous goods labelling, safety data sheets and consumption guidelines. Environmental warnings for packaging materials can also be seen in small 'responsible disposal' symbols and words on packaging at the brand owner's choice. For examples of environmental warnings and labels see Figures 1 to 4.

### Further information required

Additional information would be required if a mandatory labelling system was developed.

- scoping and feasibility assessments to determine legislative ability, design, effectiveness and final application of the system
- constitutional assessment
- regulatory impact statement
  - legal framework
  - economic modelling
  - predicted impacts and effectiveness
- consultation and working groups with external and internal stakeholders
- social research to determine the most effective messaging and images to be used.

Figure 1: Mediterranean Association to Save the Sea Turtles



Figures 2 & 3: Marine entanglement images



Figure 4: Take 3 campaign poster



## 8. Litter specific options

This section sets out options to address the objective of reducing environmental impacts of littered plastic bags. These options are being considered separately to the previous options as these focus solely on reducing litter and the environmental and social impacts of litter.

### Environmental warnings and plastic bag litter cost recovery

This option includes mandatory plastic shopping bag labelling and a cost recovery system. The system would require mandatory plain brand labelling of shopping bag i.e. the same black brand or retailer name on white bag, to link the bag to retailers and striking environmental warnings about the dangers of littered bags, similar to health warnings on cigarette packaging. For examples of potential environmental warnings for plastic bags see Figures 1–4.

This option would require ongoing periodic litter collections and audits. Plastic shopping bags would be collected counted and categorised into brand or retailer categories. The categorisation will be used to issue retailers or brand owners with clean-up costs recovered via new fees or penalties covered by pollution of land or pollution of waters offences under the *Protection of the Environment Operations Act 1997*.<sup>52</sup> A national system may require additional legislation or adoption of the program using state pollution offences.

This system allows flexibility for retailers to choose their response to the potential financial costs, such as educating customers about plastic bag litter, choosing to stop giving out plastic bags or charging a fee for plastic bags meaning the retailers can determine their impacts to a degree. Retailers may choose to use adhesive labels rather than changing manufacturer and distributor arrangements for bags.

The system may have disproportionate impacts on small and medium business, so retailers or brand owners could be split into categories for participation or clean-up cost groups i.e. profit based categories. Alternatively the system could be introduced in stages, starting with the smallest or largest distributor of plastic shopping bags.

### Further information required

Additional information would be required if a mandatory labelling system with litter cost recovery system was developed:

- scoping and feasibility assessments to determine legislative scope, design, effectiveness and final application of the system
- consultation and working groups with external stakeholders
- social research to determine the most effective messaging and images to be used.

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<sup>52</sup> *Protection of the Environment Operations Act 1997*. Clause 42A and 120

## **Example: Cigarette health warnings and plain packaging**

### *Health Warnings*

Health warnings are required on all tobacco product packaging for retail in Australia. The graphic health warnings provide a strong and confronting message to smokers about the harmful health consequences of tobacco products. These graphics and warnings are intended to increase consumer knowledge of health effects relating to smoking, to encourage people to quit smoking.

The Department of Health and Ageing has policy responsibility for the health warnings, while the Competition and Consumer (Tobacco) Information Standard 2011 (the Standard) is administered within the Treasury portfolio and enforced by the Australian Competition and Consumer Commission, in collaboration with the State and Territory fair trading agencies.

Health warnings have appeared on tobacco product packaging in Australia since 1973. It started with just one health warning 'Warning – smoking is a health hazard', and has since increased over time to the current layout. The current layout is a variety of health warnings that cover 30% of the front, and 90% of the back of cigarette packets and cartons.

### *Plain packaging*

Since December 2012, all tobacco products within Australia must be in plain packaging. The objective of this is to reduce the appeal to young people, increase the noticeability of the health warnings, and to contribute to efforts to reduce smoking rates.

### *Effectiveness*

According to the National Drug Strategy Household Survey 2013, daily smokers aged 14 years and over have halved from 1991 (24.3%) to 2013 (12.8%). Between 2010 and 2013, there has been a statistically significant decrease in percentage from 15.1% to 12.8%.

Recent figures from the Australian Bureau of Statistics show that consumption of tobacco has reached the lowest value ever recorded at \$3.405 billion, compared to \$5.135 billion in 1959.

## Recycling incentive scheme

This option is a scheme to encourage people to recycle plastic shopping bags. The scheme could offer cards, tokens or points for the return of plastic bags for recycling at retailer locations. Retailer participation would be determined by the number of plastic bags provided to consumers and would be mandatory for those with higher numbers. The aim of the scheme is to provide an incentive for people to not litter plastic shopping bags or to pick up littered plastic shopping bags.

The scheme would include all plastic shopping bags, lightweight and boutique bags. While lightweight plastic shopping bags are more highly represented in the litter stream it would be more efficient to apply the incentive scheme to all plastic shopping bags to avoid increased littering of bags not captured in the scheme.

### Further information required

Additional information would be required if a recycling incentive scheme system was developed. Significant examination is required to determine the feasibility and practicality of this option, including:

- willingness to pay research
- feasibility and scoping investigations
- social research on behaviour and attitudes around plastic bag litter
- analysis for perverse outcomes.

### Example: South Australian container deposit scheme

South Australian container deposit scheme was introduced in 1977. The scheme focuses on the 'polluter pays' principle. If someone discards an empty container they lose the right to the refund and someone else would benefit by picking it up and collecting that refund.

South Australia's container deposit legislation is contained within Part 8 Division 2 of the *Environment Protection Act 1993*. The EPA is the regulator of the scheme and ensures that the refund is made available for the person returning the empty container to the collection depot and that the empty containers are collected for recycling or reuse. However, the EPA has no direct involvement in the collection of the deposits or the recycling of the material which is the responsibility of industry.

In 2013–14 nearly 583 million containers or over \$58 million in refunds to the community were returned to collection depots, representing around 45,000 tonnes of containers that may have otherwise ended up as litter or landfill. The container deposit scheme also provides a financial benefit to community groups, sporting clubs and charities that collect empty containers for refund. In 2012–13 nearly \$60 million was refunded to the community.

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[Container deposits](#)

## Bin design and litter infrastructure funding

This option would provide support and funding from government for improved bin and litter infrastructure, better bins, more bins, recycling collection points, better and more litter fences at waste and resource recovery sites to reduce these litter sources.

Better bin design can prevent wind and animals spreading litter and therefore reduce environmental impacts of litter. There is existing bin and fence design that could be used to reduce litter. In addition new bin and infrastructure design could be explored.

More broadly, there may also be opportunities for bin and infrastructure design to address other problem litter items, such as cigarette butts, resulting in broader benefit to the environment and human health.

This option could be implemented as national funding with funding rounds managed by each state. For example, NSW could run this funding under the *Waste Less Recycle More* initiative. Community, regulatory agencies and councils could nominate sites or areas that would benefit from better infrastructure, and community, Council and facility operators could submit applications for funding to install bins and infrastructure.

NSW EPA has experience in this type of funding program and has seen success with reduced litter and better bin use behaviour from funded programs. This option will require resources of government or independent body to support the program.

### Further information required

Additional information would be required if a funding scheme was developed:

- investigation into the effectiveness to meaningfully reduce plastic shopping bag litter, opportunities for improved bins and infrastructure and funding amounts
- behaviour based research on a local level to determine the best approaches for each site, and to identify barriers to appropriate disposal.

#### **Example: NSW Waste Less Recycle More – Litter Prevention Grants Program**

The *NSW Waste Less, Recycle More* provides \$20 million for litter prevention. This includes two related grant programs to target littering hotspots and the materials that most contribute to littering in NSW. The first is Grants for Council Litter Prevention projects, and the second for Community Litter Grants. These grants are administered by Keep NSW Beautiful in partnership with the NSW Environment Protection Authority (EPA).

Projects supported by the EPA's Litter Prevention Grants Program combine enforcement, infrastructure and education. They also make use of the *Hey Tosser!* creative materials and Local Litter Check resources. This funding is supported by NSW's first litter prevention strategy, which will set out actions and timeframes to achieve NSW's ambitious litter reduction targets for 2021.

Case studies of Councils' projects to prevent litter in NSW, funded by the EPA, can be found at: [NSW EPA Council Litter Prevention Grants](#)

## 9. Consumption specific options

This section sets out potential options to address the objective of reducing consumption of plastic bags. As with all options, there needs to be consideration of effectiveness on a state and national basis.

### Product stewardship program

A product stewardship program for plastic bags could operate either as a national program through the Australian Packaging Covenant or under the National Environment Protection Measure (Used Packaging). It could also be adopted as a voluntary or mandatory scheme under the *Product Stewardship Act 2011*.

The Australian Packaging Covenant option would mean state and territories would have to agree to the inclusion of plastic bags under the packaging covenant. The National Environment Protection Measure (Used Packaging) option would require development of national legislation, introducing state based targets in state legislation and consequences for providers of plastic bags for not meeting targets. Either option could be staged in approach to first address HDPE shopping bags and then expand to other bags after two years. This option could be expanded for the inclusion of single use materials over time.

### Further information required

Additional information would be required if a mandatory or voluntary product stewardship scheme was to be developed, including:

- scoping and feasibility assessments to determine legislative ability, design, effectiveness and final application of the system
- consultation and working groups with external stakeholders
- social research to determine the most effect messaging and images to be used.

**Example: EU Directive to reduce the consumption of lightweight plastic carrier bags**

In April 2015 the European Commission approved a directive requiring member states to take action to reduce the consumption and use of plastic bags less than 50 microns thick. This was done via amendment to the Packaging and Packaging Waste Directive.

This requires member states to reduce use of plastic bags, with an initial threshold of 90 bags per person per year by 2019, followed by 40 bags in 2025. Some member state will meet this targets with current actions while other have more work to do. This method is flexible and means states can choose their approach to reduce plastic bag use. The introduction of a compulsory charge for single-use plastic bags is popular.

**Example: Industry education campaign – Plastic bag Code of Practice (Australia)**

A voluntary Code of Practice was agreed to by major retailers in 2002 in order to reduce plastic bag use by 50%. The Code operated from 2003–05 and resulted in a reported 45% reduction in the annualised rate of HDPE plastic bags issued by supermarkets (Source: Australian National Retailers Association Ltd. Working Towards Continual Environmental Improvement: Report to the Chairman Environment Protection and Heritage Council – 22 May 2006).

Educational initiatives included commitments to make multiple use/green bags and comprehensive customer information on these bags available in stores. It also included offering customers easily accessible and clearly identified recycling stations in major supermarkets and in shopping centres, targeted supermarkets, and conducted campaigns to enlist supermarkets and small retailers to adopt the Code.

Since 2005 and the end of the Code, the number of plastic bags has increased and continues to rise. The results of the Code demonstrate the effectiveness of intervention strategies (whether voluntary or mandatory) in driving behaviour change at the point of sale.

## 10. Recycling contamination specific solutions

This section sets out potential options to address the objective to reduce the impact of recycling contamination caused by plastic bags. With all options, there needs to be consideration of effectiveness on a State and national basis.

### Expand kerbside recycling for plastic bags

While material recycling facilities and transfer stations in NSW are not currently suitable for recycling plastic shopping bags, there are five councils in NSW where plastic shopping bags are accepted in the kerbside recycling bin. These are Armidale-Dumaresq, Lismore, Cooma-Monaro, Inverell and Richmond.

Residents in these local government areas are encouraged to collect their plastic bags, bag them and place them in the yellow commingled recycled bin with other recyclables. These are then pulled out of the stream manually at waste facilities so they can be diverted and recycled separately at facilities that are purpose-built to recycle soft plastics. Christchurch City Council in New Zealand and some local government areas in Victoria offer the same service. These service could be expanded across NSW with Government intervention such as infrastructure/ operational funding for targeted education campaigns, local governments and communities.

During a trial of kerbside recycling for plastic bags in Darebin Victoria, participant material recycling facilities reported that the value of the collected plastic would cover the additional sorting labour costs if the price paid for sorted flexible plastics remained above \$150 to \$200 a tonne<sup>53</sup>. This would make this solution highly dependent on soft plastics markets and a purchase commitment for local government and industry.

Therefore, before this option can be considered, it would be necessary to undertake a feasibility study of kerbside recycling of soft plastics that examines the practicability of including this material in the commingled recyclables stream. A study and accompanying trial would be vital in evaluating the practicality of kerbside collection of flexible plastics using a bag for aggregation as it is done in the five NSW councils mentioned above.

The goal of this study would be to identify the quantity and quality of material collected from households and the rate of participation. This would enable an understanding of what households generate and will divert through the kerbside system if soft plastics were included in the commingled recycling bins.

Any study should also include a consideration of the markets available in NSW for the sale of recycled soft plastics and consequences on staffing and processes at material recycling facilities.

### Further information required

Additional information would be required to provide a collection service using the existing kerbside collection system:

- feasibility study of kerbside recycling of soft plastics.

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<sup>53</sup> Sustainable Resource Use, 2013. Feasibility trial of kerbside recycling of consolidated flexible plastics. City of Darebin, Victoria.

### **Example: City of Darebin, Victoria: Feasibility trial of kerbside recycling of consolidated flexible plastics**

In 2013, the City of Darebin in Victoria conducted a feasibility study of kerbside recycling of plastic bags, conducting a trial where residents were asked to bag their plastic bags and place them in the commingled recyclables bin. The trial was conducted over 20 weeks during the middle of 2012 from June to October and it included 900 households. The participant material recycling facilities placed additional staff to pick and sort the plastic bags received at their facilities. Findings of the study include:

1. A large number of householders are prepared to sort and present a wide range of flexible plastic packaging through their kerbside recycling bin.
2. There were no collection impact issues identified and proper sorting at the material recycling facilities meant there was no impact on collection contracts or equipment.
3. There was a 90% recovery rate for flexible plastics achieved with moderate labour involved.
4. The major challenge is to ensure a favourable market pull for mixed waste plastics.

## **Public and retailer bins for recycling bags**

NSW currently has practical ways to reduce the impacts of littered plastic bags in the environment, including use of drop-off points to recycle HDPE and boutique bags that are now available at many major stores in metropolitan areas.

Used plastic bags and other soft plastics are collected and recycled into plastic products such as benches, plastic timber and pipes. However, there does not appear to be a culture or social norm of returning unused plastic bags to these collection points for recycling.

Expanding this network of recycling points would provide an additional service for NSW residents to recycle plastic bags. However, before an expansion of this network can be considered, it would be necessary to undertake a feasibility study and social research on the community's awareness and use rate of this collection points.

There is no literature available on the effectiveness of this 'take-back' scheme in NSW, however a similar scheme in California appears to have been minimally effective in increasing the recycling of plastic bags, with a study estimating an increase of only 2%<sup>54</sup>.

The scheme in its current form is beneficial, even if there is a small increase in recycling rates for plastic bags. However, it does not appear to be an effective scheme in isolation. Keeping this scheme or expanding it should be done in conjunction with other initiatives to keep plastic bags out of the commingled recyclables stream.

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<sup>54</sup> Huus, K. 2008. "Battle of the Bags." Newsweek

## Further information required

Additional information would be required to provide a collection service using the existing kerbside collection system:

- feasibility study and social research on the community's awareness and use rate of these collection points.

### Example: Take-back bins in California

In 2006, the state of California adopted the State Law AB 2449, requiring retailers to deploy storefront take-back bins for plastic bag recycling.

There is some disagreement about the effectiveness of the program, however, officials were able to estimate how AB 2449 affected the recycling rate for plastic bags in California. They determined that the law was a failure. Even the most liberal estimate of the program predicted that after three years of implementation, take-back bins only increased the recycling rate for plastic bags by 2%. Officials stated that there was no noticeable change in plastic bag waste or litter as a result of the program.

## 11. Summary

Objectives identified in this paper to manage the impacts of plastic shopping bags include:

1. **Litter:** reducing impacts of littered plastic bags and plastics in the environment.
2. **Consumption:** reducing consumption of plastic shopping bags, and avoiding waste generation.
3. **Contamination in Recycling:** reducing impacts of plastic shopping bag contamination in recycling.

There are a range of options, both traditional and innovative, which have been presented in this paper. These options require additional research, assessment and scoping before a final determination can be made on the appropriate option(s).

It is important that any option adopted accurately defines which shopping bags are included and which retailers are affected by the proposed action, to ensure unintended loopholes, perverse outcomes or environmental impacts do not arise. An assessment of consumer needs and alternative options is also required to ensure an effective option is chosen. As with all regulatory decisions, choosing an action depends on which objective or problem we are seeking to address.