



Leading the Way Toward a Clean Ocean

Communities Around the World Take
Action Against Single-Use Plastic Bags



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Executive Summary

Our oceans are polluted with millions of tons of plastic trash. In the Pacific Ocean, plastic debris churns in a soup called the Great Pacific Garbage Patch – an area twice the size of Texas where plastic bits outweigh plankton. Plastic pollution persists for hundreds of years, and can kill turtles, seabirds and other marine animals.

Throw-away plastic bags are a significant part of the problem. **To reduce ocean pollution and protect the environment, more than 80 national and local governments across the planet have taken official action** to ban throw-away plastic bags or to establish fees or taxes on such bags.

State, county, and city governments in California should follow their lead and ban the use of plastic grocery bags.

Plastic bags contribute to the pollution of California's ocean and beaches.

- Californians use approximately 16 billion plastic bags per year – more than 400 annually per person.
- Less than 5 percent of plastic bags are recycled. Instead, they end up sitting in landfills, littering streets, clogging streams, fouling beaches, or floating out to sea.
- Plastic trash threatens ocean ecosystems. Sea turtles and other marine animals often mistake plastic bags for jellyfish and eat them, causing injury or death. In parts of the Pacific Ocean, including the Great Pacific Garbage Patch, plastic outweighs plankton by up to six times.

- The city of San Francisco estimated that the taxpayer cost to subsidize the recycling, collection, and disposal of plastic and paper bags amounts to as much as 17 cents per bag. Applied to California as a whole, that adds up to more than \$1 billion per year.

More than 80 national and local governments around the world have taken action to protect the ocean by reducing the use of plastic bags.

- At least 20 nations and 47 local governments have passed bans on distributing specific kinds of throw-away plastic bags, including the nations of Italy, Kenya, Mongolia, Macedonia, and Bangladesh; the states of Maharashtra, India and Buenos Aires, Argentina; and the cities of Karachi, Pakistan and Telluride, Colorado.
- Approximately 26 nations and local communities have established fee programs to reduce plastic bag use and/or increase the use of reusable alternatives, including Botswana, China, Hong Kong, Wales, Ireland, Israel, Canada's Northwest Territories, Toronto, Mexico City, and Washington, D.C.

Bans and meaningful fee programs effectively reduce plastic bag pollution.

- Bans and fee programs quickly reduce plastic bag distribution. Ireland, which in 2002 established a fee roughly equivalent to 28 U.S. cents per bag, saw plastic bag use drop by 90 percent within the first year. After Washington, D.C., implemented a much smaller 5 cent tax on plastic bags, the number of

bags distributed by food retailers fell from 22.5 million per month to 3.3 million per month. And the year after banning plastic bags at pharmacies and supermarkets in 2007, San Francisco businesses distributed 127 million fewer plastic bags, and cut overall bag waste reaching the city landfill by up to 10 percent.

Eleven city and county governments in California have taken successful action to reduce plastic bag pollution.

- Eleven California cities and counties have bans on plastic bags in effect, including Long Beach, Santa Monica, San Jose, San Francisco, and unincorporated Marin and unincorporated Los Angeles counties. Five of these communities, including Marin County and San Jose, have also authorized mandatory charges on paper bags to encourage citizens to use reusable bags.
- Two additional communities, Oakland and Manhattan Beach, passed bans that were later struck down after legal challenges by plastic bag manufacturers.

Much more progress can be made to reduce plastic pollution in the ocean and transform our throw-away culture.

- Education and recycling cannot keep pace with the generation of plastic bag pollution. Despite a 2006 law requiring retailers to place bag recycling bins in front of their stores, less than 5 percent of bags are recycled.
- To make a real impact, all California cities and counties should restrict the use of plastic bags, and advocate for similar action at the state level.

Introduction

Our oceans are an irreplaceable treasure. The Pacific Ocean, for example, is central to California's culture and our livelihood. Off the rocky coast of Big Sur, sea otters frolic and sea turtles feed on jellyfish. The largest mammals on earth, blue whales, migrate up and down our shores. Pods of thousands of dolphins play in the wakes of ships. Seabirds congregate on beaches and harbors, belting out their familiar cries. And beneath the waves, the seafloor is covered with corals as old as redwoods.

Our oceans are also an incredibly valuable part of our economy. The Pacific Ocean contributes an estimated \$43 billion and more than 400,000 jobs to California's economy, particularly in tourism and recreation.¹

Unfortunately, our oceans are also in trouble. Destructive overfishing, global

warming, habitat damage, and pollution are putting important marine ecosystems at risk. Many critical wildlife populations are in serious decline.

The problems facing our oceans are varied and complex, from our overdependence on fossil fuels to our careless use of natural resources. However, many of these problems can be traced back toward an unreasonable expectation that our oceans will be endlessly productive even as we use them as a trash receptacle.

To protect and preserve California's treasured ocean ecosystems for the long haul, we need to stop using ocean waters as a landfill. The most important way to accomplish this is to generate less trash.

Plastic bags – the throw-away kind you can pick up at many grocery stores –



Our oceans are an irreplaceable treasure and an important part of our economy. To protect ocean ecosystems for the long haul, we need to stop using ocean waters as a landfill and generate less trash.

are a good place to start. These bags help us move groceries for a few minutes, but they pollute our environment for hundreds of years. They represent a wasteful use of limited fossil fuel resources. Switching to reusable bags can cut down on the amount of plastic trash ending up in the ocean, and begin to raise public consciousness about the need to make our civilization more sustainable.

Banning plastic bags is an idea whose time has come. As this report shows, nations from Tanzania to Italy, and communities from Buenos Aires to Santa Monica, have taken action to reduce plastic bag pollution. While the list of policies covered in this report is not necessarily exhaustive, it does show the wide scope of action across the planet to protect our oceans, reduce litter, and use our natural resources more wisely.

“By joining these global communities in banning plastic bags, California has an opportunity to build on its reputation for environmental leadership.”

By joining these global communities in banning plastic bags, California has an opportunity to build on its reputation for environmental leadership. Each new county, city or town that takes action to reduce plastic bag pollution builds momentum towards a cleaner ocean for current and future generations.

Plastic Bags Pollute California's Beaches and Ocean

Millions of tons of plastic trash pollute our oceans, everywhere from the poles to the equator.² According to the United Nations Environment Programme, every square mile of ocean contains 46,000 pieces of floating plastic, on average.³

For example, one thousand miles off the California coast, more than 100 million tons of plastic garbage has concentrated in an area known as the Great Pacific Garbage Patch.⁴ Churned by ocean currents, this plastic trash spans an area twice the size of Texas.⁵ Within this area, plastic outweighs plankton by up to six times.⁶

Too much of this trash comes from items that we use for a short time and then discard. Throw-away plastic bags are a prime – and visible – example. Plastic bags are convenient, but they are also durable and buoyant. For a few minutes

of carrying groceries, the bags have the potential to contaminate the ocean environment for hundreds of years.

Every year, Californians throw away approximately 16 billion plastic bags.⁷ That adds up to more than 400 bags per person per year.⁸ In 2007, Los Angeles County estimated that county residents used about 600 bags per year.⁹ Less than 5 percent of these plastic bags end up recycled, despite the efforts of retailers to collect used bags in storefront bins, which are required by state law.¹⁰ Instead, the bags end up sitting in landfills, littering streets, clogging streams, fouling beaches, or floating out to sea. According to beach cleanup volunteers working with the Ocean Conservancy, plastic bags were the sixth-most common item found on beaches worldwide over 25 years of clean up events, accounting for 5 percent of all trash items.¹¹



Throw-away plastic bags are a visible example of the trash contaminating our beaches and ocean. Although used for only a short while, a plastic bag can last for hundreds of years in the environment.

Plastic Trash Threatens Ocean Ecosystems

Plastic trash harms the health of ocean ecosystems. More than 260 marine species have been found with plastic in their stomachs or tangled around their bodies – interfering with feeding, movement and reproduction, and causing injury and death.¹²

In June 2011, researchers at UC San Diego’s Scripps Institute of Oceanography published a study finding that nearly one in ten small fish collected in the middle of the Pacific Ocean had plastic in their bodies. The researchers estimated that fish are eating as much as 24,000 tons of plastic each year, and that the plastic enters the food chain through small fish.¹³

Plastic pollution kills turtles, seabirds and other marine animals. Sea turtles are

a particularly visible example of a marine animal threatened by plastic pollution. Sea turtles often mistake plastic bags for jellyfish and eat them.¹⁴ The bags can get trapped in the turtle’s digestive system, causing great harm. All seven species of sea turtle are in urgent danger of extinction.¹⁵

In March, 2011, a group of sea turtle scientists gathered in Hawaii to discuss the “ocean emergency” of plastic pollution.¹⁶ In a press release, Dr. Wallace Nichols of the California Academy of Sciences wrote:¹⁷

“Last year I counted 76 plastic bags in the ocean in just one minute while standing in the bow of our sea turtle research boat at sea in Indonesia. Sea turtles have spent the past 100 million years roaming seas free of plastic pollution, and are now sadly the poster animal for impacts of our throw-away society on endangered species.”

One study by Australian scientists, including Dr. Kathryn Townsend, found that nearly 30 percent of turtle mortality in the eastern Moreton Bay region was due to plastic debris consumption. Half of the plastic in turtle stomachs was thin plastic, like the kind

used to make plastic bags.¹⁸

To protect the sea turtle and the broader ocean ecosystem, many communities around the world have taken action to reduce or eliminate plastic bag pollution.

photo: Ron Prendergast, Melbourne Zoo



Sea turtles often mistake plastic bags for jellyfish and eat them, suffering harm.

Plastic Pollution Costs Our Economy, Too

Plastic pollution costs developing and industrialized nations up to \$1.3 billion annually, primarily by threatening fishing, shipping and tourism industries.¹⁹ In the United States, governments spend at least \$11.5 billion annually on litter collection, disposal and enforcement. Businesses bear almost 80 percent of this burden.²⁰ The city of San Francisco estimated that the cost to taxpayers of subsidizing the recycling, collection, and disposal of plastic and paper bags amounts to as much as 17 cents per bag.²¹ Applied across California as a whole, that likely adds up to more than 1 billion dollars per year.

Retailers spend hundreds of millions of dollars annually to provide single-use bags to customers. Supermarkets spend up to \$1,500 to \$6,000 a month to provide single-use bags to their customers at the check-out.²² Stores typically pay 2 to 5 cents per plastic bag; these costs are embedded in food prices which are then passed onto consumers.²³

Communities Across the World Have Taken Action to Reduce Plastic Bag Pollution

More than 80 national and local governments across the world have taken official action to protect the ocean by reducing the use of plastic bags. In their place, retailers are selling reusable bags, or bags made from compostable material.

Nations from Kenya to Mongolia, and local governments from Maharashtra, India to Rio de Janeiro, Brazil, have taken action to ban throw-away plastic bags. Dozens more, from Hong Kong to Ireland, have established fee programs to reduce plastic bag use or support more sustainable alternatives. Other nations and communities have established taxes on businesses that distribute plastic bags.

Bans on Plastic Bags

At least 20 nations and 46 local governments have implemented bans on distributing specific kinds of throw-away plastic bags.

Governments have had a variety of reasons to implement bag bans. Some communities enacted bag bans specifically to reduce ocean pollution – a rationale particularly common in communities whose economies depend upon whale watching and other forms of ocean tourism. Others chose to enact the policy to reduce litter. For example, the state of Maharashtra in India, where Bombay is located, banned plastic bags to prevent them from clogging storm drains and contributing to floods.²⁴

Policies that ban the distribution of plastic bags are the most effective at reducing plastic bag pollution. For example, the year after banning plastic bags at pharmacies and supermarkets in 2007, San Francisco businesses distributed 127 million fewer plastic bags, and cut overall bag waste reaching the city landfill by up to 10 percent.²⁵ And four months after Huntingdon, Canada, banned plastic bags, the owner of a grocery store reported that 82 percent of his customers brought their own bags, while the remainder chose paper.²⁶

Governments at the national, state and local level have created various types of plastic bag bans.

Nations

At least 20 nations have passed bans to reduce bag pollution, including:²⁷

Bangladesh	(2002)
Bhutan	(2005)
Botswana	(2007) ²⁸
China	(2008)
Eritrea	(2005)
Ethiopia	(2008)
France	(2010)
Kenya	(2008)
Italy	(2007)
India	(2002)
Macedonia	(2011) ²⁹
Mongolia	(2009) ³⁰
Papua New Guinea	(2009) ³¹
Rwanda	(2005)
Somaliland	(2005)
South Africa	(2003)
Taiwan	(2003)
Tanzania	(2006)
Uganda	(2007)
United Arab Emirates	(2011)

Local Governments Abroad

Additionally, more than 20 local governments outside of the United States have passed plastic bag bans, including:³²

Dahka, Bangladesh	(2002)
South Australia	(2008)
Northern Territory, Australia	(2011)
Loddon Shire, Victoria, Australia	(2005)
Corsica, France	(1999)
Paris, France	(2007)
Rio de Janiero, Brazil	(2009)
Buenos Aires, Argentina	(2008)
Leaf Rapids, Manitoba, Canada	(2007)
Eriksdale, Manitoba, Canada	(2008) ³³
Coldwell, Manitoba, Canada	(2008) ³⁴
Huntingdon, Quebec, Canada	(2008)
Hurghada, Red Sea Province, Egypt	(2009) ³⁵
Delhi, India	(2009)
Maharashtra, India	(2005) ³⁶
Himachal Pradesh, India	(2009) ³⁷
Chandigarh, India	(2008) ³⁸
Karachi, Sindh, Pakistan	(2006) ³⁹
Zanzibar, Tanzania	(2006)
Llandysilio, Wales	(2007)

photo: Istockphoto.com, user McIninch



Policies that ban the distribution of plastic bags or establish fees or taxes on such bags are effective at reducing plastic bag pollution, and encouraging the use of reusable bags.

photo: Environment California staff



Eleven city and county governments in California have plastic bag bans in effect.

Local Governments in the United States

Well over a dozen American communities outside of California have acted against plastic bags, including:⁴⁰

American Samoa	(2011)
Maui County, Hawaii	(2008)
Kauai County, Hawaii	(2009)
At least 30 coastal communities in Alaska, including Bethel	(2009) ⁴¹
Telluride, Colorado	(2011) ⁴²
Westport, Connecticut	(2008) ⁴³
Unincorporated Marshall County, Iowa	(2008) ⁴⁴
Outer Banks, North Carolina	(2009) ⁴⁵
Southampton Village, New York	(2011) ⁴⁶
Suffolk County, New York	(1998) ⁴⁷
Brownsville, Texas	(2011)
South Padre Island, Texas	(2011) ⁴⁸
Edmonds, Washington	(2009) ⁴⁹

Local Governments in California

Within California, 13 city and county governments have taken action to reduce plastic bag pollution, including the citizens of Fairfax, in Marin County, who enacted a bag ban by popular vote through a ballot initiative in 2008.⁵⁰ Legal challenges from plastic bag manufacturers ended up invalidating two of these laws, in Oakland and Manhattan Beach.⁵¹ Eleven areas currently have bag ban policies in effect, including:⁵²

Unincorporated Marin County	(2011)
Fairfax (Marin County)	(2008)
Unincorporated L.A. County	(2010)
Calabasas (L.A. County)	(2011)
Malibu (L.A. County)	(2008)
Long Beach (L.A. County)	(2011)
Santa Monica (L.A. County)	(2011)
San Francisco	(2007)
Unincorporated Santa Clara County	(2011)
Palo Alto (Santa Clara County)	(2009)
San Jose (Santa Clara County)	(2010)

These areas represent fully 10 percent of the population of California.⁵³

Fee Programs and Taxes

Approximately 25 nations and local communities have established fee programs to reduce plastic bag use or encourage reusable alternatives.

Fee programs and taxes can have multiple purposes. First, by establishing a price on disposable bags, governments can send a price signal to citizens to motivate different behaviors. For example, in 2002 the Republic of Ireland established a 15 Euro cent tax on plastic bags (roughly equivalent to about 28 U.S. cents per bag today), applied to consumers at the point

of sale. In the first year of this policy, consumers used 90 percent fewer plastic bags. The tax grew relatively less effective over time, so the nation increased the tax in 2007. Overall, plastic bags have gone from 5 percent to less than 0.25 percent of the waste stream.⁵⁴

Washington, D.C. provides another example. After the district implemented a much smaller 5 cent tax on plastic bags, the number of bags distributed by food retailers fell from 22.5 million per month to 3.3 million per month.⁵⁵ That is a decrease of more than 85 percent. This action translated into an observed decrease in plastic pollution in area rivers and streams. According to the Alice Ferguson Foundation, since implementation of the bag fee, river cleanup efforts have turned up 66 percent fewer plastic bags.⁵⁶

Fee policies can also reimburse shop owners for any added expense of policy compliance. For example, stores in unincorporated Los Angeles County must charge customers 10 cents for every paper bag provided. The store retains the revenue and can use it to cover the cost of providing paper bags or the cost of educating customers about reusable bags. These types of features can help plastic bag reduction policies win the support of retail businesses.

Fee programs and taxes can also provide funding for government programs. For example, Ireland uses the money from its bag tax for recycling programs, enforcement of solid waste laws, and other environmental priorities.⁵⁷

Some countries have both a ban on certain types of plastic bags, and fees on others. For example, China has banned disposable bags that fail to meet the durability standards necessary to be considered reusable. China then requires retailers to charge customers a fee to ob-

tain one of the more durable plastic bags, encouraging reuse.⁵⁸

Governments that have created fee programs or taxes applied to throw-away bags include:⁵⁹

Nations

Belgium	(2007)
Botswana	(2007) ⁶⁰
Bulgaria	(2011)
China	(2008) ⁶¹
Denmark	(1994) ⁶²
Hong Kong	(2009) ⁶³
Germany	(earlier than 2005) ⁶⁴
Ireland	(2002)
Israel	(2008)
The Netherlands	(2008) ⁶⁵
South Africa	(2003) ⁶⁶
Wales	(2011)

Local Governments Abroad

Northwest Territories, Canada	(2010)
Toronto, Ontario, Canada	(2009)
Amqui, Quebec, Canada	(2008) ⁶⁷
Mexico City, Mexico	(2009)
Andalucia, Spain	(2011) ⁶⁸

Local Governments in the United States

Washington, D.C.	(2009)
Montgomery County, Maryland	(2011)

Local Governments in California

In California, state law prohibits local governments from enacting fees applying to plastic bags (although outright bans are permissible).⁶⁹ However, several communities have established fees on alternative bags to direct consumer behavior.

For example, after San Francisco's plastic bag ban, critics noted that many people simply shifted to paper – another type of disposable bag with its own set of environmental problems.⁷⁰ In response, several California communities have established fees that apply to paper bags as a companion policy to a ban on plastic bags. These policies serve as a signal to encourage consumers to furnish and use their own reusable bags. These communities include:

Unincorporated L.A. County	(2010)
Marin County	(2011)
Calabasas (L.A. County)	(2011)
Long Beach (L.A. County)	(2011)
Santa Monica (L.A. County)	(2011)
San Jose (Santa Clara County)	(2010)

Telluride, Colorado enacted a similar fee policy to complement its plastic bag ban in 2011.⁷¹



By taking action to reduce the use of plastic bags, communities across California are making a real difference in the problem of ocean pollution.

Policy Recommendations

Nothing we use for a few minutes should end up polluting our oceans for hundreds of years. Items meant only for a single use provide dubious convenience, and a great deal of hidden cost. When we throw away something like a plastic bag, “away” may actually mean our beaches, our treasured ocean, or the belly of a whale.

To protect our oceans and conserve precious natural resources, our culture needs to shift away from its “throw away” mentality.

Californians are leaders when it comes to protecting the environment. By taking action to reduce the use of plastic bags, communities across California are mak-

ing a real difference in the problem of ocean pollution.

But there is much more to be done. Education and recycling efforts simply cannot keep pace with the generation of plastic bag pollution.

Every city and county government in California should enact its own policy to limit the use of throw-away plastic bags. Not only can these individual policies have a meaningful impact on their own, they will build momentum for other state and local governments to take similar action.

Ultimately, California’s actions can lead to a cleaner ocean for current and future generations.

Notes

1. J. Kidlow et al. National Ocean Economics Program. *California's Ocean Economy, Report to the California Resources Agency*, July 2005.

2. Allsopp, Walters, Santillo and Johnston, Greenpeace, *Plastic Debris in the World's Oceans*, 2006, available at www.unep.org/regionalseas/marinelitter/publications/docs/plastic_ocean_report.pdf.

3. United Nations Environment Programme, *Ecosystems and Biodiversity in Deep Waters and High Seas*, UNEP Regional Seas Reports and Studies No. 178, June 2006.

4. Kathy Marks and Daniel Howden, "The World's Rubbish Dump: A Tip that Stretches from Hawaii to Japan," *The Independent UK*, 5 February 2008.

5. Lindsey Hoshaw, "Afloat in the Ocean, Expanding Islands of Trash," *New York Times*, 9 November 2009. The U.S. National Oceanic and Atmospheric Administration notes that there is uncertainty about the definition and size of the Garbage Patch, but the bottom line is that "man-made debris does not belong in our oceans and waterways." National Atmospheric and Oceanic Administration, *De-Mystifying the "Great Pacific Garbage Patch"*, 13 June 2011, available at marinedebris.noaa.gov/info/patch.html#5.

6. Algalita Marine Research Foundation, *Research - North Pacific Gyre Plankton Sample Analysis '07-'08*, undated, downloaded from www.algalita.org/research/np_gyre_sample07-08.html on 7 June 2011.

7. Calculated. In 2008, California's waste stream contained 123,405 tons of plastic grocery and other merchandise bags. (California Integrated Waste Management Board, *California 2008 Statewide Waste Characterization Study*, August 2009.) According to the American Chemistry Council, cited by Heal the Bay and ABC News, 2,000 plastic bags weigh roughly 30 pounds. ("Paper or Plastic? Just the Facts," *ABC News*, 7 January 2006; Heal the Bay, *The True Cost of Single-Use Bags* (factsheet), August 2010.)

8. Based on the 2010 population of California of 37.254 million, per 2010 U.S. Census data.

9. Los Angeles County Department of Public Works, Environmental Programs Division, *An Overview of Carryout Bags in Los Angeles County: Staff Report to the Board of Supervisors*, August 2007.

10. According to the EPA's 2009 Municipal Waste Characterization Study, the recycling rate for plastic HDPE films (plastic bags, sacks, & wraps) was 6.1 percent. However, this statistic is likely artificially high because it includes all wraps and packaging, like "industrial stretch films" used in shipping, not just plastic bags. The recycling rate for plastic bags alone is probably closer to 1 to 5 percent, per note 9 and per U.S. Environmental Protection Agency, *2005 Characterization of Municipal Solid Waste*, Table 7. Moreover, years after the implementation of California's 2006 AB 2449, a law requiring in-store plastic bag recycling, the state still has not published data about the effectiveness of the program.

11. Ocean Conservancy, *Tracking Trash: 25 Years of Action for the Ocean*, 2011.

12. JGB Derraik, "The Pollution of the Marine Environment by Plastic Debris: a Review," *Marine Pollution Bulletin* 44: 842-852, 2002; D.W. Laist, "Impacts of Marine Debris: Entanglement of Marine Life in Marine Debris Including a Comprehensive List of Species with Entanglement and Ingestion Records," In: J.M. Coe & D.B. Rogers (Eds.), *Marine Debris: Sources, Impacts, and Solutions*, (Springer-Verlag, New York) 1997, pp. 99-140.

13. Tony Barboza, "Researchers Find Plastic in More Than 9% of Fish in Northern Pacific Ocean," *Los Angeles Times*, 1 July 2011.

14. Colette Wabnitz & Wallace Nichols, "Editorial: Plastic Pollution: An Ocean Emergency," *Marine Turtle Newsletter* 129, March 2010.

15. Wallace Nichols, California Academy of Sciences, *Our Plastic Food Chain -or- The Turtle Who Pooped Plastic* (press release), 22 March 2011, available at www.seaturtle.org.

16. See note 14.
17. See note 15.
18. Lexi Metherell, "Third of Turtles Killed by Marine Rubbish," *ABC News Australia*, 7 June 2011, available at www.abc.net.au/news/stories/2011/06/07/3237485.htm.
19. A. McIlgorm, HF Campbell, and MJ Rule *Understanding the Economic Benefits and Costs of Controlling Marine Debris in the APEC Region*, A report to the Asia-Pacific Economic Cooperation Marine Resource Conservation Working Group by the National Marine Science Centre (University of New England & Southern Cross University), Coffs Harbour, NSW, Australia, December 2008.
20. Mid-Atlantic Solid Waste Consultants for Keep America Beautiful, Inc., National Visible Litter Survey and Litter Cost Study, 18 September 2009.
21. City of San Francisco Dept of the Environment, Bag Cost Analysis, 18 November 2004.
22. Estimates from bag manufacturers and the Food Marketing Institute: J. Downing, "Free Grocery Bags Targeted for Extinction in California," *Sacramento Bee*, 25 August 2008.
23. See note 9.
24. Ramola Talwar Badam, "Maharashtra Bans Plastic Bags," *Rediff.com*, 24 August 2005.
25. Joe Eskenazi, "Baggage: The City's Politicos Made the Enviros Happy by Banning Plastic Bags, but Left Us with More Pollution and Cost," *SF Weekly*, 7 January 2009.
26. The Canadian Press, "Anti-Plastic Bag Movement Growing as Residents Adapt to New Laws," *CBC News Canada*, 21 April 2008.
27. These policies are not uniform. Some affect bags of certain thicknesses, or from certain types and sizes of retail outlets. The purpose of this report is to note the existence of bag ban policies in a variety of locations across the world, and not to compare the relative strengths and weaknesses of these policies. Unless otherwise noted, the sources for all bag ban policies and adoption dates are: State of Florida, Department of Environmental Protection, *The Retail Bags Report: List of Retail Bag Policies*, updated 28 January 2011, available at www.dep.state.fl.us/waste/retailbags/pages/mapsandlists.htm; and Jennie R. Romer, Esq., *PlasticBagLaws.org*, *Legislation*, downloaded from plasticbaglaws.org/legislation/ on 7 June 2011.
28. Johane Dikgang and Martine Visser, Resources for the Future, "Behavioral Response to Plastic Bag Legislation in Botswana," *Environment for Development Discussion Paper Series*, EFD DP 10-13, May 2010.
29. Free bags have been outlawed since 2009. Now all plastic bags will be banned by 2013. See Richard Higgs, "Balkan Republic of Macedonia Bans Plastic Bags," *Plastics and Rubber Weekly*, 4 February 2011.
30. United Nations, *Mongolia National Report on Sustainable Development for the 18th Session of the Commission on SD*, February 2010, available at www.un.org/esa/dsd/dsd_aofw_ni/ni_pdfs/NationalReports/mongolia/Full_text.pdf
31. "PNG Government Bans Plastic Bags," *Pacific Business Online*, 3 October 2009.
32. See note 27.
33. Rural Municipality of Eriksdale, *By-Law 07-2008*, 9 December 2008, available at www.eriksdale.com/data/policies/MicrosoftWord-BL_07_2008_PLASTIC_SHOPPING_BAGS1.pdf
34. Rural Municipality of Coldwell, *Notices: Elimination of Single Use Plastic Shopping Bags in the RM of Coldwell and Lud of Lundar*, 1 October 2008, available at www.lundar.ca/notices_detail.asp?ID=67.
35. "Hurghada Plastic Bag Ban - 'One Bag at a Time'," *www.blueotwo.com*, 27 April 2009.
36. Ramola Talwar Badam, "Maharashtra Bans Plastic Bags," *Rediff.com*, 24 August 2005.
37. Government of Himachal Pradesh, *Himachal Poised to Become Polythene Free from 15th August* (press release), 27 July 2009.
38. "Chandigarh (India) Bag Ban," *Plastic Free Times*, undated, downloaded from [plasticf/chandigarh-india-bag-ban](http://plasticfreetimes.com/~plasticf/chandigarh-india-bag-ban) on 8 June 2011.
39. Sindh Governor House, Islamic Republic of Pakistan, *Manufacture, Sale and Use of Plastic*

Polyethylene Bags Banned, 3 February 2006, available at www.governorsindh.gov.pk/pressrelease/news.asp?id=1325

40. See note 27.

41. According to the Florida DEP, at least 30 coastal communities in Alaska have banned bags to reduce litter and protect wildlife, including seals and salmon. Bethel: City of Bethel, Alaska, *Ordinance #09-12*, Passed 23 June 2009.

42. Karen James, "Telluride Is the First Community in Colorado to Ban Plastic Bags," *The Watch*, 7 October 2010.

43. Wendy Carlson, "Westport First in State to Ban Plastic Bags," *New York Times*, 26 September 2008.

44. Associated Press, "Iowa County Joins San Francisco in Bag Ban," *The Street.com*, 8 April 2009.

45. This policy is the only bag ban in the United States to date that was created by a state legislature. It only applies to the Outer Banks of North Carolina, so we grouped it with local government policies.

46. "Southampton Village Bans Plastic Bags," *CBS New York / Associated Press*, 28 April 2011.

47. Suffolk County, New York, *Suffolk County Code, Chapter 301, Food Labeling and Packaging Article II, Uniform Packaging Practices for Retail Food Establishments*, Adopted 29 March 1998, available at www.mindfully.org/Plastic/Suffolk-Co-NY-Ban.htm.

48. Lynn Brezosky, "South Padre Bans Single-Use Plastic Bags," *San Antonio Express-News*, 19 January 2011.

49. Lynn Thompson, "Edmonds First In State to Ban Plastic Grocery Bags," *The Seattle Times*, 28 July 2009.

50. Jennie R. Romer, Esq., PlasticBagLaws.org, *State and Local Laws: California*, downloaded from plasticbaglaws.org/legislation/state-laws/california-2/ on 7 June 2011.

51. *Ibid.*

52. *Ibid.*

53. Kirsten James, Heal the Bay, *Local Action Adds Up*, Presentation at the 5th International Marine Debris Conference, Honolulu Hawaii, 20-25 March 2011.

54. State of Florida, Department of Environmental Protection, *Retail Bags Report for the Legislature*, 1 February 2010; S. McDonnell, F. Convery & S. Ferreira, *The Irish Plastic Bag Levy - A Review of Its Performance Five Years On*, undated, available at www.webmeets.com/files/papers/EAERE/2008/294/Plastic%20Bags%20Irish%20Levy%20-%20EAERE%20PAPER%202008.pdf

55. Lauren Markoe, NRDC, "How D.C. Beat the Plastic Bag Lobby," *On Earth*, 11 November 2010.

56. As cited by: Surfrider Foundation, *Ban the Bag: Washington D.C., A Success Story*, downloaded from ww2.surfrider.org/dc/plastics.html, 27 June 2011.

57. See note 54.

58. Mary O'Loughlin, Fulbright Research Fellow, B.Y.O.B. (*Bring Your Own Bag*): *A Comprehensive Assessment of China's Plastic Bag Policy*, 17 February 2011, available at digitalcommons.law.umaryland.edu/cgi/viewcontent.cgi?article=1019&context=student_pubs

59. These policies are not uniform. Some fees and taxes apply to plastic bags. Others apply to paper bags as an added price signal complementing a ban on plastic bags. Some apply to consumers at the point of sale. Others apply to retailers upstream in the supply chain. The purpose of this report is to note the existence of these policies in a variety of locations across the world, and not to compare the relative strengths and weaknesses of these policies. Unless otherwise noted, the sources for all policies and adoption dates are: State of Florida, Department of Environmental Protection, *The Retail Bags Report: List of Retail Bag Policies*, updated 28 January 2011, available at www.dep.state.fl.us/waste/retailbags/pages/mapsandlists.htm; and Jennie R. Romer, Esq., PlasticBagLaws.org, *Legislation*, downloaded from plasticbaglaws.org/legislation/ on 7 June 2011.

60. See note 28.

61. See note 58.

62. Denmark also taxes wasteful packaging and waste delivered to landfills to encourage more sustainable use of resources by product manufacturers and retailers.

63. City of Hong Kong, *Product Eco-Responsibility Ordinance*, Ordinance Number 32 of 2008, July 2008, available at www.epd.gov.hk/epd/psb/files/PER_Ordinance_Eng.pdf.

64. Dan Magestro, "Plastic Bag Obsession," *The Lantern: Ohio State Student Newspaper*, 31 October 2005.

65. Heal the Bay, *List of Countries with Plastic Bag Fees and Bans*, 20 November 2009.

66. Johane Dikgang, Anthony Leiman and Martine Visser, University of Cape Town, *Analysis of the Plastic Bag Levy in South Africa*, Policy Paper 18, July 2010.

67. The Canadian Press, "Anti-Plastic Bag Movement Growing as Residents Adapt to New Laws," *CBC News Canada*, 21 April 2008.

68. "Andalucia Announced 10 Cent Tax on Plastic Bags from Jan 1," *TheReader.es*, 30 October 2010.

69. State of California, Public Resources Code, Section 42254, available at www.leginfo.ca.gov.

70. See note 25.

71. See note 42.