



Plastic Industry Awareness of the Ocean Plastics Problem

- Scientists became aware of the ocean plastics problem in the 1950s, and understanding of the nature and severity of the problem grew over the next decades.
- The major chemical and petroleum companies and industry groups were aware of the ocean plastics problem no later than the 1970s.
- Plastics producers have often taken the position that they are only responsible for plastic waste in the form of resin pellets, and that other forms of plastic waste are out of their control.

The use of plastics in consumer goods has been expanding exponentially since the late 1940s. Within years of that expansion beginning, observers began to document plastic pollution in the environment, including in the world's oceans. Plastic is a pollutant of unique concern because it is durable over long periods of time and its effects accumulate as more of it is produced and discarded.

As the problem of marine plastic pollution gains greater public attention, it is critical to begin investigating what industry actors — including manufacturers of plastic

resins and the fossil fuel companies supplying them with chemical feedstocks — have known about this problem and for how long. The remainder of this document presents a brief overview of the history of public and industry awareness of marine plastic pollution. Although this historical account is detailed, it is far from comprehensive, and additional research is forthcoming.

Early Accounts of Plastic Pollution

Researchers began to notice the dangers plastics presented to marine animals around the middle of

the twentieth century. Early observers concerned about marine plastics were specifically worried about marine animals becoming entangled in discarded fishing gear and other plastic wastes. As noted by the United States' National Oceanic and Atmospheric Administration (NOAA), “[p]rior to the 1950s much of the fishing gear and land-based disposables were made of biodegradable products such as hemp rope or paper bags.”¹ Once plastic became a preferred material for fishing gear, concerns grew that these materials, which don't break down quickly in the environment, would become entanglement threats. Their

concerns were correct: in a case-by-case analysis of turtle entanglement, NOAA's George Balazs notes that “[n]one of the cases occurred before the 1950's,” and nearly all have taken place since 1970.²

Despite the early focus on fishing gear, science and industry were also aware of other forms of plastic waste, including waste from land-based sources. Late in the 1950s, anecdotal reports also began to emerge of turtles ingesting bags and other plastics.³

Beginning as early as 1960, researchers discovered plastic in the gizzards and digestive tracts of sea birds,⁴ including petrels in New Zealand⁵ and Canada⁶ and puffins in the North Atlantic,⁷ among others.

In addition to the research into marine animals, another series of experiments were taking place to determine the nature, origins, and consequences of oceanic petroleum pollution. In 1973, the National Academy of Sciences sponsored a workshop on Inputs, Fates, and Effects of Petroleum in the Marine Environment. Although the primary focus of the workshop was on petroleum, studies of the ocean surface also revealed significant amounts of plastic debris.⁸ Moreover, because studies of marine tar included investigations into the microorganisms and toxins attached to the petroleum particles, some researchers examined what contaminants were attached to plastics as well. One paper notes, “In coastal waters, polystyrene spherules are abundant … Bacteria and polychlorinated biphenyls (PCB's) are found associated with these particles, and the particles are ingested by a number of aquatic organisms.”⁹ These studies provided early evi-

dence not only that plastics were accumulating in the oceans, but also that these plastics could serve as aggregators of other contaminants, making them more hazardous.

As the problem of marine plastic pollution gains greater public attention, it is critical to begin investigating what industry actors — including manufacturers of plastic resins and the fossil fuel companies supplying them with chemical feedstocks — have known about this problem and for how long.

Several of the studies in this workshop were funded or studied by scientists at Esso, Chevron, and the American Petroleum Institute. Their participation in this conference indi-

cates that the petrochemicals industry knew, or should have known, of the presence of plastic in such ocean surveys no later than 1973.

It is clear that the industry was not only aware of the environmental longevity of plastics, but was in fact touting that feature as a benefit.¹⁰ In 1973, E. S. Nuspliger of the Society of the Plastics Industry (SPI) argued in a letter to the editor that its non-biodegradable nature makes plastic “desirable material for sanitary landfills.”¹¹

The same year, the National Academy of Sciences convened another workshop to study ocean pollutants and later issued a report entitled *Assessing Potential Ocean Pollutants*.¹² Among the participants were representatives from DuPont, Dow, and Monsanto Chemical (now Eastman).¹³ The investigation into marine litter observed that “Plastic objects are prominent in reports of litter sightings although they are a



Uwe Schmid | www.niederrhein-foto.de via Wikicommons

1973 Letter to the Editor on Plastics from the Oil Industry*

Letters to the Editor

Brief letters—one or two pages—are more likely to be printed than are long ones, which may be cut.

PLASTICS IN THE ENVIRONMENT

On behalf of the plastics industry I would like to comment on several statements dealing with the environmental effects of plastics in the article “Recycling Solid Waste in Chattanooga” (R. Vredeveld and R. Martin 1973; *ABT* 35 [2] : 84).

The authors state, “Plastics are nonbiodegradable; they will remain in the landfills forever.” It is true that most plastics will not biodegrade; but it is that very quality that makes them especially suitable for sanitary landfills. Because they do not biodegrade, they do not produce polluting odors or gases. Nor do they contribute to the contamination of groundwater, as do decaying organic materials in improperly controlled landfills. In addition, plastics, like other nonbiodegradable matter, give greater stability to the land being filled, thereby vastly improving the possibilities of reclamation for building purposes. These very characteristics have caused sanitary officials to regard nonbiodegradable plastics as desirable material for sanitary landfills.

The article also states that incineration of plastics is “also a threat to the environment: when burned, plastics give off toxic fumes... On a citywide scale, this could have damaging effects on the population.” Much of the controversy concerning the supposed toxic fumes stems from the open burning of plastics, a method of incineration the plastics industry wholly condemns. Carbon dioxide in the form of black smoke is given off in these circumstances but is, of course, nontoxic. In a proper incinerator the black smoke is totally consumed inside the incinerator, thus releasing no black smoke at all. In properly operated incinerators plastics do not give off any fumes that state or federal standards deem harmful to man.

In reference to the comment concerning recycling as a source of revenue: the high thermal content of plastics, which aids in the burning of other refuse, such as wet garbage, grass, and leaves, can be and is being used as a source of electrical power.

E. S. Nuspliger
Public Affairs Council of the
Society of the Plastics Industry, Inc.
250 Park Ave., New York, N.Y. 10017

*See E. S. Nuspliger, *Plastics in the Environment*, 35(4) THE AMERICAN BIOLOGY TEACHER 230 (1973), available at <http://d30vo02hkysua.cloudfront.net/content/35/4/230.1.chemical-industry-reinvent-itself/>.

minor component of the total refuse generated.”¹⁴ Although the researchers acknowledged that there were not “widespread significant alterations in the marine system” *at the time of writing*, there could be significant effects if pollutants accumulated, and more research would need to be done.¹⁵ By 1973, the National Academy of Sciences had held two workshops, one with participation from the petroleum industry and one

with participation from key plastics manufacturers. Both revealed the significant presence of plastics in the marine environment. Although scientists were not yet describing the issue as a crisis, there were ample studies available to demonstrate that plastic debris was deleterious to the health of marine organisms and that the damage was accelerating. Still, in 1974, a member of the Council of the British Plastics Federation

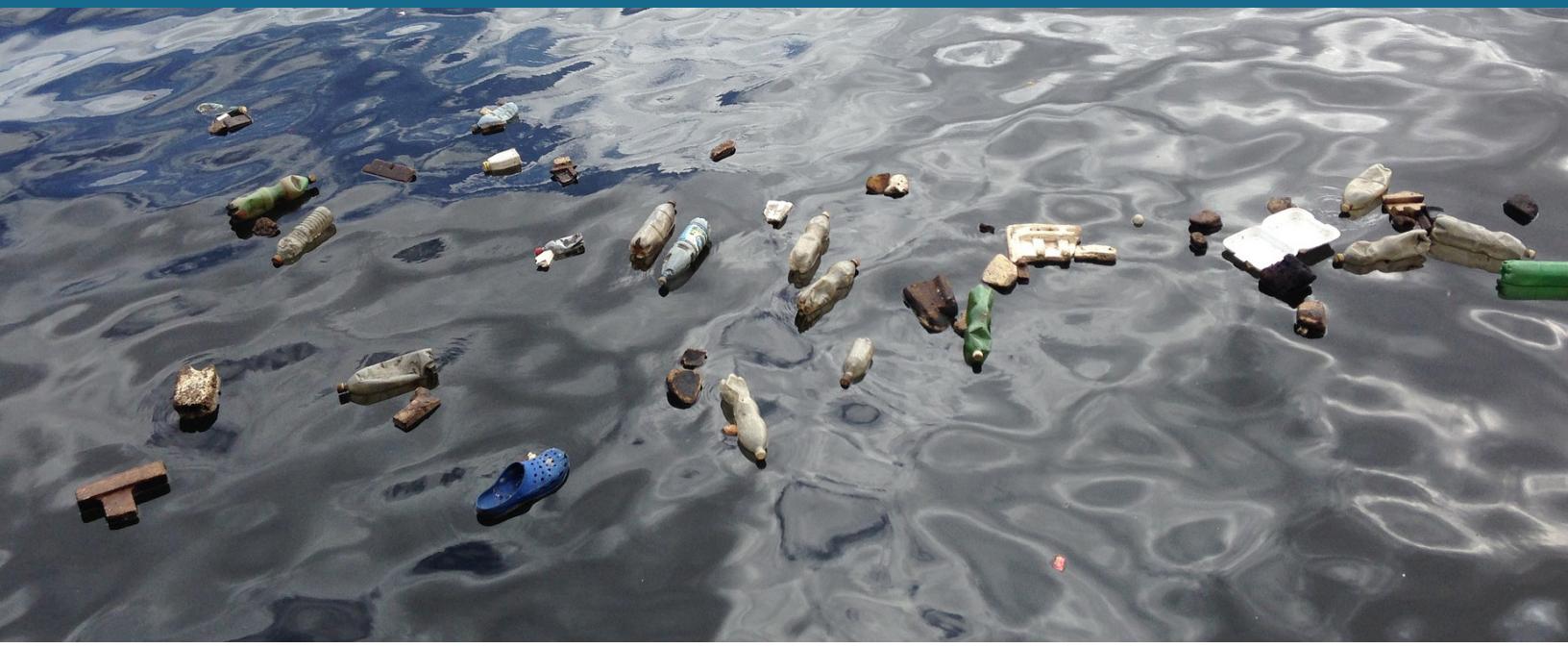
and a Fellow of the Plastics Institute claimed that “plastics litter is a very small proportion of all litter and causes no harm to the environment except as an eyesore.”¹⁶

The First National Conference on Packaging Wastes

In addition to questions of ocean plastics and marine litter, industry was concerned about waste issues generally. In September 1969, the University of California, Davis, held the First National Conference on Packaging Wastes.¹⁷ Conference participants included representatives from Dow, DuPont, Mobil, American Oil Company (AMOCO), Chevron, Stanford Research Institute, the Society of the Plastics Industry, and Procter & Gamble, among others.¹⁸ Unsurprisingly, plastic was a major focus of many of the presentations.

Thomas Becnel, of Dow Chemical, gave a presentation entitled “Wastes from Plastic Packages.”¹⁹ In it, he reiterated that the problems of plastic waste were endemic to the material itself, not the particular form of the product. “[I]t is ironic that the very molecular structure that has made [plastic] so popular creates certain disposal problems.”²⁰ Moreover, he acknowledged that landfills and dumps were impermanent solutions — “the problem is merely moved from one place to another” — and proposed incineration of plastic waste as the only viable solution to the problem.²¹

Other participants addressed issues of reusability and recyclability, pointing out repeatedly that the proliferation of single-use contain-



tkremmel/Pixabay

"In coastal waters, polystyrene spherules are abundant... Bacteria and polychlorinated biphenyls (PCB's) are found associated with these particles, and the particles are ingested by a number of aquatic organisms." (NAS 1973)

ers and the development of hard-or impossible-to-recycle materials were profit-seeking industry developments, and not the result of consumer demands.

Eric B. Outwater, an industry insider representing what appears to be an early industry front group,²² explained the trend away from deposit-type bottles. He noted that "each deposit-type bottle displaced from the market means the sale of 20 one-way containers."²³ This sentiment was echoed by another participant, Arsen J. Darnay. "The powerful motive force behind the development of the throw-away container market

is the fact that each returnable bottle displaced from the market means the sale of 20 non-returns."²⁴ Finally, Alfred Heller, of California Tomorrow, admonished the industry for "hiding behind the consumer ... and then declaring that the proliferation of packaging wastes is only a response to 'consumer demand.'"²⁵

Similarly, Outwater and Darney addressed the issue of multi-materials, packaging that contains more than one kind of material. Both presenters described multi-materials as nearly impossible to recycle, as "multi-materials make the economics [of] re-use virtually hopeless"²⁶ because these materials are "virtually unrecoverable after use."²⁷

Fights are currently raging in Asia over the use of sachets, small multi-material packages that are functionally impossible to reuse or recycle. It is worth taking a moment to reflect on that fact, given the unrecyclable nature of such products was known — and touted as a commercial advantage — nearly fifty years ago.

Public Coordination to Address the Problem

By the 1980s, the problem of marine pollution was becoming undeniable. In 1984, NOAA hosted the first Workshop on the Fate and Impact of Marine Debris.²⁸ Although no industry representatives are explicitly identified among conference participants, it is clear that by this point the industry was acutely aware of the need to manage plastic waste. A state wildlife official noted at the time that "the Society for the Plastics Industry has allocated \$5 million to establish a Plastic Recycling Foundation and Institute to aggressively pursue methods to make it economically feasible to recycle plastic in large quantities."²⁹ Moreover, she announced the industry was researching ways to produce plastics that degraded more quickly in the presence of ultraviolet light.³⁰

By the Second International Conference on Marine Debris in 1989, the Society of the Plastics Industry

(SPI) was an official participant.³¹ SPI took the position that almost all plastic pollution was “beyond the ‘control’ of the plastics industry,” but that SPI had a responsibility to deal with plastic resin pellets that might end up in the oceans.³²

The plastics industry has usually taken two parallel positions on the question of marine waste. First, it claims that it is only responsible for plastic resin pellets and flakes because end products are out of the industry’s control. Second, it promotes reuse, recycling, and proper waste management.

In 1985, SPI created the Center for Plastic Recycling and Research.³³ Eleven years later, in 1996, the Center was shut down due to discontin-

ued funding from the industry.³⁴ The closing was described as “an indicator of reduced support for recycling in the plastics industry.”³⁵ In 2016, at the inaugural “Our Ocean” Conference in Washington, DC, Dow Chemical announced that it would invest \$2.8 million to “increase the rate of recycling and reuse of plastics.”³⁶

Resin Producers Engage Downstream

Plastic shopping bags are ubiquitous and an easily recognizable symbol of plastic, but they are not often associated with the manufacturers at the beginning of the supply chain. However, the first plastic shopping bags in the United States were intro-

Both the fossil fuel and plastics manu-facturers were aware of the ocean plastics problem no later than the 1970s, and were involved in work-shops and conferences actively dis-cussing the issue and how to deal with it.

duced in 1976 by Mobil Oil (now ExxonMobil).³⁷

Recently, growing concern over the impact of disposable plastic bags has resulted in new taxes on single-use bags or full plastic bag bans.³⁸ The success and proliferation of these regulations have not been due to lack of opposition by the industry. On the contrary, industry organizations have fought aggressively to stymie such regulation.

The American Chemistry Council (ACC), which represents large petrochemical companies like ExxonMobil, Dow, LyondellBasell, SABIC, and others,³⁹ often leads fights against plastic bag regulations. During California’s 2007-2008 legislative session, the ACC led a group of seven major resin producers in a \$5.7 million spending campaign against plastic bag bans.⁴⁰ The group then spent over \$1.5 million in 2009 to overturn a bag tax in Seattle,⁴¹ and over two million dollars in 2010 when the California legislature was considering a statewide ban.⁴² These few examples demonstrate how resin makers at the beginning of the supply chain pay close attention to, and act to defend, the products their resins are used to produce.



The 5 Gyres Institute/Greenpeace



Conclusion

The scientific community became aware of the problem of marine plastics shortly after oil-based plastics came into widespread use after World War II, and awareness continued to grow throughout the 1960s and 1970s. Both the fossil fuel and plastics manufacturers were familiar with general plastic waste issues no later than the 1960s, and

they recognized the ways in which they contributed to the problem and the viability of different solutions. These industries were aware of the ocean plastics problem no later than the 1970s and then were involved in workshops and conferences actively discussing the issue and how to deal with it.

Originally, the plastics industry ignored the issue, claiming it was merely cosmetic. Now the industry acknowledges the problem, but resin producers promote reuse and recycling⁴³ while fighting local regulation of products made with their plastic.

Endnotes

1. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION MARINE DEBRIS PROGRAM, 2014 REPORT ON THE ENTANGLEMENT OF MARINE SPECIES IN MARINE DEBRIS WITH AN EMPHASIS ON SPECIES IN THE UNITED STATES 2 (2014), available at https://marinedebris.noaa.gov/sites/default/files/mdp_entanglement.pdf [hereinafter First Marine Debris Conference].
2. George H. Balazs, *Impact of Ocean Debris on Marine Turtles: Entanglement and Ingestion*, in PROCEEDINGS OF THE WORKSHOP ON THE FATE AND IMPACT OF MARINE DEBRIS, at 387 (1985), available at <http://www.st.nmfs.noaa.gov/tm/swfc/swfc054.pdf>.
3. See *id.*; Stephen E. Cornelius, *Marine Turtle Mortalities Along the Pacific Coast of Costa Rica*, 1975(1) COPEIA, at 186 (1975).
4. Peter G. Ryan, *A Brief History of Marine Litter Research* in MARINE ANTHROPOGENIC LITTER (M. Bergmann et al. eds., 2015), available at https://link.springer.com/content/pdf/10.1007%2F978-3-319-16510-3_1.pdf.
5. See P. C. Harper & J. A. Fowler, *Plastic Pellets in New Zealand Storm-Killed Prions (Pachyptila spp.) 1958-1977*, 34 NOTORNIS 100 (1987).
6. See Stephen I. Rothstein, *Plastic Particle Pollution of the Surface of the Atlantic Ocean: Evidence from a Seabird*, 75 CONDOR 344 (1973), available at <https://sora.unm.edu/sites/default/files/journals/condor/v075n03/p0344-p0345.pdf>.
7. See Ryan, *supra* note 4, at 4 (citing B. Berland,
- Piggha Og Lundfugl Med Gummistrik, 24 FAUNA, OSLO, at 35 (1971)).
8. See generally, NATIONAL ACADEMY OF SCIENCES OCEAN AFFAIRS BOARD, BACKGROUND PAPERS FOR A WORKSHOP ON INPUTS, FATES, AND EFFECTS OF PETROLEUM IN THE MARINE ENVIRONMENT (1973), available at <https://books.google.com/books?id=FD8rAAAAYAAJ&printsec=frontcover&dq=background+papers+for+a+workshop+on+inputs+fates+and+effects+of+petroleum+in+the+marine+environment&hl=en&sa=X&ved=0ahUKEwiG0oKis4LVAhXIWD4KHUW8BxkQ6AEIKDAA#v=onepage&q&f=false>.
9. *Id.* at 388.
10. See E. S. Nuspliger, *Plastics in the Environment*, 35(4) THE AMERICAN BIOLOGY TEACHER 230 (1973), available at <http://d30vo02hkyyusa.cloudfront.net/content/35/4/230.1>.
11. *Id.*
12. See NATIONAL ACADEMY OF SCIENCES, ASSESSING POTENTIAL OCEAN POLLUTANTS (1975), available at [https://books.google.com/books?id=eicQOgkswusC&printsec=frontcover&dq=inauthor:%22National+Research+Council+\(U.S.\)+Study+Panel+on+Assessing+Potential+Ocean+Pollutants%22&hl=en&sa=X&ved=0ahUKEwjThf-2tILVAhWHwj4KHYNxEAxQ6AEIKDAA#v=onepage&q&f=false](https://books.google.com/books?id=eicQOgkswusC&printsec=frontcover&dq=inauthor:%22National+Research+Council+(U.S.)+Study+Panel+on+Assessing+Potential+Ocean+Pollutants%22&hl=en&sa=X&ved=0ahUKEwjThf-2tILVAhWHwj4KHYNxEAxQ6AEIKDAA#v=onepage&q&f=false).
13. See *id.*
14. *Id.* at 423.
15. *Id.* at 430.
16. Jose G. B. Derraik, *The Pollution of the Marine Environment by Plastic Debris: A Review*, 44 MARINE POLLUTION BULLETIN 842, 842 (2002), available at http://derraik.org/resources/Publications/003.Derraik_2002-Mar_Poll_Bull.pdf
17. U.S. ENVTL. PROT. AGENCY, PROCEEDINGS: FIRST NATIONAL CONFERENCE ON PACKAGING WASTES (1971).
18. See *id.* at v-vi.
19. See Thomas B. Becnel, *Wastes from Plastic Packages*, in PROCEEDINGS: FIRST NATIONAL CONFERENCE ON PACKAGING WASTES 85 (1971).
20. *Id.* at 85.
21. *Id.* at 87.
22. Eric B. Outwater is listed on the participants list as a representative from the Foundation for Responsible Conservation of our Environment (“FORCE”), however, is considered an industry member of the Steering Committee, representing packaging firm Stuart and Gunn. See U.S. ENVTL. PROT. AGENCY, *supra* note 17, at iv, vi. Ostensibly a not-for-profit corporation, FORCE was created on August 8, 1969, just over a month before the Conference on Packaging Wastes, and what little documentation exists about this group suggests it maintained close ties to the packaging industry. See Entity Information for Foundation for Responsible Conservation of our Environment, www.dos.ny.gov (under



geraldsimon00/Pixabay

- “Businesses” tab, click “Business Search” and search for “Foundation for Responsible Conservation of our Environment”).
23. Eric B. Outwater, *Packaging – U.S.A.*, in PROCEEDINGS: FIRST NATIONAL CONFERENCE ON PACKAGING WASTES 1, 8 (1971).
 24. Arsen J. Darnay & William E. Franklin, *The Changing Dimensions of Packaging Wastes*, in PROCEEDINGS: FIRST NATIONAL CONFERENCE ON PACKAGING WASTES 11, 14 (1971).
 25. Alfred Heller, *The “Bias” of the Concerned Citizen Toward Packaging Wastes*, in PROCEEDINGS: FIRST NATIONAL CONFERENCE ON PACKAGING WASTES 53, 54 (1971).
 26. Outwater, *supra* note 23, at 7.
 27. Darnay & Franklin, *supra* note 24, at 16.
 28. See NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, PROCEEDINGS OF THE WORKSHOP ON THE FATE AND IMPACT OF MARINE DEBRIS (1985), available at <http://www.st.nmfs.noaa.gov/tm/swfc/swfc054.pdf> [hereinafter FIRST MARINE DEBRIS CONFERENCE].
 29. *Id.* at 158. See also Leo H. Carney, *The Environment*, N.Y. TIMES (Sept. 15, 1985), <http://www.nytimes.com/1985/09/15/nyregion/the-environment.html>.
 30. See FIRST MARINE DEBRIS CONFERENCE, *supra* note 28, at 158.
 31. See NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, PROCEEDINGS OF THE SECOND INTERNATIONAL CONFERENCE ON MARINE DEBRIS 1077 (1990), available at <ftp://apapane.soest.hawaii.edu/users/hafner/NIKOLAI/5IMDC/2IMDC%20proceedings.pdf>.
 32. *Id.*
 33. See NANCY A. WOLF & ELLEN E. FELDMAN, PLASTICS: AMERICA’S PACKAGING DILEMMA 80 (1991).
 34. News Brief, BuildingGreen, Rutgers Center for Plastics Recycling Research Closing (Nov. 1, 1996), available at <https://www.buildinggreen.com/newsbrief/rutgers-center-plastics-recycling-research-closing>.
 35. *Id.*
 36. Press Release, Dow Chemical, Dow commits \$2.8 million toward collaborative efforts to reduce marine debris (Sept. 16, 2016), available at <http://www.dow.com/en-us/news/press-releases/dow-commits-collaborative-efforts-reduce-marine-debris>.
 37. See SUSAN FREINKEL, PLASTIC: A TOXIC LOVE STORY 144 (2011).
 38. See Lily Kuo, *After Issuing the World’s Harshest Ban on Plastic Bags, Kenya Adjusts to Life Without Them*, QUARTZ (Aug. 31, 2017), <https://qz.com/1065681/after-issuing-the-worlds-harshest-ban-on-plastic-bags-kenya-adjusts-to-life-without-them/>.
 39. See Member Companies, AMERICAN CHEMISTRY COUNCIL, <https://www.americanchemistry.com/Membership/MemberCompanies/> (last visited Aug. 31, 2017).
 40. See FREINKEL, *supra* note 38, at 163.
 41. See *id.* at 164.
 42. See *id.* at 165.
 43. See, e.g., OPERATION CLEAN SWEEP, <http://www.opcleansweep.org.au/> (last visited July 12, 2017).



1101 15th Street NW, #1100
Washington, DC 20005
E: info@ciel.org | P: 202.785.8700
www.ciel.org

Plastics Industry Awareness of the Ocean Plastics Problem is the third in an ongoing series, *Fueling Plastics*, that examines the links between plastics and fossil fuels.

Plastics Industry Awareness of the Ocean Plastics Problem by The Center for International Environmental Law is licensed under a Creative Commons Attribution 4.0 International License.

Cover image: hhach/Pixabay