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Articles

Picking Up the Pieces: Congress's Role in Combatting the Global Issue of Marine Debris

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Life on this planet is inextricably linked to our oceans. The oceans drive weather patterns and modulate the earth's climate.¹ They feed the world,² drive our economy,³ and inspire our culture. The scale of the oceans is vast, but it is not immune to the hand of man. The effects of our carbon pollution, for example, are unmistakable. Oceans have absorbed about a third of all carbon dioxide produced by humans since the Industrial Revolution⁴—

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1. See *What Role Does the Ocean Play in the Weather?*, NAT'L OCEAN SERV., http://oceanservice.noaa.gov/facts/ocean_weather.html (last updated Apr. 7, 2014).

2. See L. ABABOUCH ET AL., FOOD AND AGRIC. ORG. OF THE UNITED NATIONS, THE STATE OF WORLD FISHERIES AND AGRICULTURE: CONTRIBUTING TO FOOD SECURITY AND NUTRITION FOR ALL 108 (2016), <http://www.fao.org/3/a-i5555e.pdf>.

3. The U.S. ocean economy employed over 3 million people and contributed almost \$360 billion to the U.S. GDP in 2013. JUDITH T. KILDOW ET AL., NAT'L OCEAN ECON. PROGRAM, STATE OF THE U.S. OCEAN AND COASTAL ECONOMIES: 2016 UPDATE, 7–8 (2016), <http://www.oceaneconomics.org/Download/>.

4. Lauren Morello, *Oceans Turn More Acidic Than Last 800,000 Years*, SCIENTIFIC AMERICAN (Feb. 22, 2010), <https://www.scientificamerican.com/article/acidic-oceans/>.

around 600 gigatons. When that carbon dioxide hits the ocean, it reacts chemically and acidifies the seawater. The rate of change in ocean acidity is faster now than any other time in the past 50 million years.⁵ By the end of this century, the National Oceanic and Atmospheric Administration (NOAA) predicts the world's oceans and estuaries could become 150 percent more acidic than they are now.⁶

The oceans have also physically soaked up “more than [ninety percent] of the Earth's uptake of heat associated with greenhouse-gas-attributed warming since 1970.”⁷ That is a lot of heat: a study published in the journal *Nature Climate Change* found that the oceans have absorbed approximately 150 zettajoules of energy since 1997.⁸ The Associated Press pointed out that is as much energy as “a Hiroshima-style bomb being exploded every second for seventy-five straight years.”⁹ That excess energy is warming our oceans at alarming rates and causing sea levels to rise by the law of thermal expansion coupled with the melting of ice sheets.

Ocean acidification, warming seas, and sea level rise portend real consequences for our fishermen, our coastal communities, and our saltwater ecosystem. Unfortunately, they are not the only effect of the hand of man on the oceans.

Marine plastic debris has emerged as one of the most troubling environmental issues of the twenty-first century. Plastic is a human invention, and the startling amount of plastic trash that now swirls in our oceans and litters our coasts is a human problem. No coastline is immune to the problem, nor is the open ocean.

Last year, Newport, Rhode Island, served as a stop for the demanding Volvo Ocean Race. The racers, who had sailed the world, reported an ocean so strewn with debris that they had to

5. *Ocean Acidification*, OCEAN PORTAL, <http://ocean.si.edu/ocean-acidification> (last visited Feb. 23, 2017); TONY BARTELME, EVERY OTHER BREATH: PLANKTON AND THE HIDDEN STORIES OF CLIMATE CHANGE (2016), <https://data.postandcourier.com/saga/plankton/page/7>.

6. *What is Ocean Acidification?*, PAC. MARINE ENVTL. LAB.: CARBON PROGRAM, <http://www.pmel.noaa.gov/co2/story/What+is+Ocean+Acidification+%3F> (last visited Feb. 24, 2017).

7. Peter J. Glecker et al., *Industrial-era Global Ocean Heat Uptake Doubles in Recent Decades*, 6 NATURE CLIMATE CHANGE 394 (2016), <http://www.nature.com/nclimate/journal/v6/n4/full/nclimate2915.html>.

8. *Man-made heat absorbed by oceans has doubled since 1997*, CBS NEWS (Jan. 18, 2016, 5:15 PM), <http://www.cbsnews.com/news/man-made-heat-put-in-oceans-has-doubled-since-1997/>.

9. *Id.*

perform regular checks for garbage fouled on their keels, slowing down their boats—even in the faraway South Atlantic, thousands of miles from shore.¹⁰ “Man overboard” drills are a longstanding routine for sailors; keel-clearing drills are a novelty.

Each year eight million metric tons of plastic waste enters the oceans.¹¹ Dr. Jenna Jambeck of the University of Georgia equates that to five grocery bags of plastic for every foot of coastline worldwide, every year.¹² A report released last year by the World Economic Forum found that unless our habits change, the plastic in the oceans will outweigh the biomass of living fish in the oceans by 2050.¹³

Plastic waste is not benign as it floats about. A 2015 study looked at 186 seabird species and predicted that by 2050, ninety-nine percent of all seabird species will have plastics in their bellies.¹⁴ The sad story of albatrosses on isolated Midway Atoll slowly starving their chicks by feeding them discarded lighters and other plastic junk they mistook for food, and the ghastly photos of dead birds with stomachs packed full of bottle caps and plastic fragments, have traveled far from these isolated islands and lent poignant imagery to the consequences of marine debris.¹⁵

Birds are not the only victims. Thirteen sperm whales beached themselves on the German coast in January 2015 with plastic in their stomachs, including a 43 foot-long shrimp-fishing net and a

10. *Marine Debris and Wildlife: Impacts, Sources, and Solutions: Hearing Before the Subcomm. on Fisheries, Water, and Wildlife of the S. Comm. on Env't and Pub. Works*, 114th Cong. 7–8 (2016) [hereinafter *Marine Debris & Wildlife Hearing*] (statement of Sen. Sheldon Whitehouse, Ranking Member, Subcomm. on Fisheries, Water, and Pub. Works).

11. *Id.* at 54 (statement of Nicholas Mallos, Director, Trash Free Seas Program).

12. *Id.* at 49 (statement of Jenna Jambeck, Associate Professor of Environmental Engineering, University of Georgia).

13. ELLEN MACARTHUR FOUND., WORLD ECON. FORUM, *THE NEW PLASTICS ECONOMY: RETHINKING THE FUTURE OF PLASTICS 7* (2016), http://www3.weforum.org/docs/WEF_The_New_Plastics_Economy.pdf.

14. Chris Wilcox et al., *Threat of plastic pollution to seabirds is global, pervasive, and increasing*, 112 PNAS 11899, 11901–02 (2015), <http://www.pnas.org/content/112/38/11899.full.pdf>.

15. See Nick Paton Walsh et al., *Plastic Island: how our throwaway culture is turning paradise into a graveyard*, CNN WORLD, <http://www.cnn.com/interactive/2016/12/world/midway-plastic-island/> (last visited Mar. 9, 2017); Kate Baggaley, *Midway to Devastation*, AUDUBON (July 19, 2013), <http://www.audubon.org/news/midway-devastation>.

large piece of a plastic cover from an automobile engine.¹⁶ Leatherback turtles have stomachs full of plastic bags, mistaken for the jellyfish on which they feed.¹⁷ These animals suffer digestive blockage and slowly starve.¹⁸ Scientists have documented harmful plastic interactions in nearly 700 species.¹⁹

Turtles, marine mammals, and other unintended fish drown or starve in entanglements with derelict fishing gear and other debris.²⁰ In September, the New England Aquarium reported an increasing number of right whales dying each year due to entanglements,²¹ and that very month two endangered right whales were found dead off the coast of Maine, one of them entangled in fishing gear.²² With only 500 left,²³ every right whale counts.

Plastics really only came into widespread use around seventy years ago, following World War II.²⁴ Plastic is now in every corner

16. Wajeeha Malik, *Sperm Whales Found Full of Car Parts and Plastics*, NAT'L GEOGRAPHIC (Mar. 31, 2016), <http://news.nationalgeographic.com/2016/03/160331-car-parts-plastics-dead-whales-germany-animals/>.

17. See N. Mrosovsky et al., *Leatherback turtles: The menace of plastic*, 58 MARINE POLLUTION BULL. 287, 287–88 (2009), https://atrium.lib.uoguelph.ca/xmlui/bitstream/handle/10214/2014/Leatherback_plastic.pdf?sequence=4.

18. See Colette Wabnitz & Wallace J. Nichols, Editorial, *Plastic Pollution: An Ocean Emergency*, MARINE TURTLE NEWSL., Oct. 2010, at 2, <http://www.seaturtle.org/mtn/archives/mtn129/mtn129p1.shtml?nocount>; Michelle Sigler, *The Effects of Plastic Pollution on Aquatic Wildlife: Current Situations and Future Solutions*, WATER AIR SOIL POLLUTION, Oct. 18, 2014, at 3, https://earthexpeditions.org/system/files/Sigler_Michelle_Water%20Air%20Soil%20Pollut_2014.pdf.

19. S.C. Gall & R.C. Thompson, *The Impact of Debris on Marine Life*, 92 MARINE POLLUTION BULL. 170, 170, 172 (2015), <http://www.sciencedirect.com/science/article/pii/S0025326X14008571>.

20. See Clare Leschin-Hoar, *Whales, Sea Turtles, Seals: The Unintended Catch Of Abandoned Fishing Gear*, WNPR (Sept. 28, 2016), <http://wnpr.org/post/whales-sea-turtles-seals-unintended-catch-abandoned-fishing-gear>.

21. Scott D. Kraus et al., *Recent Scientific Publications Cast Doubt on North Atlantic Right Whale Future*, FRONTIERS MARINE SCI., Aug. 17, 2016, at 1, <http://journal.frontiersin.org/article/10.3389/fmars.2016.00137/full>.

22. Kevin Miller, *Another right whale is found dead off Maine coast*, PORTLAND PRESS HERALD (Sept. 27, 2016), <http://www.pressherald.com/2016/09/27/another-endangered-right-whale-found-dead-off-maine-coast/>.

23. Kraus et al., *supra* note 21, at 1.

24. See Susan Freinkel, *A Brief History of Plastic's Conquest of the World: Cheap Plastic Has Unleashed a Flood of Consumer Goods*, SCIENTIFIC AMERICAN (May 29, 2011), <https://www.scientificamerican.com/article/a-brief-history-of-plastic-world-conquest/>.

of the marine environment—from sandy beaches on faraway islands,²⁵ to Arctic ice cores,²⁶ to deep-sea sediments,²⁷ to ocean gyres in the remote Pacific.²⁸

Compounding the concern is that plastic can enter the oceans as microbeads or microfibers from clothing, and large plastic can break down into smaller and smaller pieces, some so small they are consumed by microscopic creatures at the bottom of the food chain.²⁹ Scientists are working to understand what this “microplastic” means for the marine food web—and for humans who eat food from the sea.³⁰

Eighty percent of the plastic waste in the oceans originates from land, and of that, fifty percent comes from just five countries: China, Indonesia, the Philippines, Vietnam, and Sri Lanka.³¹ A report from Ocean Conservancy and its partners showed that three-quarters of the plastic that makes its way from land into the sea comes as a result of poor upland waste transportation and disposal practices.³²

In the United States, Alaska is bearing the brunt of this influx. International laws are not yet able to tackle the land-based pollution found in our oceans. International treaties address ship-

25. See, e.g., *NOAA removes 57 tons of marine debris from Northwestern Hawaiian Islands*, NAT'L OCEANIC & ATMOSPHERIC ADMIN. (Oct. 28, 2014), http://www.noaa.gov/stories/2014/20141028_marinedebris_hawaii.html.

26. See Rachel W. Obbard et al., *Global warming releases microplastic legacy frozen in Arctic Sea ice*, 2 EARTH'S FUTURE 315, 316, 318–19 (2014), <http://onlinelibrary.wiley.com/doi/10.1002/2014EF000240/epdf>.

27. Lucy C. Woodall et al., *The deep sea is a major sink for microplastic debris*, ROYAL SOC. OPEN SCI., Nov. 2014, at 1, 6, <http://rsos.royalsocietypublishing.org/content/royopensci/1/4/140317.full.pdf>.

28. See *Great Pacific Garbage Patch*, NAT'L GEOGRAPHIC SOC'Y, <http://www.nationalgeographic.org/encyclopedia/great-pacific-garbage-patch/> (last updated Sept. 19, 2014).

29. See Nate Seltenrich, *New Link in the Food Chain? Marine Plastic Pollution and Seafood Safety*, 123 ENVTL. HEALTH PERSP. A34, A37 (2015), <https://ehp.niehs.nih.gov/wp-content/uploads/123/2/ehp.123-A34.alt.pdf>.

30. See *id.* at A35.

31. See Jenna R. Jambeck et al., *Plastic waste inputs from land into the ocean*, 347 SCI. 768, 768–69 (2015), https://www.iswa.org/fileadmin/user_upload/Calendar_2011_03_AMERICANA/Science-2015-Jambeck-768-71_2_.pdf.

32. See MCKINSEY CTR. FOR BUS. & ENV'T, OCEAN CONSERVANCY, *STEMMING THE TIDE: LAND-BASED STRATEGIES FOR A PLASTIC-FREE OCEAN 14* (2015), <http://www.oceanconservancy.org/our-work/marine-debris/mckinsey-report-files/full-report-stemming-the.pdf>.

based dumping of garbage and pollutants,³³ but none require the proper handling of waste on land to prevent subsequent marine debris. Without an international treaty in place, trade agreements will continue to overlook marine debris.³⁴

More and more waste makes landfall every year, even on some of the world's most remote beaches. The 2011 Japan tsunami alone sent millions of pounds of debris across the Pacific.³⁵ In 2015, around one million pounds of debris, half from the Japan tsunami waste, was collected from Alaska beaches and transported to Washington state for final disposal.³⁶ For all that effort, it was estimated to be less than one percent of the marine litter that fouls the 44,000 miles of Alaska's coast.³⁷ According to Gulf of Alaska Keeper, a nonprofit marine debris cleanup organization, some of Alaska's remote beaches could have as much as thirty tons of plastic per mile.³⁸ The costs of cleaning up this debris is tremendous—over \$100,000 per mile—since it can require helicopters, boats, barges, and skilled workers.³⁹

There is still much we need to learn about all this marine debris. But we already know that we ought to take serious action as soon as possible. Without effective intervention, our oceans will

33. See, e.g., International Convention for the Prevention of Pollution from Ships, Protocol, *opened for signature* Feb. 17, 1978, 33 U.S.C.A. §§ 1901–1915 (Westlaw through Pub. L. No. 114–316), 1340 U.N.T.S. 61 (entered into force Oct. 2, 1983).

34. The Trans-Pacific Partnership (“TPP”), an unratified international treaty between countries that border the Pacific Ocean, would seek to “prevent[], abate[] or control . . . the release, discharge or emission of pollutants or environmental contaminants.” Trans-Pacific Partnership art. 20.1, Feb. 4, 2016, OFFICE U.S. TRADE REP., <https://ustr.gov/sites/default/files/TPP-Final-Text-Environment.pdf>. The TPP can still be ratified by February 2018; however, the United States withdrew from the agreement on January 23, 2017, significantly decreasing the treaty's chances of recognition. See *TPP: What is it and why does it matter?*, BBC NEWS (Jan. 23, 2017), <http://www.bbc.com/news/business-32498715>.

35. *Tsunami Debris and Marine Debris in Alaska*, ALASKA DEP'T ENVTL. CONSERVATION: DIV. ENVTL. HEALTH, <http://dec.alaska.gov/eh/marine-debris/> (last visited Mar. 2, 2017).

36. Beena Raghavendran, *With barge arrival in Seattle, 2011 tsunami debris nears*, SEATTLE TIMES (Aug. 7, 2015, 9:01 PM), <http://www.seattletimes.com/seattle-news/environment/with-barge-arrival-2011-tsunami-debris-nears-journeys-end/>.

37. *Id.*

38. *Marine Debris & Wildlife Hearing*, *supra* note 10, at 76 (statement of Chris Pallister, President & Co-Founder, Gulf of Alaska Keeper).

39. See *id.* at 41.

soon be overrun by plastic and other waste debris.

Marine debris is one of the few environmental issues of the modern era that has broad bipartisan support for action in the United States Congress. This was reflected in the collegial hearing on marine debris held last year by the Environment and Public Works Committee.⁴⁰ Further, our Senate Oceans Caucus has thirty-five bipartisan members committed to solving some of the biggest issues facing our oceans.⁴¹ Marine debris is one of the Caucus's top priorities, along with pirate fishing, where the Caucus made significant legislative progress in recent years, and ocean data collection and monitoring.

The Senate Oceans Caucus is looking at ways the United States can use our trade influence to motivate developing countries to invest more in waste infrastructure. We are working to promote research and development of innovative materials that actually biodegrade in the oceans, and programs that support the proper disposal, collection, and recycling of fishing gear. We are exploring ways to better prepare for and support cleanups after severe marine debris events. We brought these issues into the Save Our Seas Act,⁴² a truly bipartisan bill we cosponsored with six other members of the Senate Oceans Caucus. At the time of this writing, the bill just passed the Senate Commerce, Science, and Transportation Committee unanimously and is heading to the floor for consideration.

NOAA's Marine Debris Program already does essential work recovering fishing gear,⁴³ supporting cleanups,⁴⁴ and promoting awareness.⁴⁵ Reauthorizing the program and supporting

40. See *id.* at 79 (statement of Sen. Dan Sullivan, Chairman, Subcomm. on Fisheries, Water, and Wildlife); Arianna Skibell, *Marine debris Stokes concerns over trade pact, coastal health*, E&E DAILY (May 18, 2016), <http://www.eenews.net/eedaily/2016/05/18/stories/1060037435>.

41. See Press Release, Sen. Sheldon Whitehouse, Senate Oceans Caucus Adds Seven New Members: Bipartisan Group's Membership Grows to 30 (Jan. 15, 2016), <https://www.whitehouse.senate.gov/news/release/senate-oceans-caucus-adds-seven-new-members>.

42. S. 756, 115th Cong. (2017).

43. See *Fishing for Energy*, NAT'L OCEANIC & ATMOSPHERIC ADMIN.: MARINE DEBRIS PROGRAM, <https://marinedebris.noaa.gov/prevention/fishing-energy> (last updated Mar. 3, 2017).

44. See *Marine Debris Tracker*, NAT'L OCEANIC & ATMOSPHERIC ADMIN.: MARINE DEBRIS PROGRAM, <https://marinedebris.noaa.gov/partnerships/marine-debris-tracker> (last updated Mar. 3, 2017).

45. See *Educational Materials*, NAT'L OCEANIC & ATMOSPHERIC ADMIN.: MARINE DEBRIS PROGRAM, <https://marinedebris.noaa.gov/educational->

appropriations at its full authorized amount of \$10 million would bolster the program's work. At the Our Ocean Conference, hosted by Secretary of State John Kerry, representatives from more than ninety countries⁴⁶ came together in Washington, D.C., to pledge more than \$5 billion in new commitments to conserve ocean and coastal resources.⁴⁷ Over \$1 billion of those pledges were focused on combatting marine debris.⁴⁸

Though the United States is not a top contributor of plastic to the oceans, we are not without blame.⁴⁹ We have the power to make a global difference, with political and economic sway that can help shape consumer and product development practices, and research and technical expertise that can help developing countries bring their waste infrastructure up to par.

We must act now to have a realistic chance of beating back the flood of plastics and other waste entering our oceans each year.

materials (last updated Mar. 3, 2017).

46. *Welcome Remarks at the Our Ocean Conference*, U.S. DEPT ST. (Sept. 15, 2016), <https://2009-2017.state.gov/secretary/remarks/2016/09/261959.htm>.

47. *See* Press Release, U.S. Dep't of State: Office of the Spokesperson, Our Ocean 2016 Commitments (Sept. 16, 2016), <https://2009-2017.state.gov/r/pa/prs/ps/2016/09/262042.htm>.

48. *See id.*

49. Note: The U.S. is still in the top twenty. *See* Jambeck et al., *supra* note 31, at 769.