

An Overview of the Environmental Issues in Oceans



IVKA KALUS

Chief Investment Officer
and Portfolio Manager
Promethos Capital, LLC



AMA ASAMOAH

Intern
Promethos Capital, LLC



JONATHAN KABEYA

Equity Research Analyst
Promethos Capital, LLC

INTRODUCTION

The ocean is essential for both aquatic and terrestrial life because it not only supplies a multitude of food sources for consumption but also provides approximately 50 to 85 percent of the Earth's oxygen thanks to phytoplankton that photosynthesize sunlight and carbon dioxide.¹ The ocean covers 70 percent of the Earth and there are numerous lucrative opportunities in its waters that generate hundreds of billions of dollars annually such as fishing, aquaculture, and offshore oil drilling. These industries are essential for providing jobs, growing Gross Domestic Product (GDP) for countries, and improving socio-economic development. However, for centuries, commercial activities have degraded the water quality, disturbed marine biodiversity and habitats, and became a contributor to global warming and climate change. Even though there has been a rise in the public's recognition of environmental issues in the ocean, it is critical for corporations and stakeholders to be held accountable for their environmental impacts. It would be pivotal if businesses made adjustments to their current practices because it will ultimately enable global sustainability and protection of marine habitats.

OVERFISHING

Humans need to be held accountable for their commercial actions, especially in the fishing and aquaculture industry because their neglect impacts marine life and habitats. Practices such as overfishing, ghost fishing, and improper techniques in aquaculture can deplete fish populations which will eventually cause the collapse of these industries. Systemic overfishing occurs when fish are caught faster than the population can replenish itself.² According to the Food and Agriculture Organization of the United Nations, "The number of overfished stocks globally has tripled in half a century and today fully one-third of the world's assessed fisheries are currently pushed beyond their biological limits."³ Pervasive illegal fishing and subsidies are one of the main drivers of overfishing. Illegal catches and trades cause "high-valued species" to be caught at a higher frequency. Subsidies, on the other hand, cause fishing grounds to reach overcapacity, even though the amount of stock collected is above what is needed.

continued >





Systemic overfishing impacts ecosystems because it depletes fishing populations which then alters the ocean's food web. Already, the food chain is fragile, and any slight change such as a reduction of feed for the foundation of the hierarchy can have a huge impact.⁴ Additionally, overfishing affects the species' rate of reproduction and maturity, especially since there is reduction in the number of available mates. The overexploitation of fish is also driven by the economic opportunities it provides for developing nations. Fish is one of the most widely traded food commodities and fishermen get paid by the amount

they catch. However, if fish populations continue to decline so will the job opportunities in this industry. In order to protect the fishing operations and the ecosystems, there needs to be more regulations and improvements in fishing management and conservation.⁵ It may be difficult to completely eradicate illegal fishing and trading, however, if this can be more controlled, there would not be an excess of harvested seafood. Lastly, there needs to be a decrease in subsidies and an increase in converting certain areas of the oceans into protected zones to allow populations to restabilize.

GHOST FISHING

Ghost-fishing is the act where fishermen lose or discard their fishing gear such as longlines, trawls, gillnets, and crab traps, into the ocean. This is also known as derelict fishing gear (DFG). As fishing operations rise to meet consumer demand, so does ghost-fishing. Typically, fishing instruments are lost because of weather patterns such as storms, currents, sedimentation, ice cover, and deep water conditions.⁶ In addition, ghost-fishing can occur if the gear is intertwined with other vessels or bottom topography such as reefs or rocky bottoms.⁷ Furthermore, the use of outdated or worn out equipment can cause it to break loose.⁸ Lastly, it can be purposely discarded into the sea because it is viewed as the easiest avenue of disposal.⁹ Since these fishing gear are not made of biodegradable materials, its impact is prolonged until retrieved.

Whether it is intentional or unintentional, ghost-fishing needs to be rectified because these instruments are killing target and non-target marine organisms who may be endangered or protected species.¹⁰ When this equipment is no longer under the control of the fisherman, the tool underwater will continue to catch creatures such as turtles, whales, and seals.¹¹ Commercially valuable and endangered species that are trapped in the gear will die as a result of cannibalism, predation, or starvation.¹² The dead animals then become bait and attract other animals and it then becomes a constant cycle. The abandonment of these tools is a contributor towards pollution. The debris damages

underwater habitats such as coral reefs and benthic fauna which are essential to housing thousands of aquatic plants and species.¹³ It is unknown how many organisms have been killed or how much fishing gear has been lost, but it is known where the debris has accumulated and how this practice is severely impacting marine life.

The ocean currents and winds shift the debris into areas such as the Northwestern Hawaiian Islands (NWHI) also known as the North Pacific subtropical convergence zone.¹⁴ Other accumulation areas include the Chesapeake Bay, Gulf of Mexico, North Pacific Ocean, South Pacific Ocean, and the North Atlantic Ocean basins. Overall, there needs to be more efforts to retrieve DFGs because approximately "90 percent of species caught in DFG are of commercial value."¹⁵ There needs to be more investments in gear design to reduce the likelihood of failure. Fishing gear should include integrated GPS systems for easier retrieval and be designed with biodegradable materials as a way to reduce the severity of its impacts.¹⁶ In addition, there needs to be less gear per boat, periodic checks of equipment, legalized distance between vessels to avoid entanglement, and affordable disposal areas to reduce purposeful abandonment. Some incentive programs have been created in which fishermen are compensated for proper disposal of fishing gear. However, to reduce the depletion of marine populations, these programs, as well as removal projects, need to be universally implemented.

IMPROPER AQUACULTURE TECHNIQUES

The aquaculture industry is relatively new, and it has been glorified because of its assistance meeting global demand for seafood and other commercial products. However, its improper techniques endanger several organisms and habitats. Lack of periodic checks and updates of a farm's infrastructure can cause the farmed fish stock to escape and integrate with the local populations. This integration not only causes the transmission of disease and parasite but also causes invasive species to overpower the native stock, thus causing the native stock to have forced migrations or die out. Furthermore, if the escaped fish breed with the natives, its offspring will have genetic disorders and reduced lifespan, vitality, and production.¹⁷

The aquaculture industry is frequently criticized for their excessive use of antibiotics and improper maintenance of

effluents. These techniques create toxic environments that harm both aquatic and terrestrial life. Antibiotics not only protect the farmed stocks from disease and parasites but also allow the stock to grow at a faster rate. This practice is essential to the industry because it allows farms to meet the necessary quota in demand. However, the excess use of antibiotics creates antibiotic-resistant bacteria that can be fatal to humans.¹⁸ Effluents, on the other hand, lead to the creation of hypoxic zones which affect both farmed and native stocks. Effluents are rich with phosphorus and nitrogen and its excess can cause eutrophication that causes oxygen depletion.¹⁹ To protect both the farmed and fish stock, it is critical that investments be made in farm infrastructure, a switch from antibiotics to probiotics, and improvements in wastewater management.

EUTROPHICATION

The fishing and aquaculture industry have been flourishing for decades; however, anthropogenic activities caused an uprising of hypoxic and dead zones that are also detrimental to the ocean's ecosystems. Excessive fossil fuel consumption, improper disposal of effluents from intensive farming, wind erosion, volatilization, and sewage systems that empty into the ocean waters lead to the fatal process of eutrophication.²⁰ Eutrophication "[degrades] aquatic habitats by reducing light levels and ... [harms] marine life by producing toxins, some of which are harmful to

humans."²¹ An abundance of nitrogen and phosphorus fuel algal bloom and when the algae dies it settles and decays on the ocean floor. Bacteria then accumulates and feeds on the decomposing algae. During consumption, oxygen levels decrease which then makes these areas incapable of supporting life.²² In addition, phytoplankton which is a food source to bottom-feeding organisms such as shrimp, crabs, and worms, propagate from the nutrients in the water. There is then an excess amount of phytoplankton and epiphytes which leads to bacterial blooms and oxygen depletion.

IMPACTS OF HYPOXIC AND DEAD ZONES

Marine ecosystems are very delicate and any alteration such as water quality declination can be fatal to its habitats. As oxygen depletes, hypoxic zones or dead zones formulate which eliminates marine life. These zones alter the dynamic of the ocean's food structures through hindering the marine system's energy flow.²³ Hypoxia is known to "reduce biomass and diversity of benthic or bottom-dwelling communities."²⁴ This fatal process affects

fishery and aquaculture companies because hypoxia causes fish to suffocate and the dead stock cannot be sold. Once a section of the ocean manifests into one of these zones, it is nearly irreversible because the nutrients are stored in the area for years. This forces nearby fish populations to migrate elsewhere.²⁵ Reversing the effects of dead zones requires a long-term commitment to reducing nutrient inputs and periodic monitoring of business operations.²⁶



OCEAN ACIDIFICATION

The outcome of eutrophication serves as one of the contributors to ocean acidification because eutrophication lowers water-column pH.²⁷ The ocean has absorbed about one-third of anthropogenic carbon dioxide since the start of the industrial revolution and this has caused a 0-1 reduction in pH units.²⁸ As of now, the ocean waters are 30 percent more acidic.²⁹ Invertebrates are prone to weaker skeletons or shells because ocean acidification reduces the amount of calcium carbonate available.³⁰ If the effects are not reversed, it will cause a decrease in reproduction for several calcifying organisms such as oysters, clams, sea urchins, shallow water

corals, deep sea corals, and calcareous plankton.³¹ This will devastate seafood retail and distribution enterprises because there will be a 35 percent reduction in annual supplies in clams and 55 percent for scallops.³² In addition, the coral reefs which homes thousands of marine species are “bleaching” because the change of pH concentration is eroding the reefs faster than it can rebuild itself.³³ Coral reef structures are essential because they serve as a shield against waves, storms, and floods from the shorelines which then prevents loss of life, property damage, and erosion.³⁴ If global average temperatures rise above 2°C, coral reefs will become extinct.

RISING SEA LEVELS AND OCEAN WARMING

Ocean acidification and rising sea level are parallel to each other because each appears as a result of the over absorption of greenhouse gases and rising sea temperatures. For centuries, carbon dioxide and other greenhouse gases are released and trapped in the Earth’s atmosphere because of the burning of fossil fuels. Rising sea temperatures cause thermal expansion and the melting of ice sheets and glaciers.³⁵ Since 1880, the average sea levels have risen by 8 inches and about three of those inches were gained in the past 25 years.³⁶ Sea level rising can cause “destructive erosion, wetland flooding, aquifer and agricultural soil contamination with salt, and lost habitat for fish, birds, and plants.”³⁷ Millions of people will be forced to migrate from their communities to avoid flooding because sea level rise is occurring simultaneously with hurricanes and typhoons.³⁸

Since the pre-industrial era, the ocean has absorbed approximately 29 percent of global carbon dioxide emissions. Companies that are reliant on fossil fuels, pollute both the air and water quality which then serves as a vehicle to these environmental issues. “Emissions from 88 of the largest fossil fuel producers’ and cement manufacturers’ products contributed more than 55 percent of the increase in ocean acidification, about 52 percent of the global temperature rise, and about 34 percent of global sea level rise between 1880 and 2015.”³⁹ Furthermore, investor-owned fossil fuel producers such as ExxonMobil, Chevron, Royal Dutch Shell, DP, Peabody Energy, and ConocoPhillips contributed 17 percent in the rise of ocean acidification and global average surface temperature and 13 percent of sea level rise from 1880 to 2015.⁴⁰

OFFSHORE OIL DRILLING

Offshore oil drilling, like many industries operating in the oceans, is quite lucrative, however, it also causes catastrophic impacts to marine ecosystems. Offshore drilling has the potential of spills and current methods for cleanup leaves the majority of the oil spilled in the ocean for years. The excess oil has long term impacts on threatened and endangered species, marine mammals, fish, shellfish, and sea birds.⁴¹ During the 2010 Gulf of Mexico spill, the “resulting spill covered 68,000 square miles of sea surface and killed approximately 1 million coastal and offshore seabirds, 5,000 marine mammals, and 1,000 sea

turtles.”⁴² Overall, these spills can cause cancer, damage animals’ immune and reproductive systems, and destroy their usual areas they nest and breed.⁴³

Aside from oil spills, these operations release tons of pollutants into the atmosphere and water sources. Each drill well, for instance, produces tens of thousands of gallons of waste drilling muds. This substance contains harmful and toxic metals such as mercury, lead, and cadmium that can “bioaccumulate and biomagnify in marine organisms, including in [the] seafood supply.”⁴⁴

Each well and oil platform generates toxic waste made of benzene, arsenic, lead, toluene, and radioactive pollutants. On average, these wells release approximately 50 tons of nitrogen oxides, 13 tons of carbon monoxide, 6 tons of sulfur oxides, and 5 tons of volatile organic chemicals.⁴⁵ Millions of people live in close proximity to these facilities that cause air and water pollution and they are exposed to an array of health issues such as cancer, liver damage, and birth defects.

The process of locating and estimating the size of an offshore oil reserve, requires seismic surveys, which

produces seismic waves that damage and kill eggs and larvae.⁴⁶ These waves make marine animals lose their hearing which impacts their ability to communicate, locate food sources, avoid predators, and navigate. These operations cause forced migrations of several species because either the drilling destroys their habitats or impacts their survival. Coastal communities are also impacted by the uprising of offshore drilling, because this industry requires installments of infrastructure such as roads, pipelines, and processing facilities. These construction sites destroy pristine areas because they cause a decline in habitat functionality and acreage.⁴⁷

MARINE DEBRIS

Businesses and corporations should not be the only parties at fault. Citizens are also a contributor to the decline of the ocean's health and must be held accountable as well. For centuries, the ocean has been used as a landfill and approximately 8 million tons of trash is dumped into the ocean each year, and 75 percent of it is marine debris.⁴⁸ Marine debris, "is any human-made solid material that is disposed of or abandoned on beaches, in waterways that lead to the ocean, or in the ocean itself, regardless of whether disposal occurred directly, indirectly, intentionally or unintentionally."⁴⁹ Marine debris consists of manufactured materials such as plastics, paper, wood, and metal. According to the Ocean Health Index, 80 percent of marine debris starts from land and 20 percent originates from ocean vessels.⁵⁰

Marine debris, like other pollutants, poses serious threats to the health of organisms. Several animals such as turtles, seabirds, seals, whales, sharks, and fish mistake trash for food. These items can either block their digestive systems, strangle them, or hinders their ability to swim and dive.⁵¹ The accumulation of these debris weakens the immune systems of both humans and animals because of toxic chemicals found in microplastics and nanoplastics.⁵² Microplastics are derived from the breakdown of large pieces of plastics while nanoplastics, which are not visible, come from items such as cosmetics and face washes.⁵³ The removal of microplastics and nanoplastics is not possible and they easily enter the food chain. These debris contain polychlorinated biphenyls (PCB) and Dichlorodiphenyltrichloroethane (DDT).⁵⁴ Mercury, another toxic compound, enters the oceans through atmospheric

deposition because of the burning of oil, coal, and wood that makes mercury airborne or through discharge from offshore oil drilling. Small organisms can then convert inorganic mercury into its organic form of methylmercury.

PCBs, DDTs, and methylmercury are either ingested or absorbed and it can affect the food chain because these toxins flow through each level and will eventually be consumed by humans.⁵⁵ The consumption of contaminated fish can impact infants and adolescents' neurological and muscle development and reduce their visual recognition.⁵⁶ It can also cause a decline in a child's birth weight, memory attention, cognitive thinking, language, and learning potential.⁵⁷ Infected products are also linked to other birth defects, cancer, susceptibility of diseases and infections, and changes in the liver, blood, and immune functions.⁵⁸

Because of gyres, marine debris tends to accumulate in the North Pacific Gyre, the South Pacific Gyre, the North Atlantic Gyre, the South Atlantic Gyre, and the Indian Ocean Gyre.⁵⁹ The amassing of waste impacts tourism, recreation, and the seafood industry. To combat this pollution, several organizations, such as the Ocean Conservancy have organized ocean clean-up projects where volunteers collect trash from the beach, coast, water surface, and the ocean floor.⁶⁰ Many of the materials that are retrieved from these projects are recycled and converted into new products for commercial use.⁶¹ There needs to be a continuum of these clean-up operations because it will ultimately improve the health of humans, habitats, marine life, recreation, and livelihood.



CONCLUSION

The ocean is essential to both aquatic life and to humans. To enable sustainability, there needs to be tremendous change in corporate perception and treatment of this invaluable resource. The fishing and aquaculture industry provides seafood and other essential commercial products to humans, but have seen their financial survival

impacted by the effects of climate change and global warming, even as offshore oil drilling operations are contributing to the destruction of marine ecosystems. The degradation of ocean ecosystems will continue to have catastrophic effects on both human and marine life unless corporations implement sustainable practices and policies.

REFERENCES

Beachapedia. "Overview of Offshore Oil Drilling." http://www.beachapedia.org/Offshore_Oil_Drilling

Beijnen, Jonah van and Gregg Yan. "Is the Aquaculture of Invasive and Non-Native Species Worth the Risk?" Last modified, November 6, 2019. <https://thefishsite.com/articles/is-the-aquaculture-of-invasive-and-non-native-species-worth-the-risk>

Earth Sky. "How Much Do Oceans Add to the World's Oxygen." Last modified June 5, 2015. <https://earthsky.org/earth/how-much-do-oceans-add-to-worlds-oxygen>

Environmental Defense Fund. "PCBs in Fish and Shellfish." <http://seafood.edf.org/pcbs-fish-and-shellfish>

FAIRR. "Investors Call for Sea Change in Aquaculture." Last modified June 5, 2019. <https://www.fairr.org/article/investors-call-for-sea-change-in-aquaculture/>

FAIRR. "Shallow Returns?: ESG Risks and Opportunities in Aquaculture." Last modified June 5, 2019. https://cdn.fairr.org/2019/06/30101629/FAIRR_Shallow-returns_final_5-June_191-1.pdf

Flynn, Kevin J, et al. "Ocean Acidification with (De)eutrophication Will Alter Future Phytoplankton Growth and Succession." *Proceedings: Biological Science* 282, no.1804 (2015): 1-6.

Kelly, Morgan W. and Gretchen E. Hofmann. "Adaption and the Physiology of Ocean Acidification." *British Ecological Society* 27, no.4 (2013): 980-990.

Licker, Rachel et al. "Tracing Fossil Fuel Companies' Contribution to Climate Change and Ocean Acidification." *Union of Concerned Scientists* (2019): 1-8.

Joyce, Stephanie. "The Dead Zones: Oxygen-Starved Coastal Waters." *Environmental Health Perspectives*. 108, no.3 (2000): 120-125

Mee, Laurence. "Reviving Dead Zones." *Scientific American* 295, no.5 (2006): 78-85.

National Oceanic and Atmospheric Administration. "How Do Coral Reefs Protect Lives and Property." Last modified November 15, 2019. https://oceanservice.noaa.gov/facts/coral_protect.html

National Oceanic and Atmospheric Administration. "Impact of 'Ghost Fishing' via Derelict Fishing Gear." *2015 NOAA Marine Debris Program Report*. March 2015, 1-21.

Natural Resources Defense Council. "Protecting Our Ocean and Coastal Economies: Avoid Unnecessary Risks from Offshore Drilling." *Ocean Facts*, September 2019, 1-4.

Nunez, Christina. "Sea Level Rise, Explained." Last modified February 19, 2019. <https://www.nationalgeographic.com/environment/global-warming/sea-level-rise/>

Ocean Health Index. "Trash Pollution Overview." <http://www.oceanhealthindex.org/methodology/components/trash-pollution>.

PMEL Carbon Program. "What is Ocean Acidification." <https://www.pmel.noaa.gov/co2/story/What+is+Ocean+Acidification%3F>

Raloff, Janet. "Limiting Dead Zones." *Science News* 165, no.24 (2004): 378-380

Schilling, Lauren. "Making the Most (And Least) of Marine Trash,," Last modified November 7, 2014. http://www.oceanhealthindex.org/news/Making_Least_Most_Marine_Trash

The Wilderness Society. "7 Ways Oil and Gas Drilling is Bad for the Environment." Last modified August 9, 2019. <https://www.wilderness.org/articles/blog/7-ways-oil-and-gas-drilling-bad-environment>

World Wildlife. "Overview." <https://www.worldwildlife.org/threats/overfishing>

The information provided is as of September 2020 and does not constitute investment advice and should not be relied on as such. The information and opinions expressed in this material was derived from internal and external sources believed to be reliable. However, Promethos cannot guarantee its accuracy or completeness. This material may contain "forward-looking" statements and there is no guarantee that any forecasts will come to pass. Reliance upon information in this material is at the sole discretion of the reader and Promethos does not accept any liability for such reliance.



1. Earth Sky, "How Much Do Oceans Add to the World's Oxygen," last modified June 5, 2015. <https://earthsky.org/earth/how-much-do-oceans-add-to-worlds-oxygen>
2. World Wildlife, "Overview," <https://www.worldwildlife.org/threats/overfishing>
3. Ibid.
4. Ibid.
5. Ibid.
6. National Oceanic and Atmospheric Administration, "Impact of 'Ghost Fishing' via Derelict Fishing Gear," 2015 NOAA Marine Debris Program Report, March 2015, 1.
7. Ibid.
8. Ibid.
9. Ibid.
10. Ibid.
11. Ibid., 4.
12. Ibid., 2.
13. Ibid., 1.
14. Ibid., 3.
15. Ibid., 4.
16. Ibid., 12.
17. Jonah van Beijnen and Gregg Yan, "Is the Aquaculture of Invasive and Non-Native Species Worth the Risk?," last modified November 6, 2019. <https://thefishsite.com/articles/is-the-aquaculture-of-invasive-and-non-native-species-worth-the-risk>
18. FAIRR, "Investors Call for Sea Change in Aquaculture," last modified June 5, 2019. <https://www.fairr.org/article/investors-call-for-sea-change-in-aquaculture/>
19. FAIRR, "Shallow Returns?: ESG Risks and Opportunities in Aquaculture," last modified June 5, 2019. https://cdn.fairr.org/2019/06/30101629/FAIRR_Shallow_returns_final_5-June_191-1.pdf
20. Laurence Mee, "Reviving Dead Zones," Scientific American 295, no.5 (2006): 81.
21. Stephanie Joyce, "The Dead Zones: Oxygen-Starved Coastal Waters," Environmental Health Perspectives 108, no.3 (2000): 121.
22. Janet Raloff, "Limiting Dead Zones," Science News 165, no.24 (2004): 378.
23. Stephanie Joyce, "The Dead Zone," 121.
24. Ibid., 122.
25. Laurence Mee, "Reviving Dead Zones," 84.
26. Stephanie Joyce, "The Dead Zone," 121.
27. Kevin J. Flynn et al., "Ocean Acidification with (De)utrophication will Alter Future Phytoplankton Growth and Succession," Proceedings: Biological Science 282, no.1804 (2015): 1.
28. Morgan W. Kelly and Gretchen E. Hofmann, "Adaption and the Physiology of Ocean Acidification," British Ecological Society 27, no.4 (2013): 980.
29. Rachel Licker et al., "Tracing Fossil Fuel Companies' Contribution to Climate Change and Ocean Acidification," Union of Concerned Scientists (2019): 1.
30. Ibid., 2.
31. PMEL Carbon Program, "What is Ocean Acidification." <https://www.pmel.noaa.gov/co2/story/What+is+Ocean+Acidification%3F>
32. Rachel Licker, "Tracing Fossil Fuel Companies," 1.
33. PMEL Carbon Program, "What is Ocean Acidification."
34. National Oceanic and Atmospheric Administration, "How Do Coral Reefs Protect Lives and Property," last modified November 15, 2019. https://oceanservice.noaa.gov/facts/coral_protect.html
35. Christina Nunez, "Sea Level Rise, Explained," last modified February 19, 2019. <https://www.nationalgeographic.com/environment/global-warming/sea-level-rise/>
36. Ibid.
37. Ibid.
38. Ibid.
39. Rachel Licker, "Tracing Fossil Fuel Companies," 3.
40. Ibid., 3-4.
41. Natural Resources Defense Council, "Protecting Our Ocean and Coastal Economies: Avoid Unnecessary Risks from Offshore Drilling," Ocean Facts, September 2019, 2.
42. The Wilderness Society, "7 Ways Oil and Gas Drilling is Bad for the Environment," last modified August 9, 2019. <https://www.wilderness.org/articles/blog/7-ways-oil-and-gas-drilling-bad-environment>
43. Ibid.
44. Natural Resources Defense Council, "Protecting Our Ocean and Coastal Economies," 3.
45. Ibid.
46. Beachapedia, "Overview of Offshore Oil Drilling," http://www.beachapedia.org/Offshore_Oil_Drilling
47. Ibid.
48. Lauren Schilling, "Making the Most (And Least) of Marine Trash," last modified November 7, 2014. http://www.oceanhealthindex.org/news/Making_Least_Most_Marine_Trash
49. Ocean Health Index, "Trash Pollution Overview," <http://www.oceanhealthindex.org/methodology/components/trash-pollution>.
50. Ibid.
51. Ibid.
52. Lauren Schilling, "Making the Most (And Least) of Marine Trash,"
53. Ibid.
54. Ibid.
55. Ibid.
56. Environmental Defense Fund, "PCBs in Fish and Shellfish," <http://seafood.edf.org/pcbs-fish-and-shellfish>
57. Ibid.
58. Ocean Health Index, "Trash Pollution Overview,"
59. Ibid.
60. Ibid.
61. Ibid.

WHAT MAKES US DIFFERENT

IMPACT: Our portfolios seek alpha and integrate intent to drive social and environmental change.

TEAM: Our CIO's extensive portfolio management experience and scientific background provides a distinct perspective coupled with a team diverse in both thought and culture.

INDEPENDENCE: We are an employee-owned firm. Our interests are aligned with your interests.

ENGAGEMENT: Meetings with companies, letters to management, shareholder collaboration and proxy voting to influence discussions on ESG issues and drive change. **Action:** Co-signed investor statements with 322 investors representing US\$9.2T for workers' protections during COVID-19. Working with a large group to deliver recommendations for the Meat Sector during COVID-19.

INVESTING WITH INTENT *because* **CAPITAL DRIVES CHANGE™**