

Towards a Buddhist approach for living in harmony with the oceans and its life

Colin D Butler BMed, MSc, PhD

Associate Professor, National Centre for Epidemiology and Population Health
Australian National University,
Canberra, Australia 0200

Medical Director, Benevolent Organisation for Development, Health and Insight
(BODHI)

Introduction:

Life and many physical aspects of the oceans are changing at a rate which is extraordinary in its speed and scale. Many of these changes are due to human action, and hence can be influenced at least in part. These changes illustrate impermanence, but they should not be observed passively, because of their immense implications for current and future human well-being, not to mention the health of many ocean species. Because of this, it is here argued that Buddhists have a duty to exercise wisdom and compassion, and to act where they can to slow these changes. Ways by which Buddhists may act include by becoming informed, educating others, and engaging in right consumption. In some cases Buddhists may wish to participate in social action to stop the most egregious harms.

The loss of unimaginable treasures

About 70% of Earth's surface is covered by water, thus justifying the name of the watery planet. Until recently the seas and oceans teemed with an incredible variety of life, which to many seemed indestructible. Thomas Huxley, one of the most famous scientists of the 19th century, exemplified this complacency. He wrote: "The cod fishery, the herring fishery, the pilchard fishery, the mackerel fishery, and probably all the great sea fisheries, are inexhaustible, that is to say that nothing we do seriously affects the number of fish".¹ Huxley published this just at the start of industrial fishing, led by the deployment of the first steam-powered trawlers in the seas around England.² Today, the oceans still teem with life, but the nature of that life is changing fast, and mostly in ways that are harmful to human health, human well-being, and to long-lived ocean species.

It is impossible for us to imagine the scale and nature of the ecological riches that have vanished from the ocean and coast. Christopher Columbus in 1493 described the Caribbean, even though already populated by humans for millennia, as a "paradise" rich in natural resources.³ When the Italian adventurer John Cabot first sailed to the cod fishery in the Atlantic Ocean in 1497 off the coast of the now Canadian province of Newfoundland his crew declared: "the sea there is full of fish that can be taken not only with nets but with fishing-baskets, a stone being placed in the basket to sink it in the

¹ T. Huxley, *Nature* **23**, 607 (1881).

² J. A. Anticamara, R. Watson, A. Gelchu, D. Pauly, *Fisheries Research* **107**, 131 (2011).

³ J. Mercer, D. Dominey-Howes, I. Kelman, K. Lloyd, *Environmental Hazards* **7**, 245 (2007).

water”.⁴ Jackson et al (2001) lament how: “place names for oysters, pearls, and conches conjure up other ecological ghosts of marine invertebrates that were once so abundant as to pose hazards to navigation, but are witnessed now only by massive garbage heaps of empty shells”.⁵

Traces of those marine riches are rapidly disappearing, even though a few remote coral reefs (especially in the “Coral Triangle” in the Indo-Australian Archipelago) still possess great colour and diversity of lifeforms. A root cause of the human raiding and transformation of the ocean is the growth in human population size, now almost seven thousand million, and still expanding by 70 to 80 million each year. This growth in human numbers has of course been facilitated by technological innovation and by the exploitation of vast supplies of energy removed from Earth’s crust — principally oil, gas, coal and uranium. In turn, innovation and cheap energy are being used to detect, catch, freeze and transport food from oceans all over the world, mostly to feed the quarter of the world’s population which is most affluent.

Fishing effort: using a fleet of bulldozers to flatten a mountain

For centuries, the dominant predator in the ocean has been our species, *Homo sapiens*. Today, this pillage continues with little abate, though with an ever increasing documentation. In 2006, three leading fisheries experts wrote that the human interaction with fisheries resemble “wars of extermination”.⁶ Human fishing pressure is a potent evolutionary force that has changed the size at maturation of many fish, in ways that may be difficult to reverse.⁷

Human “fishing effort” has greatly expanded, due to many innovations and cheap energy. Fishing effort was estimated in 2002 to exceed the rate which would maintain ocean fish stocks at their then level by a factor of three to four.⁸ Innovations which have contributed to the inadvertent effort to destroy the wealth it was designed to seek include refrigeration, radar, echo-sounder, global positioning systems and the use of “mother ships” which can remain at sea for months. The race to plunder the oceans has been called the “tragedy of the commons”. This is discussed later in this paper.

As wild fish stocks decline, an increasing fraction of this still-increasing fishing effort is subsidized from other parts of the economy. The most recent report of the Food and Agricultural Organisation of the United Nations (FAO) found that 85% of wild fishstocks

⁴ H. Pringler, *Canadian Geographic*, (1997).

<http://www.canadiangeographic.ca/specialfeatures/atlanticcod/cabot.asp>

⁵ J. B. C. Jackson *et al.*, *Science* **293**, 629 (2001).

⁶ D. Pauly, R. Watson, J. Alder, *Philosophical Transactions: Biological Sciences* **360**, 221 (2005).

⁷ A. M. de Roos, D. S. Boukal, L. Persson, *Proceedings of the Royal Society B* **273**, 1873 (2006).

⁸ D. Pauly *et al.*, *Nature* **418**, 689 (2002).

were either fully or “over” exploited. Twelve percent were “moderately” exploited, leaving only 3% as “under-exploited”.⁹

Some fish species most valued by humans are now endangered such as cod and bluefin tuna. These fish are high on the “food chain”, because in turn they prey on zooplanktivorous fish such as sardines and herring. The collapse of the Grand Banks cod fisheries (the same one described by Cabot in the 15th century) is especially well documented. Here, the cod stocks have largely been replaced by invertebrates, and there are fears that the cod will not recover, even though fishing pressure has been greatly reduced. However, fisheries in other locations have recovered, such as the herring fishery in the North Sea, following a four year moratorium in the 1980s.¹⁰

Tuna are highly prized for sushi in Japan and elsewhere. For several years, activists have been concerned that Atlantic bluefin tuna (*Thunnus thynnus*) will share the fate of Atlantic cod. These are remarkable long-lived creatures which weigh up to 900 kilograms and regularly make transoceanic migrations, including to actively hunt in frigid high latitudes.¹¹ However, bluefin tuna populations in both the Atlantic and Mediterranean are now less than 15% of their historic levels. In 2008, the International Commission for the Conservation of Atlantic Tuna voted for a quota of 22,000 tonnes, far more than the level recommended as sustainable by its scientific advisers (15,500 tonnes.) The commission also rejected scientific advice to protect fragile spawning areas in May and June. Disturbingly, it was also alleged that the European Union had threatened developing states with trade retaliations if they supported mechanisms to protect tuna.¹²

Until recently, Pacific tuna stocks have been considered to face less risk than their Atlantic relatives. However a single adult Pacific bluefin tuna can sell for US\$100,000 or more, creating immense pressure for their slaughter. Toshio Katsukawa, a leading Japanese fisheries expert, has recently warned that Japanese boats are increasing their target of the Pacific tuna spawning grounds, contributing to risk of this fishery collapse.¹³

In summary, though the global stocks of fish are immense, like a mountain, there is a relentless drive to reduce the size of this mountain, by using a fishing fleet of bulldozers. Today, a staggering amount of fish (over half of the total wildcatch) is raised by aquaculture, both on land and in coastal areas. This is encouraging, but it has not yet stopped the pillage of the wild fisheries. Furthermore, a substantial fraction of wild fishcatch is used to feed piscivorous (carnivorous) species in aquaculture, such as salmon and tuna. To date tuna cannot be bred via aquaculture, though some progress has been made.¹⁴ However, they can be “ranched” using juvenile wildcaught fish, in turn fed with

⁹ FAO, “State of the World’s Fisheries and Aquaculture 2010” (Food and Agriculture Organization of the United Nations, 2010).

¹⁰ D. Pauly et al., in *Ecosystems and Human Well-Being: Current State and Trends*, R. Hassan, R. Scholes, N. Ash, Eds. (Island Press, Washington DC, 2005), vol. 1, pp. 477-511.

¹¹ C. Safina, D. H. Klinger, *Conservation Biology* **22**, 243 (2008).

¹² N. Williams, *Current Biology* **18**, R1110 (2008).

¹³ D. Cyranoski, *Nature* **465**, 280 (2010).

¹⁴ S. Masuma, T. Takebe, Y. Sakakura, *Aquaculture*, (in press).

other fish that are caught in the wild, or farmed. The mountain is diminishing and the number and power of the bulldozers is growing.

There is a growing global conservation movement, especially for the most charismatic species, such as tuna, whales and turtles. This has led to limited fishing bans, efforts to preserve habitat and calls to reduce fishing effort.¹⁵ But while the size of protected marine areas is increasing, the rate is not fast enough to reverse the increased fishing effort. Furthermore, considerable illegal fishing occurs.¹⁶ And many additional threats are emerging to the oceans.

The Anthropocene and its diverse threat to the oceans

The process by which humans are continuing to accelerate the transformation of the land, seas and atmosphere has been called the “Anthropocene”. This term, coined about ten years ago, is meant to invoke the idea that since about 1800 CE (about the year 2340 in the Buddhist era), at the start of the Industrial Revolution, human activity is on such a scale that it should be considered a new geological force.¹⁷ In the oceans, these Anthropogenic processes extend beyond changes to fishstocks and other forms of life to include several physical changes.¹⁸ These include increasing ocean temperatures, increasing acidity, and coastal algal blooms and “dead zones”.¹⁹ Increased ocean stratification may result in less vertical oceanic mixing, possibly leading to localized falls in oxygen levels, further stressing marine life.²⁰

The ocean is warming, together with the atmosphere, because of the human release of greenhouse gases such as carbon dioxide and methane, the burning of fossil fuels and the clearing of forests. These contribute to both a rise in sea level and to the melting of glaciers that come into contact with warmer water. Warmer temperatures also influence the distribution of marine species, including of some organisms that cause human disease.²¹ Rising ocean temperatures also affect weather systems, storm intensity and the climate on land. Warmer oceans in tropical regions cause “coral bleaching”²² and have been linked with a decline in phytoplankton production of about 1% per annum over the last 30 years. Phytoplankton are crucial to marine ecosystems.²³ Finally, excessive carbon dioxide permeating the ocean will make sea water more acidic. This is predicted to harm surface corals and other forms of life.²⁴

¹⁵ B. Worm *et al.*, *Science* **325**, 578 (2009).

¹⁶ F. Berkes *et al.*, *Science* **311**, 1557 (2006).

¹⁷ W. Steffen, P. J. Crutzen, J. R. McNeill, *Ambio* **38**, 614 (2007).

¹⁸ T. Tyrrell, *Philosophical Transactions of the Royal Society A* **369**, 887 (2011).

¹⁹ R. J. Diaz, R. Rosenberg, *Science* **321**, 926 (2008).

²⁰ R. F. Keeling, A. Körtzinger, N. Gruber, *Annual Review of Marine Science* **2**, 199 (2010).

²¹ J. B. McLaughlin *et al.*, *New England Journal of Medicine* **353**, 1463 (2005).

²² E. L. Peñaflo, W. J. Skirving, A. E. Strong, S. F. Heron, L. T. David, *Coral Reefs* **28**, 841 (2009).

²³ D. G. Boyce, M. R. Lewis, B. Worm, *Nature* **466**, 591 (2010).

²⁴ T. Tyrrell, *Philosophical Transactions of the Royal Society A* **369**, 887 (2011); S. C. Doney, V. J. Fabry, R. A. Feely, J. A. Kleypas, *Annual Review of Marine Science* **1**, 169 (2009).

Corals, cod and jellyfish: ecosystems vulnerable to integrated human-driven change

Marine ecosystems face additional threats. Tropical corals are threatened not just by increased temperatures (causing coral bleaching), but by pollution from agricultural and industrial runoff. Marine life is threatened by oilspills, such as in the coastal areas of Nigeria and in the Gulf of Mexico. Hypersalinity, a consequence of desalination plants, especially in the Persian Gulf is also likely to be problematic. Overfishing, especially of “ecological suites”, that is, species which perform specialised roles,²⁵ also harms marine ecosystems. For example, several species of fish (planktivores) specialise in eating plankton in coral reefs. Multiple species performing this function provide a form of ecological insurance. Corals can thrive with plankton, but normally the quantity of plankton is limited by fish species that graze on the plankton. The complete loss of *one* planktivorous species will not necessarily lead to a plankton bloom, if other planktivores remain. But the loss of the last population in a functionally related group will have a major ecological effect. Coral fisheries in the Caribbean have a low representation of such species and are thus vulnerable to plankton overgrowth with other harmful flow-on effects.

Corals are also threatened by physical and chemical attacks, such as from blasting with explosives and the use of cyanide to kill fish. Blasting is commonly performed by impoverished populations with access to corals, particularly in Southeast Asia²⁶ and along the East African coast.²⁷ Blast fishing creates large fields of dead coral rubble where new coral recruits settle but cannot thrive.

Changes in ecosystems, including through overfishing, temperature change and pollution, can also cause other forms of ecosystem shifts, some of which may be irreversible. For example overfishing can create conditions for invertebrate sea life to multiply as more food becomes available, and as fish that normally eat invertebrate fish become scarce. The fisheries expert Boris Worm laments how the “the formerly fish-rich Benguela upwelling system off Namibia is now dominated by millions of tons of jellyfish”.²⁸

Jellyfish are often unwanted, and there are concerns that their populations are expanding. Jellyfish blooms can burst fishing nets, block water inlets to power stations and frighten off tourists. They also consume fish eggs and larvae.²⁹ Increased jellyfish numbers are caused by several factors in addition to the overfishing of their predators and competitors. These other factors include climate change, habitat modification and the inadvertent release of jellyfish from ballast water, along with their deliberate release for aquaculture,

²⁵ D. R. Bellwood, T. P. Hughes, C. Folke, M. Nyström, *Nature* **429**, 827 (2004).

²⁶ K. M. Haisfield, H. E. Fox, S. Yen, S. Mangubhai, P. J. Mous, *Conservation Letters* **3**, 243 (2010).

²⁷ M. Guard, M. Masaiganah, *Marine Pollution Bulletin* **34**, 758 (1997); J. E. Cinner, *Environmental Conservation* **36**, 321 (2009).

²⁸ B. Worm, *Science* **314**, 1546 (2006); C. P. Lynam *et al.*, *Current Biology* **16**, (2006).

²⁹ C. P. Lynam *et al.*, *ibid.*

especially in Asian coastal waters,³⁰ where they have been eaten by humans since at least 300 CE. On the positive side, Leatherback turtles, another endangered, charismatic species,³¹ also eat jellyfish.³²

In the Atlantic, the once fabled cod fisheries have also been replaced by invertebrates such as shrimp, crabs, and lobster.³³ This fishery is still valuable, and much more highly prized than jellyfish. Numbers of invertebrate fisheries are increasing worldwide. But they too will need to be better regulated to reduce the chance that overfishing, climate change and other human effects impair them.³⁴

Kamma, the political economy of the oceans and the tragedy of the commons

The oceans are part of an Earth system which is besieged, threatened by a mentality, technology and human population with the means to undermine numerous life support systems.³⁵ A tiny but powerful fraction of the world's population acts vigorously to obstruct efforts to slow climate change and other aspects of Earth system failure.³⁶ One such actor is the oil corporation BP, largely responsible for the 2010 oilspill in the Gulf of Mexico. But corporations are assisted by a public which is very often quiescent, and even acquiescent in this process. Too few people, including Buddhists, understand the connectivity of the global system. Thus, when a forest, coral reef or charismatic species is lost, few pay attention — until something we value is lost, on our own doorstep. From a kammic perspective, it seems beneficial to develop awareness and to campaign to protect global public goods, such as the climate, energy stocks and fisheries.

An example of this connectivity may be evident in the increased piracy off Somalia, a nation whose fisheries have collapsed since the failure in 1991 of effective governance in that north east African nation. Somalia's fisheries have been repeatedly raided by foreign fleets, including from Europe.³⁷ Illegal fishing fleets displaced much of the local, less capital intensive industry, leading to worsening Somali poverty, lost livelihoods, and a scarcity of locally available marine protein. This conjunction of events is a highly plausible underlying factor for the great increase in Somalian piracy, most of which

³⁰ J. E. Purcell, S.-i. Uye, Wen-Tseng, *Marine Ecology Progress Series* **350**, 153 (2007); A. J. Richardson, A. Bakun, G. C. Hays, M. J. Gibbons, *Trends in Ecology and Evolution* **24**, 312 (2007).

³¹ P. J. Ferraro, H. Gjertsen, *Chelonian Conservation and Biology* **8**, 48 (2009).

³² A. J. Richardson, A. Bakun, G. C. Hays, M. J. Gibbons, *Trends in Ecology and Evolution* **24**, 312 (2007).

³³ B. Worm, R. Myers, *Ecology* **84**, 162 (2003).

³⁴ S. C. Anderson, J. M. Flemming, R. Watson, H. K. Lotze, *PLoS One* **65**, 2553 (2011).

³⁵ L. Brown, *World on the Edge*. (Earthscan, London, 2011); C. D. Butler, *Global Change and Human Health* **1**, 156 (2000).

³⁶ N. Oreskes, E. M. Conway, *Merchants of Doubt: How a Handful of Scientists Obscured the Truth on Issues from Tobacco Smoke to Global Warming*. (Bloomsbury Press, New York, 2010), pp. 368.

³⁷ M. G. Hassan, A. Mwangura, "IUU fishing and insecurity impacts on Somali fisheries and marine resources" (Chatham House, 2008).

involves Somalian fishermen.³⁸ Piracy, kidnapping and ransoms which target comparatively wealthy ships off the Somalian coast, have received substantially more attention than this earlier form of international piracy, where the victims were poor Somalis. This sequence also appears to illustrate collective karma.

The “tragedy of the commons” was first advanced concerning the oceans.³⁹ In pessimistic formulations of this theory, the common resources of the ocean were considered highly vulnerable, because they could not be fenced. Hence, it was argued, it served the self-interest of those parties who were the most aggressive and earliest to raid marine and other common resources, whether of fish, the atmosphere, fossil energy supplies, or of forest products, because to hold back was to risk seeing a competitor appropriate an unfair share of the resource. There is much evidence to support this principle, not only for fish but also for the global supply of fossil fuels, other crucial substances such phosphate and the climate system. On the other hand, critics of the tragedy have pointed out how often the commons have historically been protected by good governance,⁴⁰ and that this could evolve again, even for global public goods.

A role for Buddhists in the protection of marine resources

The harvest of marine food (even seaweed) involves killing, yet provides valuable nutrients and livelihood, especially important for coastal and island populations. Buddhists may regret the suffering caused to other species by such killing, but should reflect on an even larger scale of violence inflicted upon the ocean. Four principles are here suggested (see box)

.1. All species deserve respect but not equal respect. Land animals used for food, such as cattle, sheep, kangaroos and chickens, have consciousness and experience pain and emotion.⁴¹ Their killing for human food is clearly a cause for human regret and animal pain. However, such species are not endangered, in contrast to many marine species, including some with high intelligence. Prominent among these are cetaceans, marine mammals which include whales, dolphins, porpoises and dugongs. Endangered and intelligent marine mammals deserve to be treated with more respect than other species, just as there is surely less kammic harm involved in the killing of a mosquito compared to a primate. However, invertebrates also have consciousness; some octopi have even been shown to use tools.⁴² All species deserve respect; if killed for food then gratitude is due.

³⁸ R. Middleton, “Piracy in Somalia. Threatening global trade, feeding local wars” (Chatham House, 2008); M. A. Waldo, (2009) The two piracies in Somalia: why the world ignores the other? http://www.imcsnet.org/imcs/docs/somalias_twin_sea_piracies_the_global_aramada.pdf

³⁹ H. S. Gordon, *Journal of Political Economy* **62**, 124 (1954); G. Hardin, *Science* **162**, 1243 (1968).

⁴⁰ S. J. Buck, *Environmental ethics* **7**, 49 (1985); E. Ostrom, *Journal of Economic Perspectives* **14**, 137 (2000).

⁴¹ J. Panksepp, *Science* **308**, 62 (2005).

⁴² J. K. Finn, T. Tregenza, M. D. Norman, *Current Biology* **19**, R1069 (2009).

The deliberate, large scale hunting of cetaceans by people replete with food, such as sections of the Japanese, Norwegian and Icelandic populations, deserves censure. Whales are long-lived, intelligent species that do not harm, threaten or directly compete with humans for fish, as they eat plankton or are benthic (bottom) feeders. Many cetaceans are heavily contaminated by persistent pollutants and metals such as mercury. A plea is made here to avoid eating and to end the hunting of cetaceans, especially those species that are endangered and that are killed using particularly cruel methods as documented in the film 'The Cove'.⁴³ Dolphins, including Killer whales (*Orcinus orca*) do eat fish, but because of their high intelligence⁴⁴ should not be considered preferred food for humans, given the abundance of other available food. Ric O'Barry, trainer of the famous dolphin Flipper, now regrets his role in that training. He believes that the capture of dolphins and their use for entertainment is cruel and is actively campaigning against such practices.⁴⁵

Buddhists can act collectively to influence wider society concerning the principle that all species deserve respect, even in countries whose people appear indifferent. Activists who oppose the clubbing of dolphins and factory-killing of whales in solidarity with all life forms should not be vilified, censored and labeled as anti-nationalist, as in Japan, a country in which Buddhism is widely practised. Buddhists should support campaigns to eliminate these practices and call for a fairer interpretation of Japanese laws, for example the treatment of the "Tokyo two" (Junichi Sato and Toru Suzuki) who exposed corruption in the taxpayer-funded Japanese whaling industry.⁴⁶ They intercepted whale meat, allegedly embezzled by whaling crews programme, and called for a public prosecutor. Paradoxically, it was the activists who were investigated, with the Toyo Two held for 23 days without charge before being charged with trespass and theft. This action infringes the United Nations' International Covenant on Civil and Political Rights (ICCPR), which Japan has signed and ratified. Such treatment also sends what the European Court of Human Rights calls a 'chilling effect', an attempt to discourage the peaceful dissent integral to a free and open society.⁴⁷

The early abandonment of the 2011 "scientific" whale hunt has been suggested to indicate that a generational, attitudinal shift may be underway in Japan, even if driven as much by health fears as compassion. The new tactics of the Sea Shepherd Conservation Society probably played a role, including by making whale hunting more costly.

2. Protection of resources for future human generations. Practices such as "bottom-scouring", ghostnets and coral blasting and should be censured, even if practiced by people who are desperately poor. Coral blasting harms future fish catches by damaging coral structures. Instead, Buddhists should lobby for a greater use of aquaculture and for

⁴³ <http://www.thecovemovie.com/>

⁴⁴ R. C. Connor, *Philosophical Transactions of the Royal Society B* **362**, 587 (2007).

⁴⁵ <http://savejapandolphins.org/blog/post/an-early-end-to-japans-whaling-season-and-what-it-means-for-dolphins>

⁴⁶ D. Voorhoof, S. Gutwirth, (2010). Activism is not a crime
<http://www.abc.net.au/unleashed/34694.html>

⁴⁷ D. Voorhoof, S. Gutwirth, *ibid.*

practices which will reduce poverty, thus lowering the incentive for poor people to use crude techniques which will impair future livelihoods and well-being.

Similarly, bottom scouring harms small and microscopic marine life which is necessary to maintain a viable food web. Ghost driftnets cause extreme harm without even benefiting humans. Though now banned, giant drift nets still float like ghosts, trapping both valuable fish and unwanted “bycatch”. The over-fishing of endangered species such as bluefin tuna also inflicts violence on future human generations, who should also be able to benefit from sustainable consumption of these species. Buddhists, even if fish eaters, should not consume such fish, including tuna, unless they know that the tuna fishery is sustainably managed. Aquaculture is growing rapidly. Although it too is not without risks, in general the consumption of aquaculture products entails fewer ecological and ethical risks than the consumption of wild fish, unless from well-managed, sustainable fisheries.

3. Other forms of right fish consumption. Some fishing industries exploit human beings as well as marine resources. A recently documented example involves the use of Thai captains and boats with foreign crews — particularly from Myanmar — which are effectively enslaved.⁴⁸ Where possible, fish caught by such boats should not be purchased or eaten, in order to reduce the economic incentives for fishing practices that rely on human slavery and exploitation. Existing laws which outlaw slavery should be adhered to and enforced. The practice of finning sharks and then returning them to die in pain in the oceans is cruel and wasteful.⁴⁹ Buddhists can have an impact on this practice by avoiding the consumption of sharkfin products.

Other forms of right consumption. Buddhists should in other ways practice ethical consumption that minimizes harming the oceans. Other examples include a conscious reduction in their use of fossil fuel, in order to slow global warming, ocean acidification and also to reduce incentives to drill oil from the sea-floor. Buddhists should also contribute to the development and use of less harmful forms of energy (eg wind and solar), and in many other ways accelerate the “sustainability transition”. Another way to do this is for Buddhists to have, on average, two children or less.⁵⁰

4. Buddhists should engage in collective social action. Humans are a social species; we live and interact in an “ocean” of social forces and collective behaviour, caused by the thoughts, memories and beliefs transmitted to the seven billion people alive today. Attempts by individuals to influence these immense forces are almost ineffectual; instead people who aspire to improve the world need to form and to participate in coalitions. Sometimes, it may appear that individual actions have had large effects (such as assassinations), however, usually such people are part of larger movements. Of course, not all collective social action is “right” or wise, such as cults like the Ku Klux Klan, or Aum Shinrikyo, Japanese terrorists whose members released the nerve gas sarin in a

⁴⁸ S. Powell, *The Australian* <http://www.theaustralian.com.au/news/executive-lifestyle/human-bycatch/story-e6frg8jo-1225940157820>, (2010).

⁴⁹ J. D. Metcalfe, *Journal of Fish Biology* **75**, 2855 (2009).

⁵⁰ C. D. Butler, *Public Library of Science Medicine* **1**, 192 (2004).

Tokyo subway in 1995. Indeed many nationalist traits, such as intolerance or warmongering are also harmful. Buddhists need always to practice discriminating wisdom.

Conclusion

Unless all of humanity, including those of us who are Buddhist, can learn to live within Earth's limits, then our future as a species is bleak.⁵¹ A central Buddhist teaching is to practice the Middle Path between the extremes of self-denial and indulgence. Another is to practice compassion. When searching for courage to attempt these reforms and practice these examples of self-restraint, we can recall that Buddha was a strong critic of the caste system in Brahmin India. Today, the caste system remains strong in India, but even stronger is a global form of caste (a "claste" system) in which the treasures of Earth are appropriated for the indulgence of a few.⁵² Buddhists should seek to reform this system and to resist behaviour encouraged by the small number of powerful people who are driving Earth and our civilisation towards a precipice.

Four principles by which Buddhists can slow destruction of the ocean

All species are not equal. Marine animals that are endangered, highly intelligent, contaminated by chemicals, or whose death involves extremely cruel methods should not be eaten, especially by populations who can afford other food sources.

Protect resources for future generations. Marine areas should not be overharvested, species such as tuna should be preserved in the wild, and ways to prevent blast damage to corals by very poor populations should be prioritized.

Right consumption of marine products should avoid the purchase and consumption of products that whose capture relies on exploited and even enslaved workforces. Numerous **other forms of right consumption** are also required to protect oceans, especially the avoidance of fossil fuels.

Finally, Buddhists need to **engage in social movements** that help to protect marine ecosystems and other forms of marine environments.

⁵¹ C. D. Butler, in *Global Recovery: The Buddhist Perspective*, K. Dhammasami, P. H. Dhammhaso, P. S. Vutthikaro, D. O. Peoples, Eds. (Mahachulalongkornrajavidyalaya University, Bangkok, Thailand, 2010), pp. 49-55.

⁵² C. D. Butler, *Global Change and Human Health* **1**, 156 (2000).